Direct ophthalmoscopy

- Fundoscopy = examination of the visible retina
- Perform on both eyes, then make a diagnosis
Anatomy
Ophthalmoscope head (one type)

- Looks into patient’s eye
- Lens strength selector wheel
- Bulb in here
- Connects to rheostat and handle containing batteries
- Viewing aperture (on other side)
- Selects white or green lens
- Selects light size, grid or cobalt blue
Before proceeding

- GRI P
  - Greet, rapport, introduce and identify, explain procedure
- Inform patient
  - Lights down and close curtains for a good view
  - Need to get close for a “good look”
  - Bright light may dazzle but not damaging
  - Patient to focus on a distant point (identify one for them)
- May need eye drops **(Not if driving or history of closed angle glaucoma)**
  - Tropicamide or cyclopentolate
  - Tropicamide takes 15-30 mins to work, lasts 1-2 hours

- Consider chaperone
Get ready!

- Check the ophthalmoscope works
  - Only use full power if necessary
    - Miosis and discomfort
- Set the lens to 0 power
- Remove patient’s and own spectacles
  - Unless you have a significant astigmatism
- Position the patient on a seat
  - You need access to both sides of the patient
  - Ensure patient is at a good working height
  - Can also be done with patient laying down
- Darken the room
Examine the patient’s right eye

- Rest left hand on patient’s forehead with thumb extended
- Hold ophthalmoscope in right hand and look through your right eye at patient’s right eye
- Examine for red reflex at arm’s length
  - Normal - red glow from choroid
  - Look for opacities or loss of reflex
  - Determine depth of obstruction by moving side to side
    - In front of pupil moves away from you
    - Behind pupil moves with you
    - In line of pupil - doesn’t move
Normal red reflex. Dilated pupil.
Cataract (black, spidery thing) obscuring red reflex
Fundoscopy – optic disc

- Move as close to the patient as possible
  - Rest the thumb of your left hand on your forehead
  - Focus on the fundus

- Find the optic disc
  - Follow a retinal vessel back (arrow sign)

- Examine the optic disc
  - Normal
  - Swollen/ blurred margins
  - Pale
  - Optic disc/ cup ratio
    - Can measure with grid
Normal

Blurred disc margin
Engorged, tortuous veins
Congested, pink disc
Disc swollen / raised

Papilloedema
Increased cupping
Cup:disc ratio $> 1/3$
= Glaucoma
Pale, featureless disc = optic atrophy (ischaemia, MS etc)
Fundoscopy - fundus

- **Colour**
  - Darker with pigmented skin or retinitis pigmentosa
  - Pale with arterial occlusion
- **Vessels in 4 quadrants** - arteries narrower and usually cross veins
  - Number
  - Straight or tortuous?
  - Colour and width
  - Light reflex
  - Points of crossing
- **Macula**
  - "look at light"
Fig. 24. A view of the fundus of the eye and of the retina in a patient who has retinitis pigmentosa.
Fundoscopy - pathology

- **Added features**
  - Haemorrhages or exudates
    - Green “red-free” filter makes haemorrhages easier to see
- **Hypertension**
  - A-V nipping, hard exudates, retinal oedema, arteriolar vasoconstriction, haemorrhages (rarely papilloedema)
- **Diabetes**
  - Cotton wool spots, blot haemorrhages, new vessel formation (laser burns if treated)
- **Glaucoma**
  - Optic disc cupping
Severe non-proliferative diabetic retinopathy

- Cotton wool spot
- Haemorrhage
- Hard exudates
- Microaneurysm
Proliferative diabetic retinopathy

Several small, friable new vessels forming around the optic disc.

If these rupture, the haemorrhage can lead to blindness
# International grading system for diabetic retinopathy

<table>
<thead>
<tr>
<th>Name</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>No diabetic retinopathy</td>
<td></td>
</tr>
<tr>
<td>Mild non-proliferative diabetic retinopathy</td>
<td>Microaneurysms only</td>
</tr>
<tr>
<td>Moderate non-proliferative diabetic retinopathy</td>
<td>More than microaneurysms but less than severe NPDR</td>
</tr>
<tr>
<td>Severe non-proliferative diabetic retinopathy</td>
<td>Any of the following:</td>
</tr>
<tr>
<td></td>
<td>&gt;20 microaneurysms in each 4 quadrants</td>
</tr>
<tr>
<td></td>
<td>definite venous beading in &gt;2 quadrant</td>
</tr>
<tr>
<td></td>
<td>prominent intra-retinal microvascular abnormalities in &gt;1 quadrant</td>
</tr>
<tr>
<td></td>
<td>no signs of proliferation</td>
</tr>
<tr>
<td>Proliferative</td>
<td>Definite neovascularization</td>
</tr>
<tr>
<td></td>
<td>Preretinal or vitreous haemorrhage</td>
</tr>
<tr>
<td>Clinically significant macular (o)edema</td>
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Laser photocoagulation
Hard exudates (cholesterol / lipid deposits)
Cotton wool spots (areas of ischaemic retina with resulting oedematous axons)
Hypertension

- Ghost vessel
- Haemorrhages
- Silver wiring
- AV nipping
Hypertension
Move on to the front of the eye

• Rack through the lenses and examine:
  – Vitreous
  – Lens
  – Iris
  – Cornea
    • Can look for ulcers with fluorescein drops and cobalt blue lamp
Dendritic ulcer (herpes virus) on the cornea stained with fluorescein eye drops and inspected with cobalt blue lamp
Corneal ulcer leading to iritis – corneal injection (red eye) hypopyon (pus in the anterior chamber)
Foreign body and cataract
Examine the left eye

- Left eye to left eye best
- If unable, extend patient neck and use your right eye from above
- Repeat all of the above
  - Red reflex
  - Fundus
    - Disc, colour, vessels, macula, added features
  - Vitreous
  - Lens
  - Iris
  - Cornea
Finishing your examination

- Switch the lights on
- Summarise your findings
- Try not to comment during examination itself
- You may be asked to make a diagnosis
- Remember, this is part of a full ocular examination
  - Fields, acuity, extraocular movements, pupillary reaction, external examination, colour vision
- Look at as many eyes as you can!
Further Reading

- For a detailed chapter on eye disease:
Hello, my name is Ashley Southall and I’m a third year medical student.
I’ve been asked to examine your eyes, would that be OK?
Could I start by checking your name and date of birth? Thank you.
Have you had this done before?
It involves me using this instrument here which is a bit like a microscope to look at the back of your eye.
It has a bright light on it which may dazzle you, but will not cause any damage.
Please let me know if it is uncomfortable and I will stop.
In order to see properly, I’ll have to make the room very dark and be very close to your head. Are you comfortable with that? You can have someone else in the room if you would like.
Ideally I would like to put some drops called tropicamide in your eyes to dilate your pupils so that I can see more. They make your vision blurry for a couple of hours and so you shouldn’t drive or operate machinery for that time. Is that OK? Do you suffer from glaucoma?
We just need to wait 30 minutes for the drops to work
I’m going to turn off the lights now. What I would like you to do is to focus on that point over there (far away point at eye level)
At various points my head may get in the way, if that happens please try and keep your eyes still and pretend your are still looking at that point.
You can blink as often as you like and don’t forget to breathe!
Is it OK if I rest my hand on the top of your head?
Can you look straight into the light for me?