

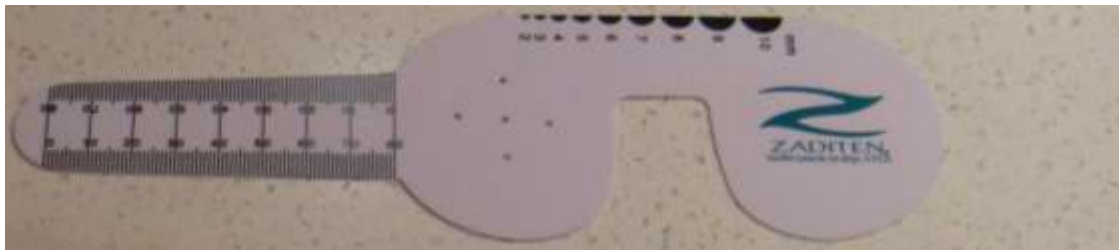
Eye Case Studies

Sean Every

1. Examination of the adult eye in General Practice
2. Examination of the paediatric eye in General Practice
3. Transient visual loss
4. The red eye
5. Flashes and floaters
6. Macular degeneration update

Minimum equipment requirement (= perfectly adequate)

- VA chart
- Pinhole/occluder
- Ophthalmoscope



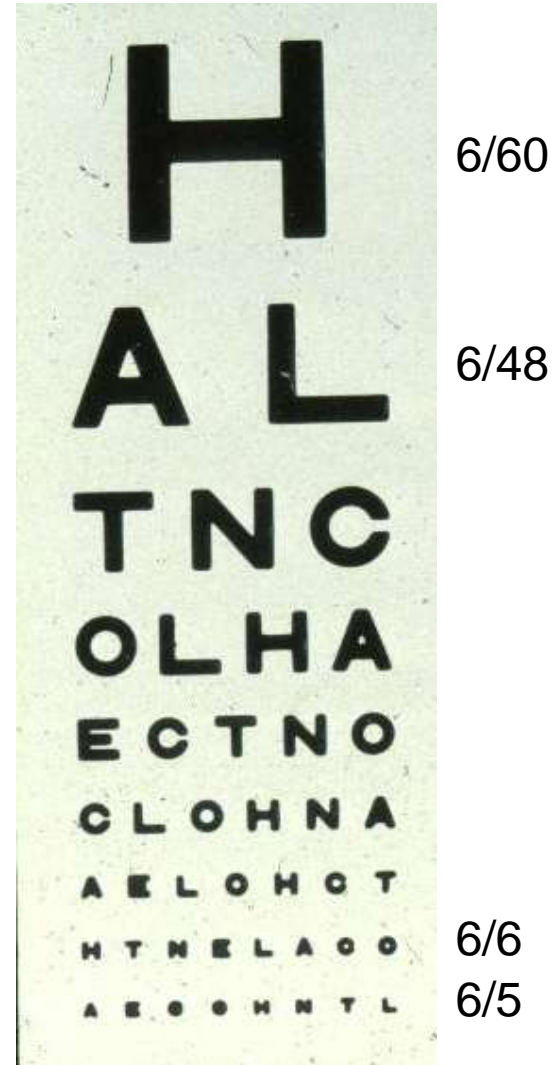
Minimum examination (=enough)

- Visual acuity (with pinhole test)
- Red reflex
- Pupil light response
- Observe ocular surface (pattern of redness)

- +/-
 - Funduscopy
 - Ocular alignment and motility
 - Visual fields

Testing VA

- Chart factors:
 - Well illuminated chart
 - Correct test distance
- Patient factors:
 - Have their distance correction on
 - Make sure they don't have their readers on
 - Ensure truly monocular test
- Recording the result
 - 6/6 vs 6/60?
 - Numerator = test distance
 - Denominator = lowest line on chart read





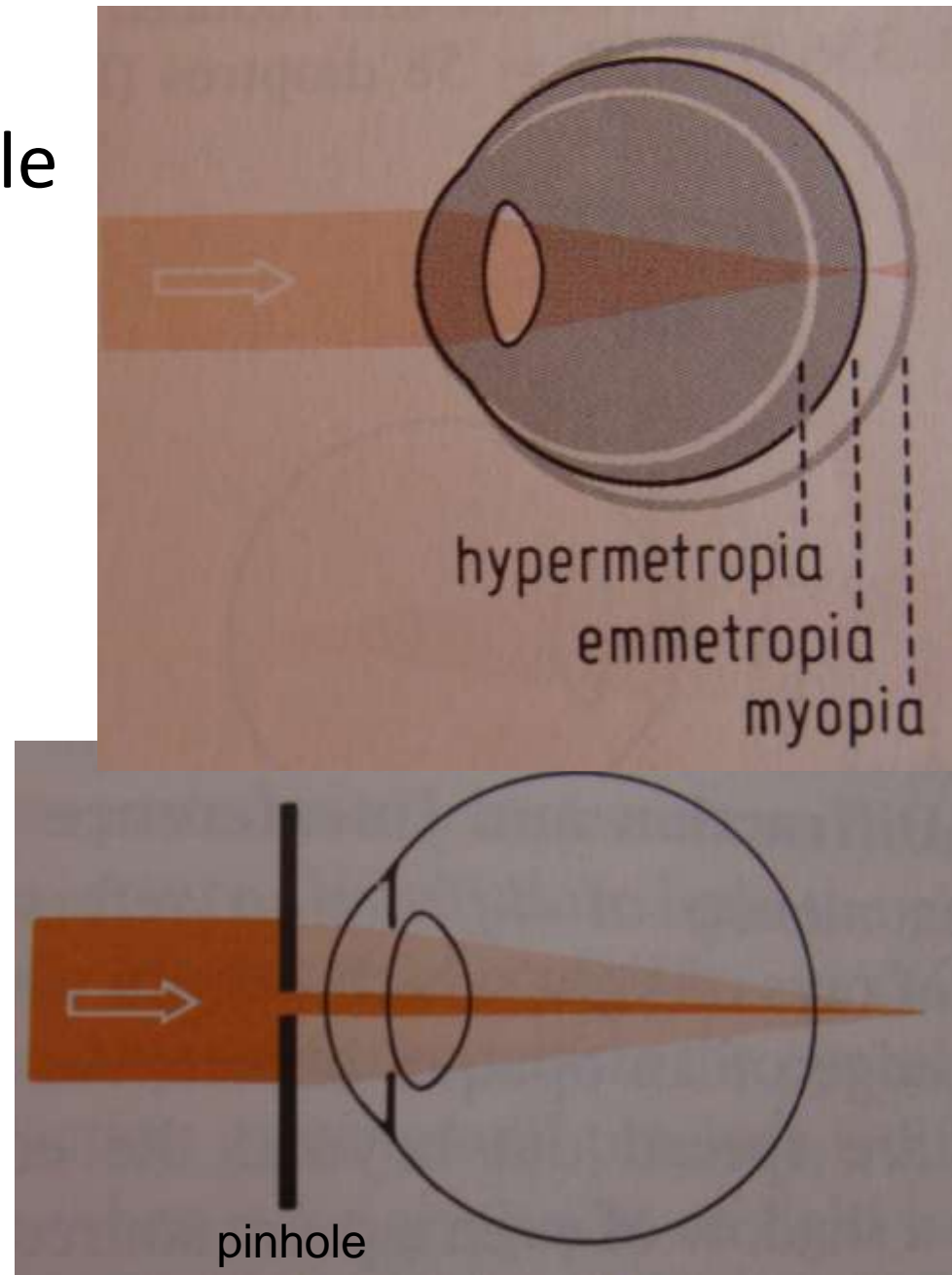
VA: *“I can’t read the top line Dr”*

1. Shorten the viewing distance
 - 3/60
 - 2/60
 - 1/60
2. Can you see my hand moving?
 - 6/Hand movements
 - 3/HM
3. Can you see the light I’m shining?
 - PL (perception of light)
 - NPL (no perception of light)



The secret of the pinhole

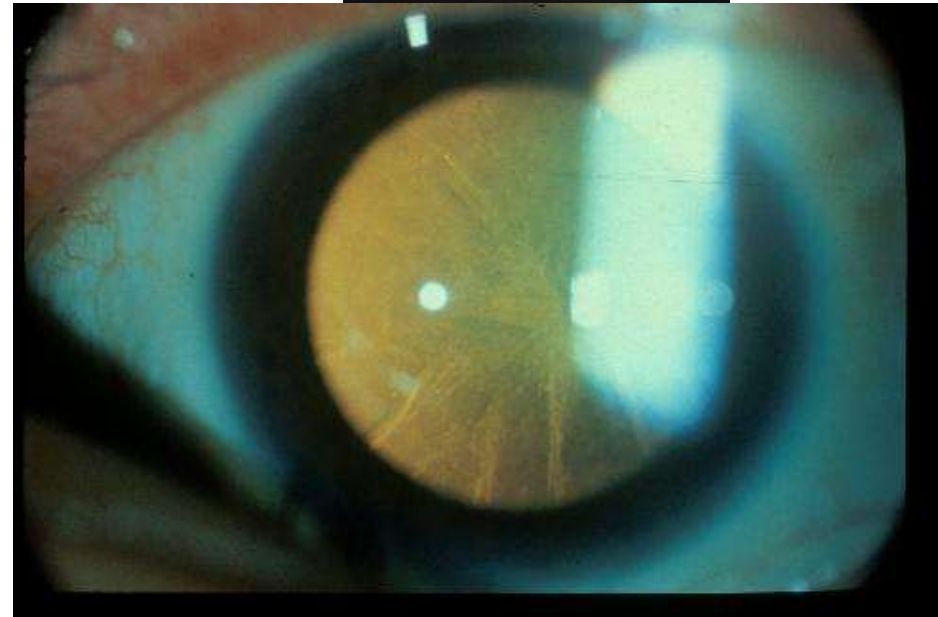
- Triages refractive error from other eye pathology
- VA improving with the pinhole implies refractive error – refer optometry



Using an ophthalmoscope

“what does the RED REFLEX mean”?

- the transparent ocular media are clear
 - Cornea (infection)
 - Aqueous (uveitis/blood)
 - Lens (cataract)
 - Vitreous (diabetic vitreous haemorrhage, vitreous detachment)
 - Retina grossly normal (retinal detachment)



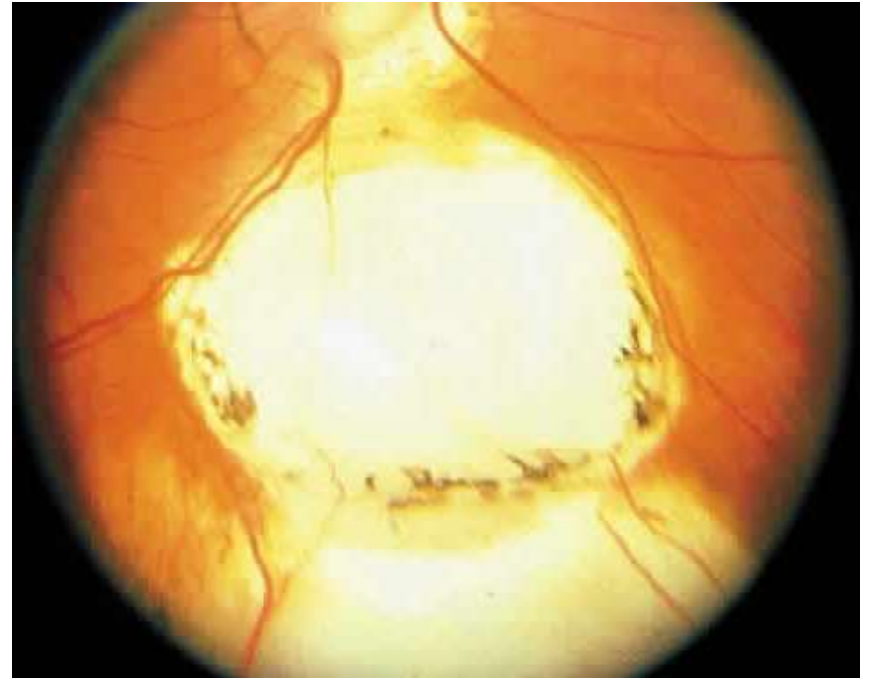
Using an ophthalmoscope

How to test the RR

- Dial 0
- Leave your distance glasses on
- Take your reading glasses off

Is that a normal RR?

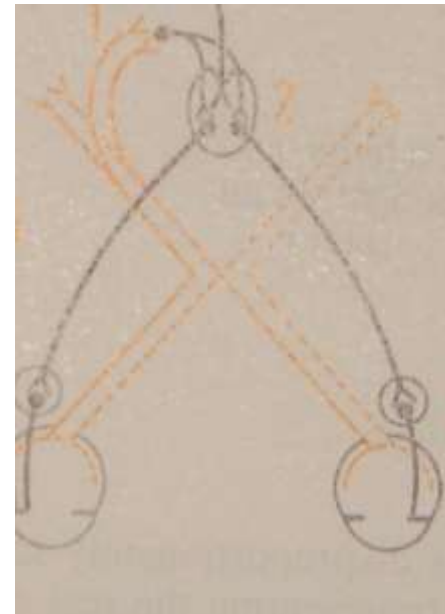
- Racial variations
- Compare symmetry
- Leukocoria



Pupil light response

(fix on distance target so not testing accommodative near response)

- It tests
 - Afferent:
 - Global retina/optic nerve function
 - Efferent:
 - Third cranial nerve
- Normally – shine light in one eye and get bilateral pupil constriction



Midbrain

Chiasm

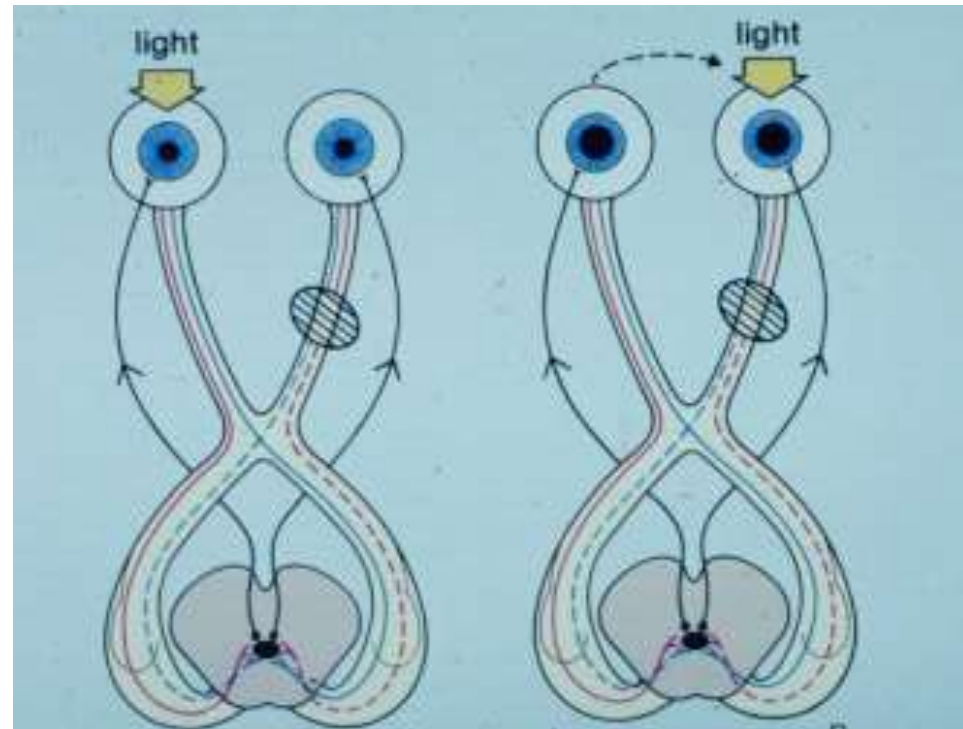
Eye

Testing pupil reactions to light

- Older people have smaller pupils – harder to see the light reaction
- Tips
 - Dim the room lights
 - Use a bright light

Relative Afferent Pupillary Defect (RAPD)

- The master class in testing pupils.
- The swinging flashlight test.
- Highlights subtle pathology in retina or optic nerve
 - Positive test when pupil dilates with light



Left relative afferent pupillary defect (RAPD)



Ophthalmoscope: Funduscopy

“...you won't see much unless you dilate”

- Don't be afraid to dilate
 - Can't recall a case of acute glaucoma caused by dilation
- Tropicamide 1%
- Phenylephrine 2.5%

- If dilating both eyes, caution regarding driving within 4 hours



Targeted examination based on history

- Diplopia (double vision)
 - Monocular diplopia: less concerning and probably blur
 - Tear film disturbance
 - Cataract
 - Refractive error
 - Binocular diplopia: the eyes are not looking in the same place – A significant symptom REFER

Visual Field examination

- Lots of different ways
- Easiest screen for people who can't follow instructions well
 - “look at my nose”
 - “keep your eye still”
 - “this is a test of the your peripheral vision”
 - “can you see all of my face”
 - *[repeat as necessary]*



2: Examination of the paediatric eye in General Practice

- Examination is age dependant
- Opportunistic
- Depends on child's cooperation

Equipment

ADULT

- VA chart
- Pinhole
- Ophthalmoscope

CHILD

- If pre-literate need an interesting visual target
 - (doesn't squeak)
- ~~Pinhole~~
- Ophthalmoscope
 - For RR and pupil reactions
 - Don't bother trying funduscopy

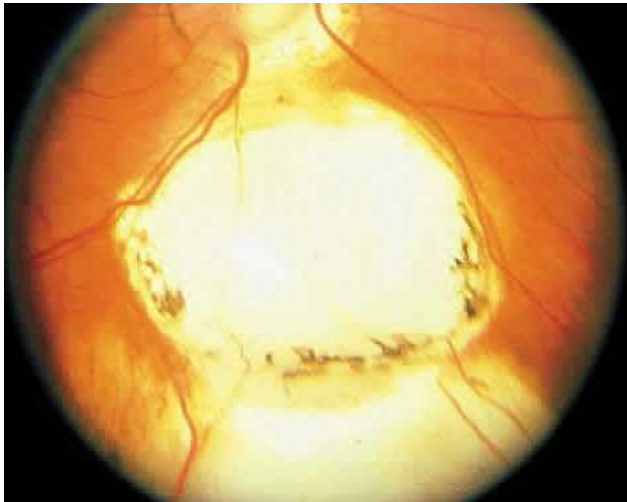
Testing acuity in children can be difficult

- <2 years
 - ability to fix and follow
 - objection to occlusion
 - pick up a small object
- 3-5 years
 - letter matching tests
 - Picture optotypes



Red reflex

- Leukocoria = white red reflex
 - retinoblastoma (1:20,000)
 - colobomas (defect in development of the eye)



Ocular alignment

Use the ophthalmoscope as a light source to show the corneal light reflexes – usually just nasal to centre of pupil



Right esotropia



Pseudo-esotropia

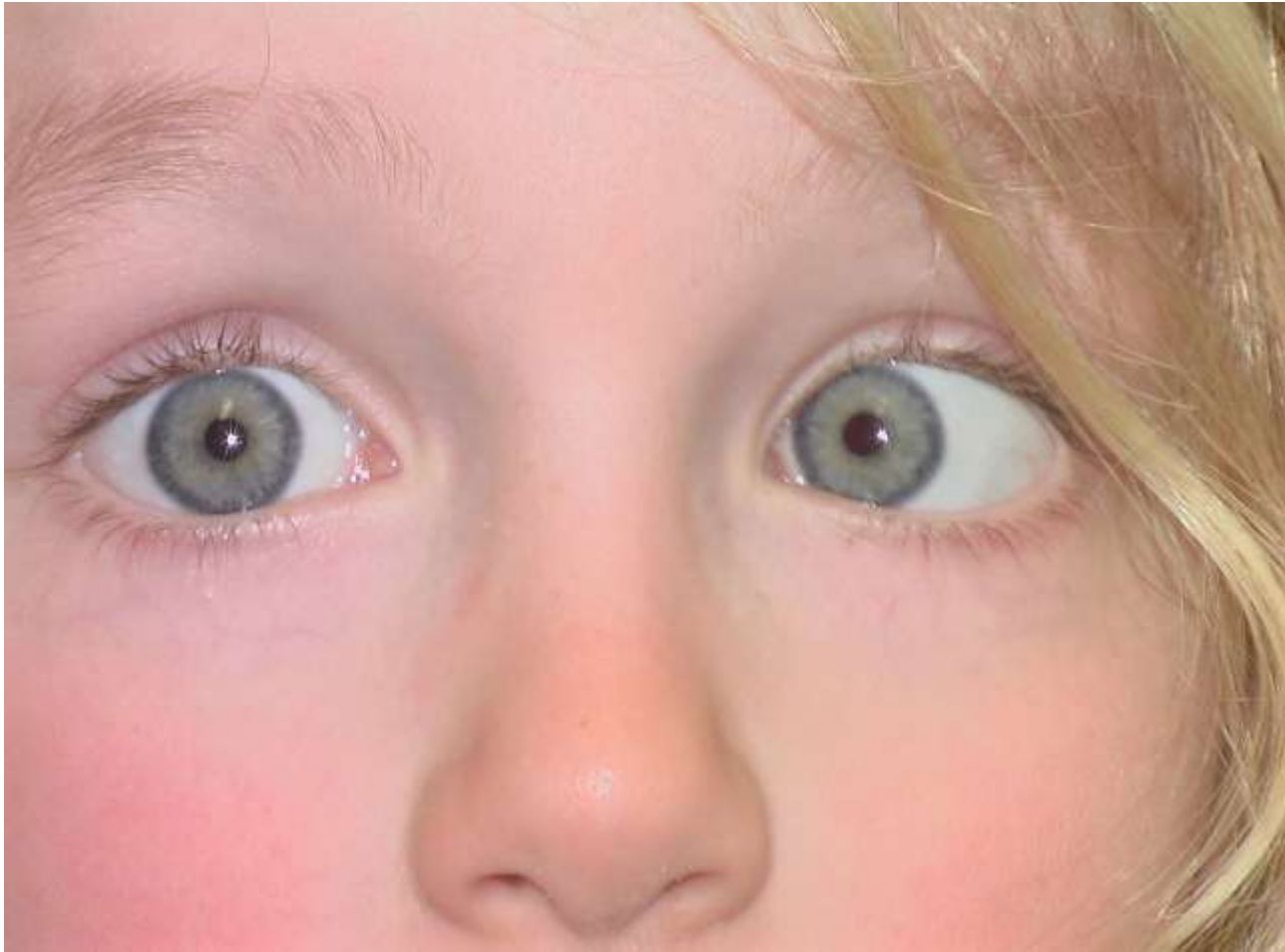
secondary to epicanthic folds



Exotropia (divergent)

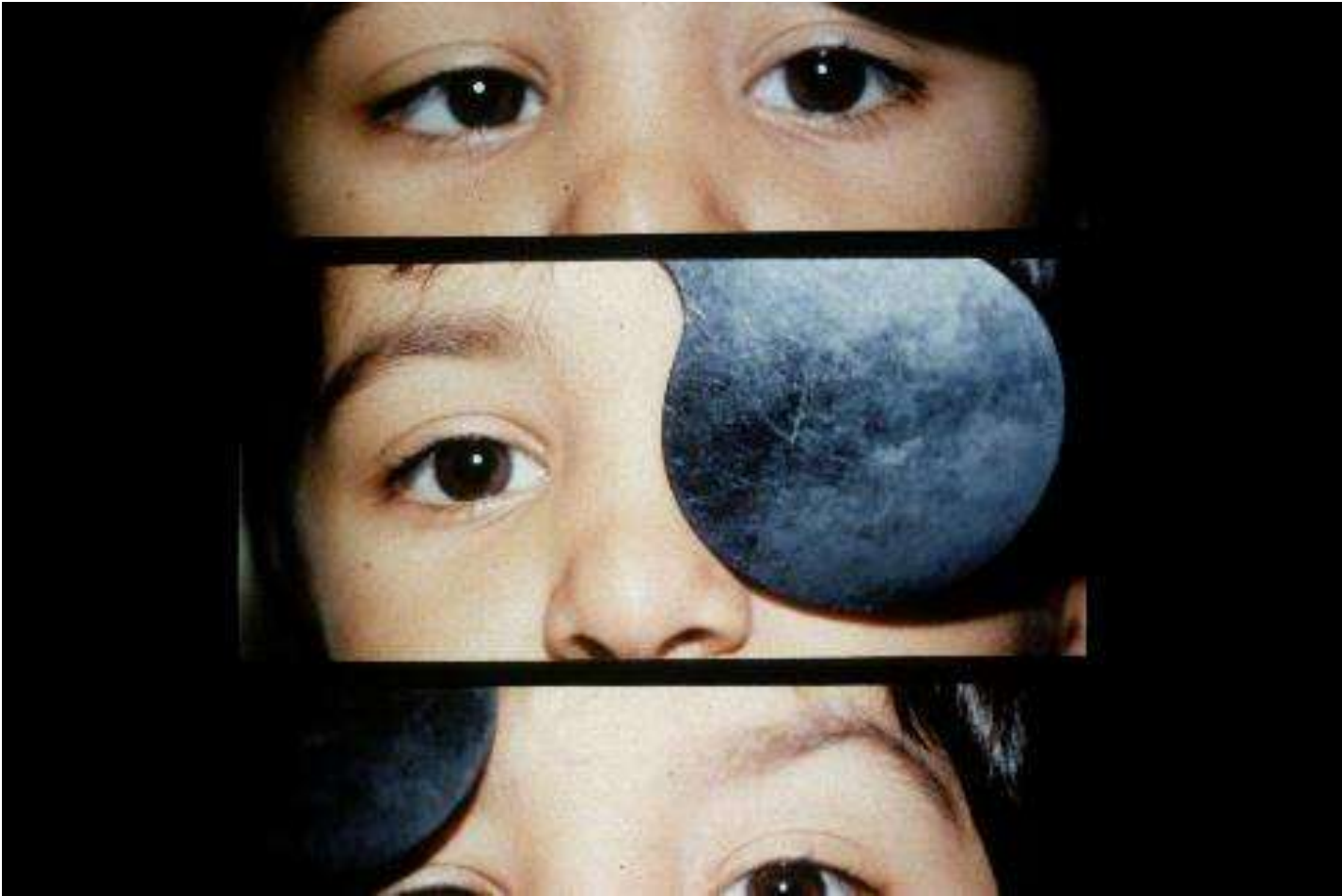


Left esotropia



With glasses. Straight





Cover – Uncover test

Left esotropia - fixates with right eye

At risk of left amblyopia



Initially right esotropia but can maintain fixation with both eyes. This implies no amblyopia



Transient Visual Loss

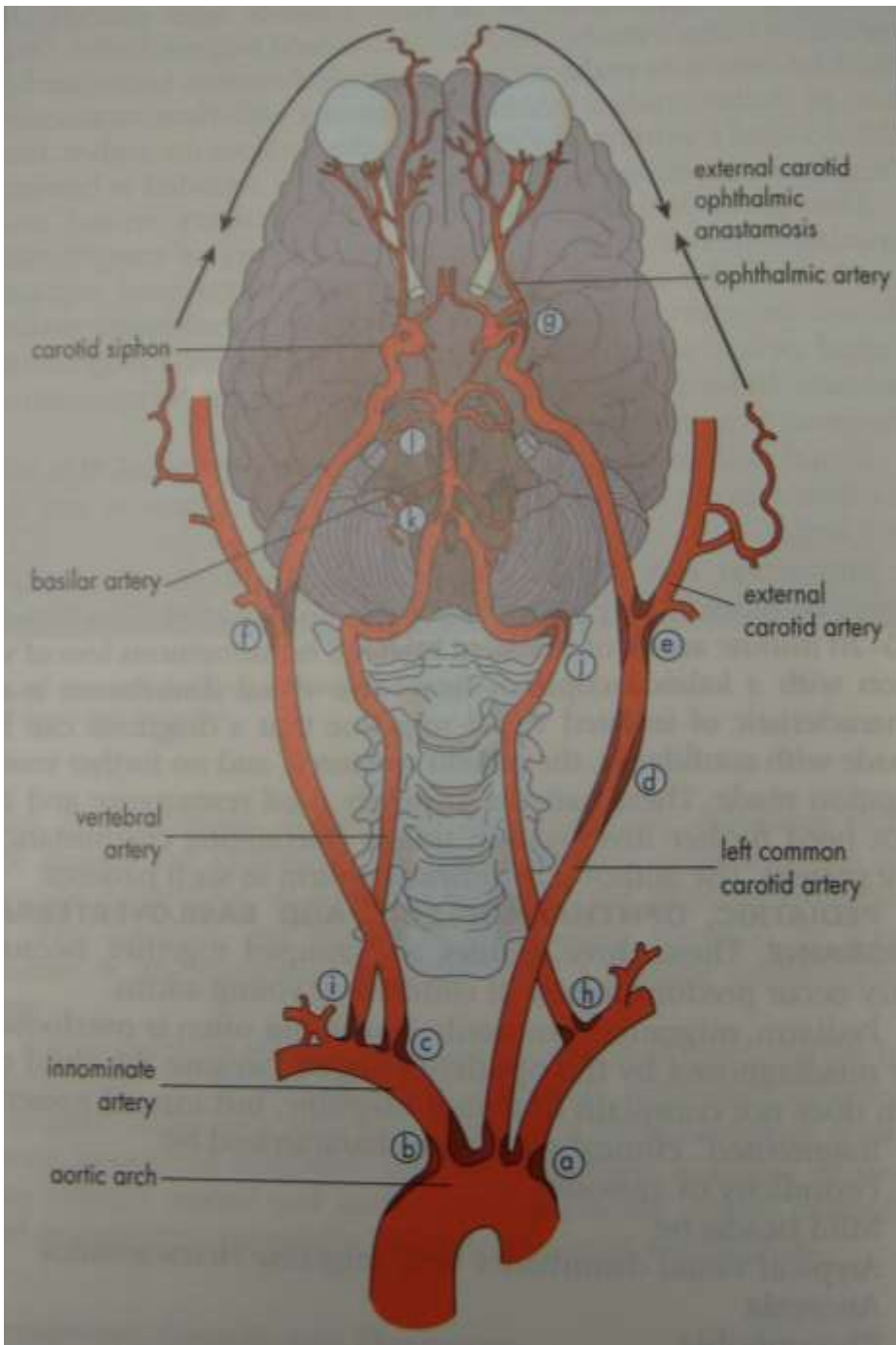
- Abrupt loss of visual function
 - Reversible (duration seconds to hours)
 - Loss of partial or full field of vision
 - Monocular or binocular
 - Associated features
- The history is the key as examination is often normal for GP and ophthalmologist

Mechanism

- Ischaemia
 - *Embolic* (cardiac, carotid, vertebrobasilar)
 - Vasculitic (Giant Cell Arteritis)
 - Reduced cardiac output/hypotension
- *Migrainous*
- Ocular causes (*rare*)
- No cause identified

Dual blood supply to the visual system

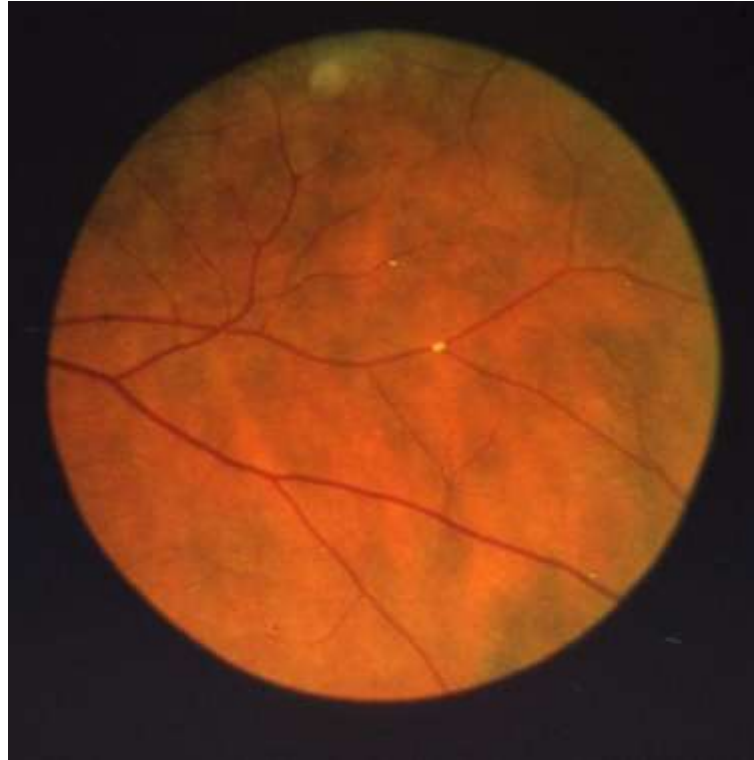
Carotid
Vertebrobasilar



Cardiac Disease

- AF
- Cardiac thrombosis
- Atrial Myxoma

Carotid Disease: retinal emboli



Amaurosis fugax (blind coming down, dimming, fogging)

Increased stroke related mortality
(even if an incidental finding)

Vertebrobasilar Disease

- Visual disturbances (blackouts, photopsias) in association with other symptoms eg.
 - Vertigo
 - Dizziness
 - Drop attacks
 - Diplopia
 - Dysarthria
 - Dysphagia

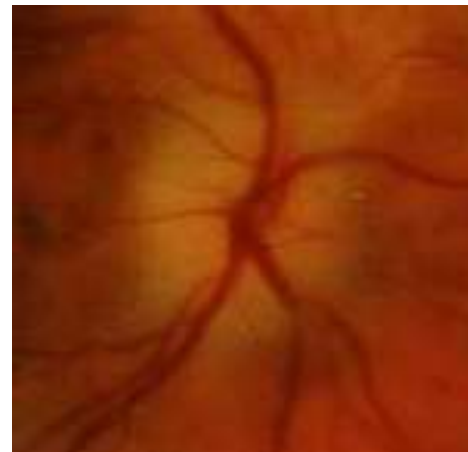
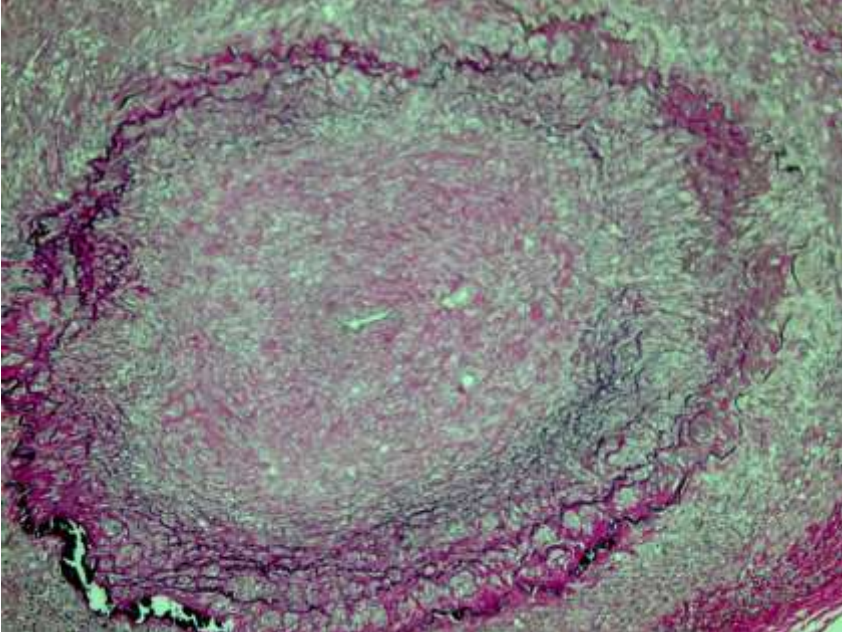
Giant Cell Arteritis



Scalp tenderness
Jaw claudication
New onset headaches

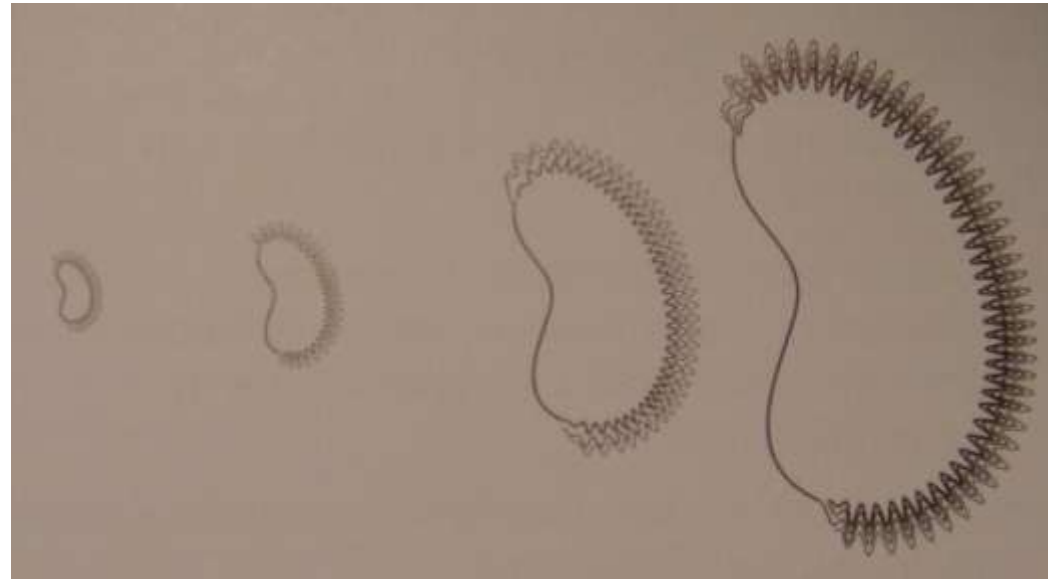
Weight loss
Proximal weakness

Raised CRP
Raised ESR
Temporal artery biopsy



Migraine

- Cortical phenomenon
 - Vasospasm
- Typically
 - Fortification spectra
 - Migrates peripherally
 - Scotoma
 - Headache
- Acephalgic migraine
 - No headache



time

Ocular Causes

- Sub-acute angle closure
- Hyphaema
- Vitreous floaters
- Papilloedema
 - (disc swelling due to raised intracranial pressure)

Management

- Older
 - Investigate/manage CVS risk factors
 - ESR/CRP
 - Carotid USS
 - If new onset migraine consider neuroimaging
- Younger
 - Investigate for CVS risk factors
 - Thrombophilia screen
 - +/-Neuroimage
 - +/- Echocardiography

The Red Eye

Structures

- Conjunctiva
- Cornea
- Iris
- Sclera
- Lids
- Orbit



Fluids

- aqueous/Intra ocular pressure
- tear film

History

- Timecourse
- Associated features
 - Rash (HZO)
 - Crusted discharge
- Trauma
- CL wear
- ? Similar previously
 - HSV keratitis
 - Marginal keratitis

Examination

- VA
- Distribution of vascular engorgement – where is it most red?
- Red reflex
- Clarity of the cornea/iris detail
- Pupil assymetry
 - Iritis smaller
 - AACG larger

Pattern of injection

Focal

- Pinguicula
- Pterygium
- Episcleritis
- Peripheral corneal lesion
 - Marginal keratitis



Pattern of injection

Generalized

- Conjunctivitis
- Acute glaucoma

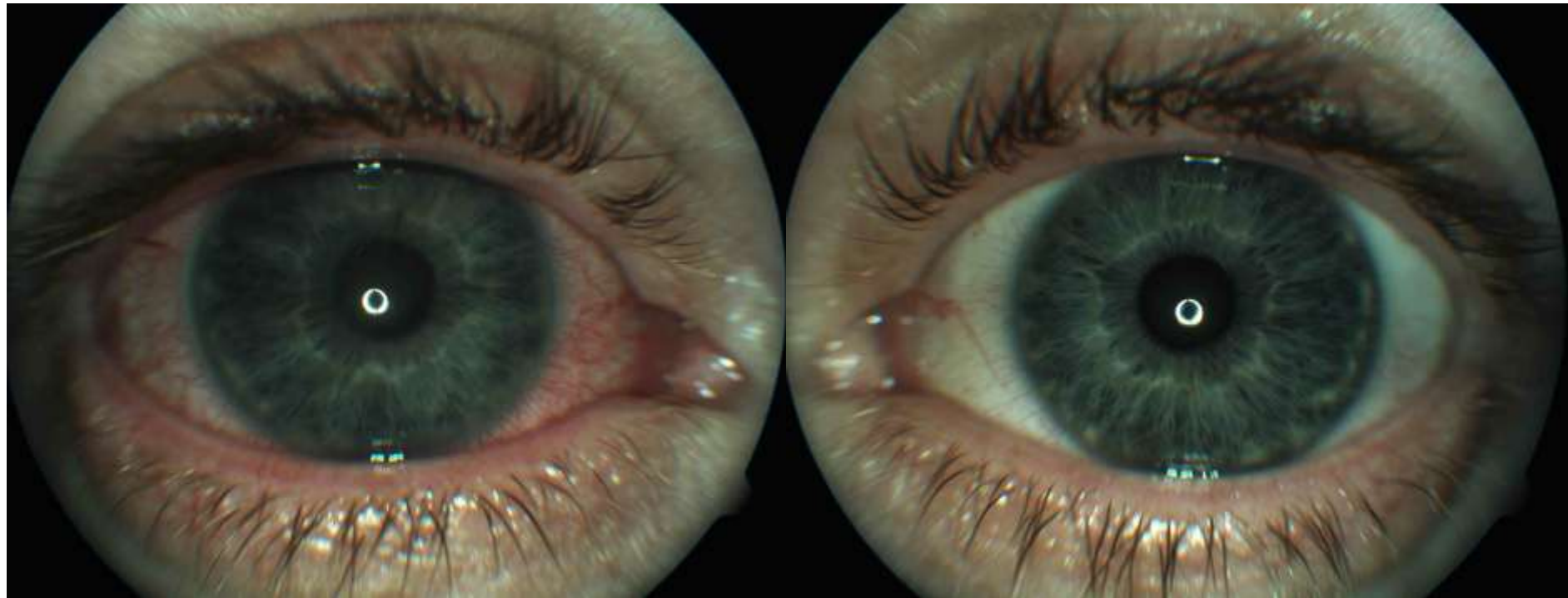


Limbal

- Iritis



Look for clarity of iris detail

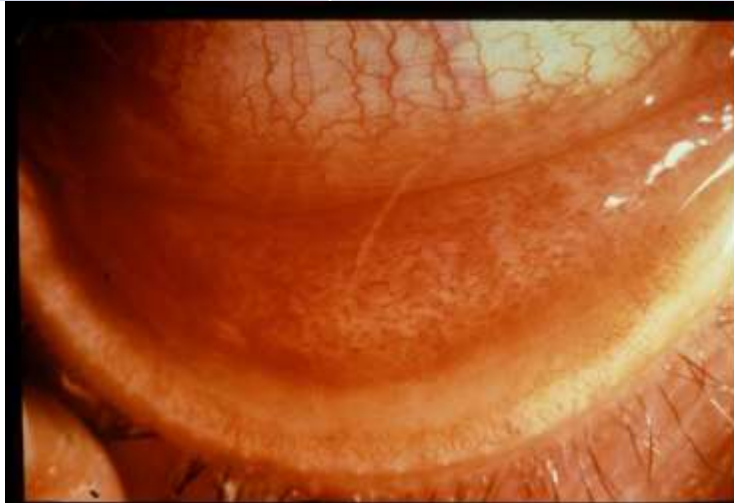


Conjunctivitis

- Essential feature is:
 - Ocular discharge
 - Lids stuck together in the morning
 - Gritty
 - Mild-moderate discomfort
 - Vision normal

Conjunctivitis

	Viral	Allergic	Bacterial
History	+/- viral URTI + contact	++ itch + atopy	
Ocular discharge	Watery	watery, mucoid	Mucopurulent
Eyelid oedema	Mild	Mod-severe	Moderate
Preauricular LN	+	-	-



Iritis

History

- Photophobia
- Often recurrent

Examination

- VA
- Limbal injection
- Pupil may be smaller



Cornea: Herpetic Eye Disease (recurrent)

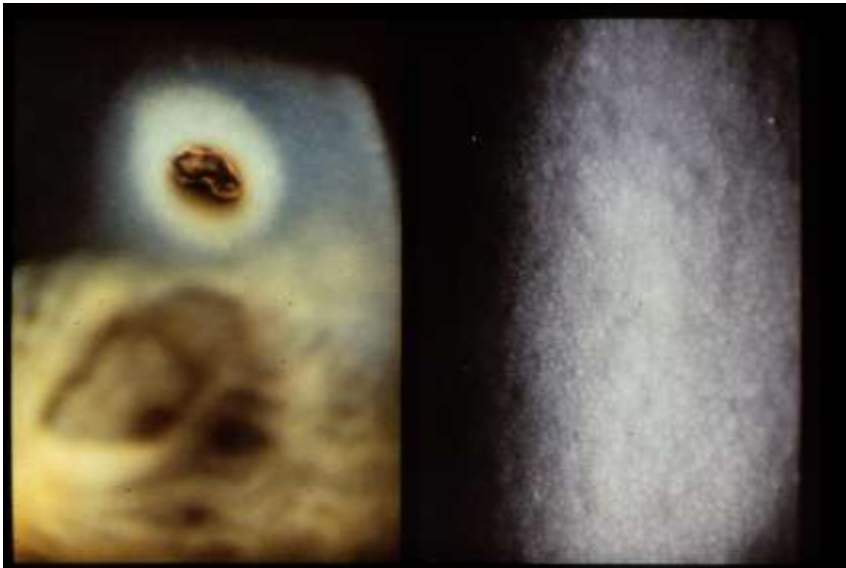


- Herpes Simplex



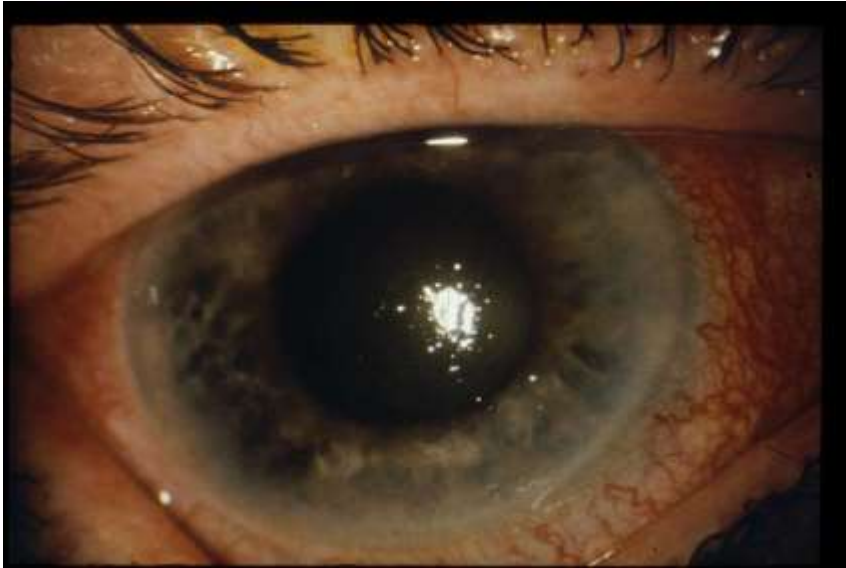
- Herpes Zoster Ophthalmicus
- (naso-ciliary nerve)

Corneal Foreign Body



- Index of suspicion based on history
- Can be occult
 - Surface
 - Intraocular
- Need a slit lamp to remove
 - Especially if near to visual axis

Acute Angle Closure Glaucoma



- Rainbows/haloes around lights
- Painful
- mid-dilated pupil
- Loss of iris clarity
- Stony hard globe when palpated through the upper lid



Orbital Disease

- Most common orbital cause of a red eye is thyroid eye disease



Red flags

- Unilateral red eye
 - Chlamydial conjunctivitis (young people, sexually transmitted)
 - Occult foreign body or “lost” contact lens
 - HSV
- History of trauma (mechanism of injury)
- History of Contact lens use – increased risk of bacterial corneal infection
- Visual loss
- Severe pain
- Neonatal conjunctivitis

Acute Flashes and Floaters

- Both always significant symptoms
- Need a definitive diagnosis

Flashes of light

Retinal

Posterior vitreous detachment
(PVD)

[Retinal inflammation/tumours]

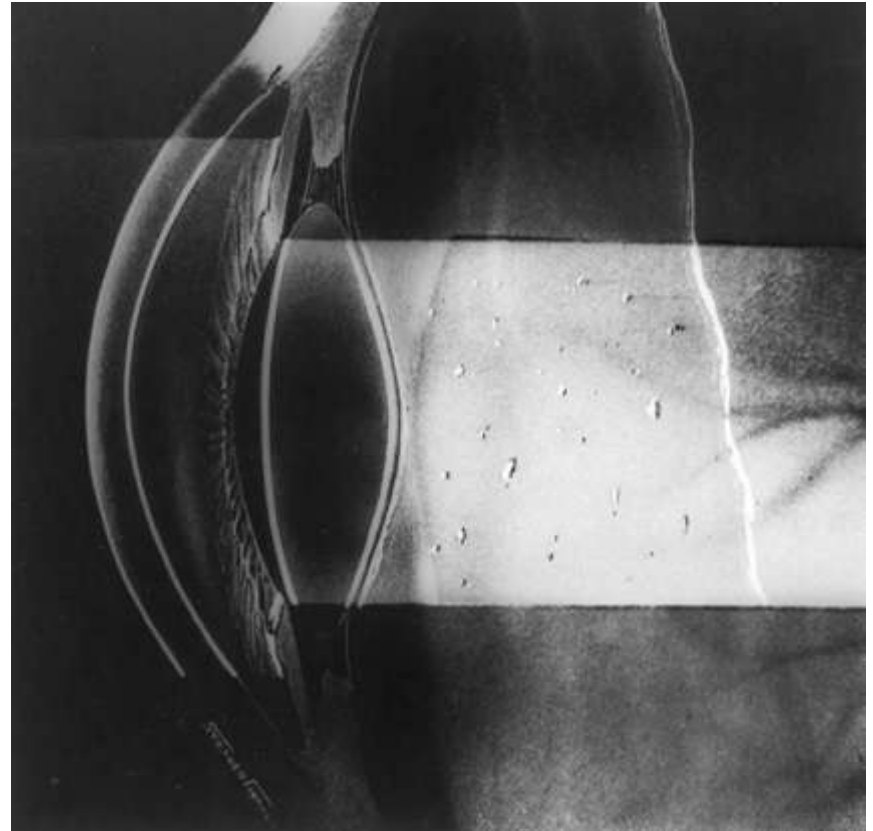
Cortical

Migrainous
Vertebrobasilar insufficiency

Floaters are due to opacities suspended in the vitreous

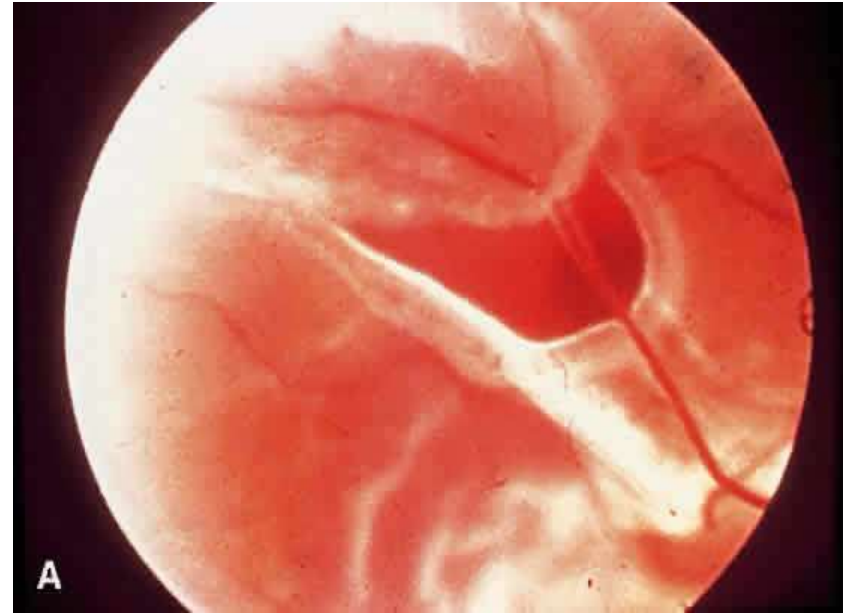
- Retinal tear
- Vitreous haemorrhage
- Vitreous inflammation
- Vitreous neoplasm (lymphoma)

- Acute floaters imply possible risk of retinal tear or detachment
- Chronic floaters > 3 months – reassuring and unlikely to be significant

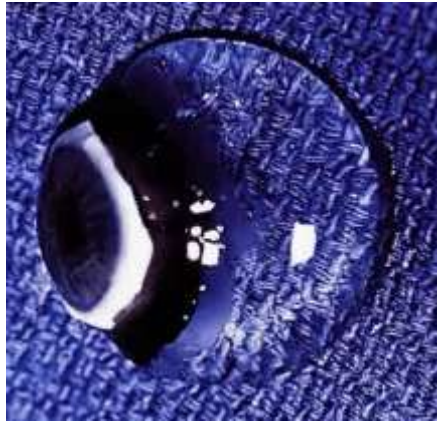


Combined Flashes and Floaters

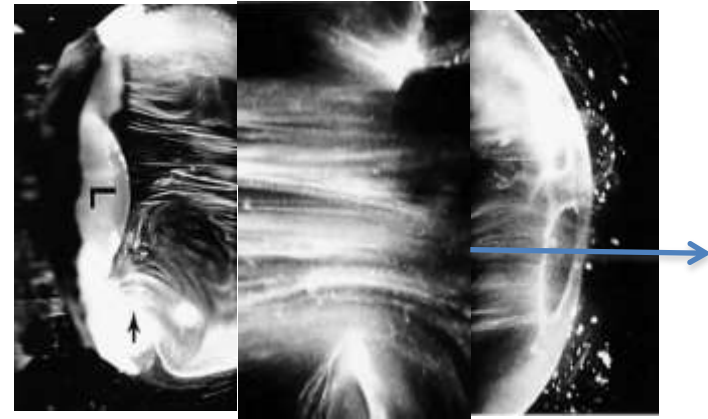
- This is due to a PVD and needs ophthalmology review
- This is an age related event



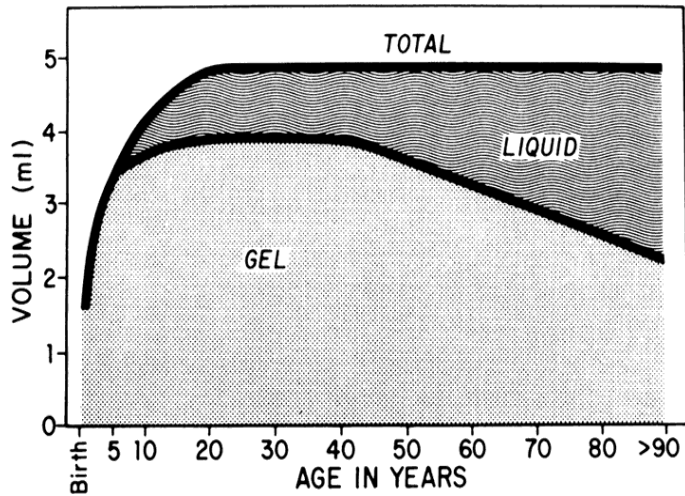
The Vitreous and the PVD



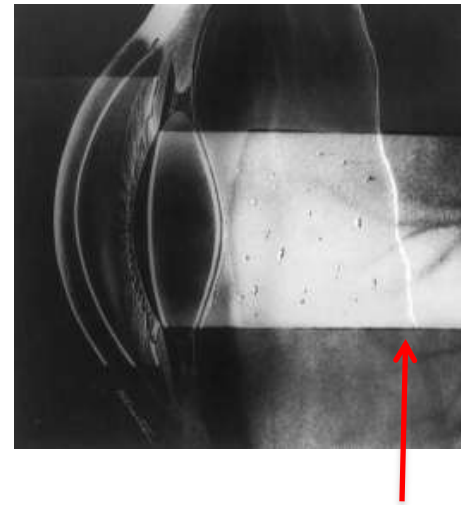
The infant vitreous



Vitreous collagen



Age related liquifaction of the vitreous

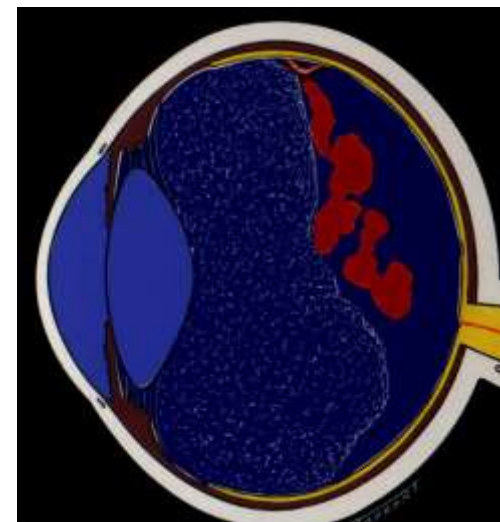
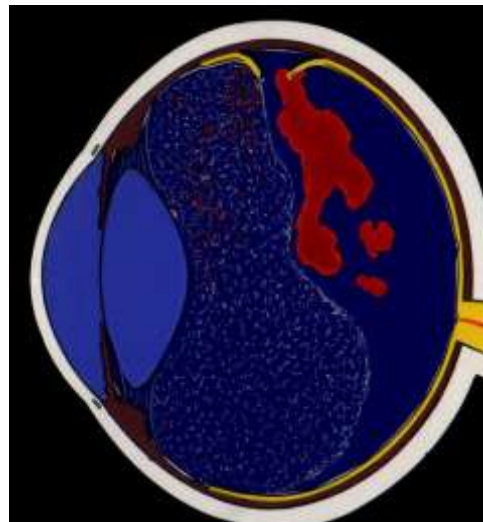


Posterior vitreous detachment

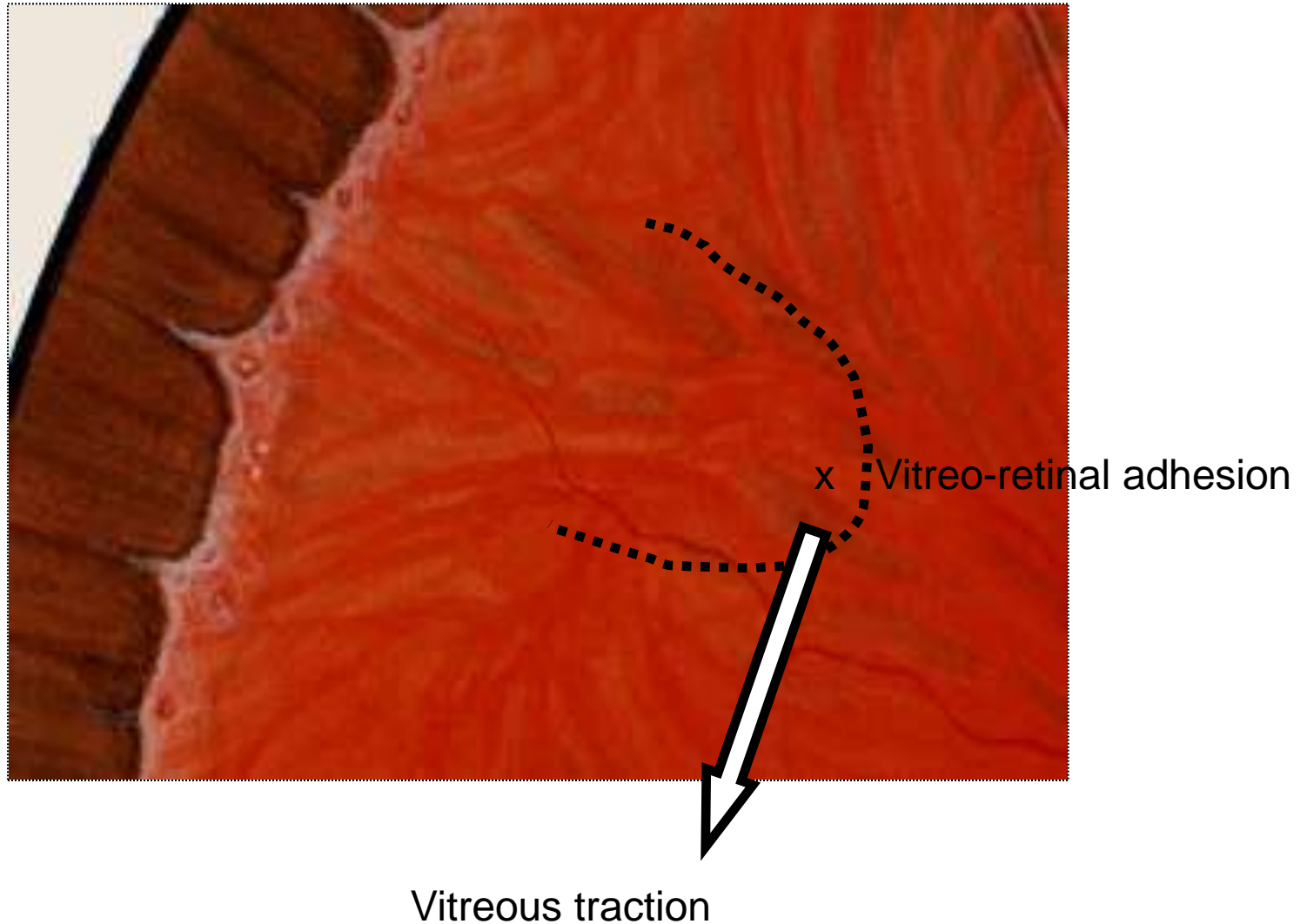
Acute Posterior Vitreous Detachment

Flashes and floaters	45%
Floater	41%
Flashes	14%

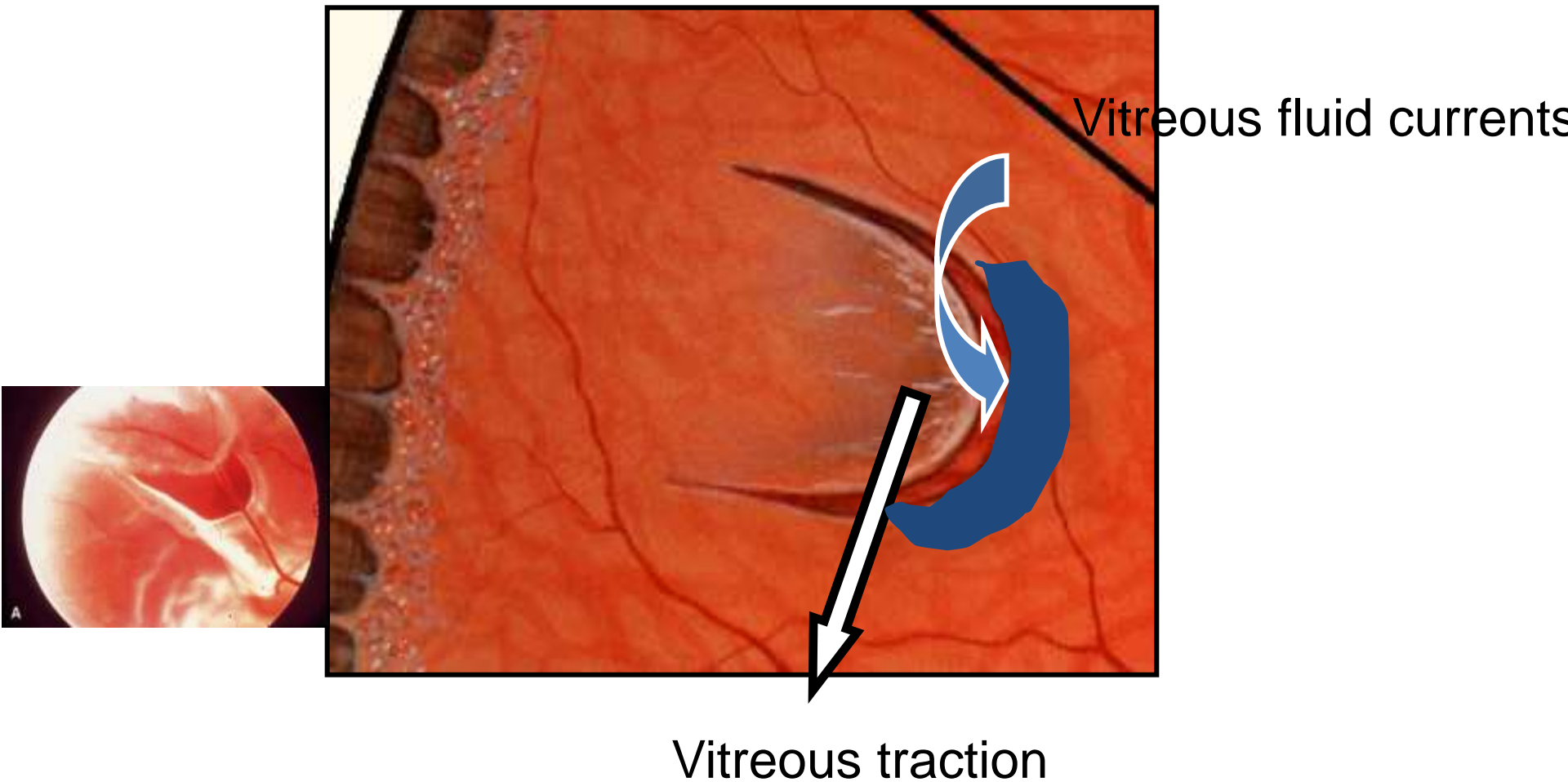
On symptoms alone can't distinguish an uncomplicated PVD from a PVD associated with retinal tear



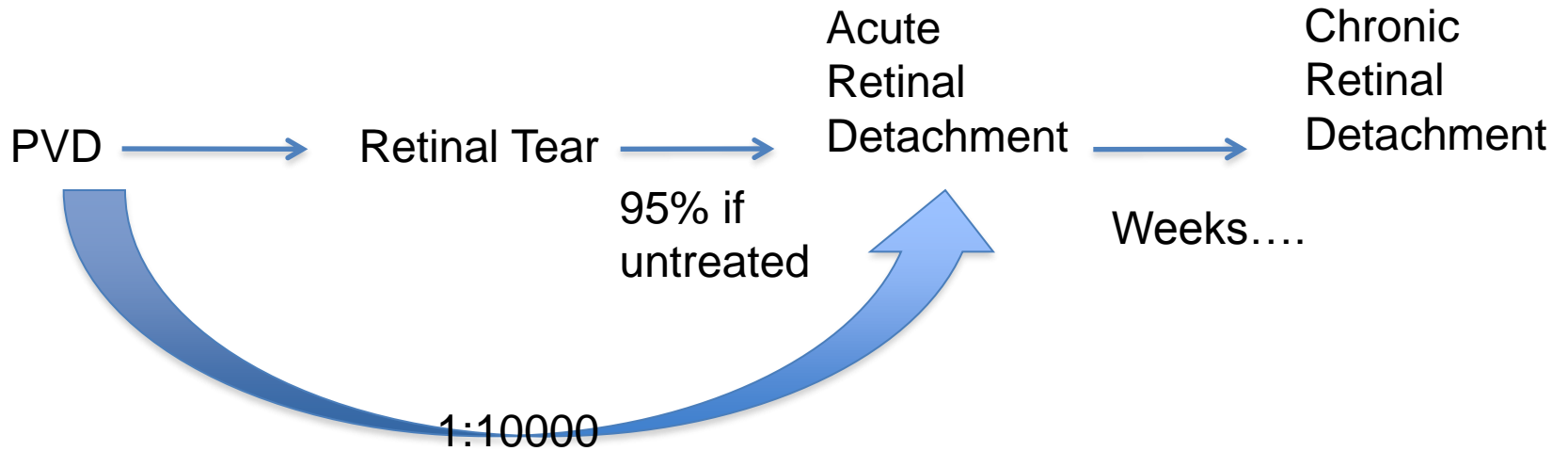
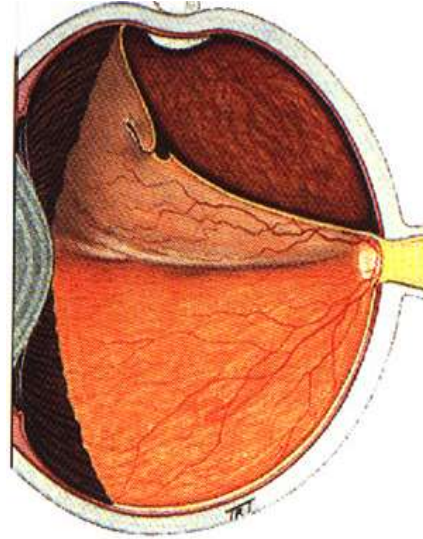
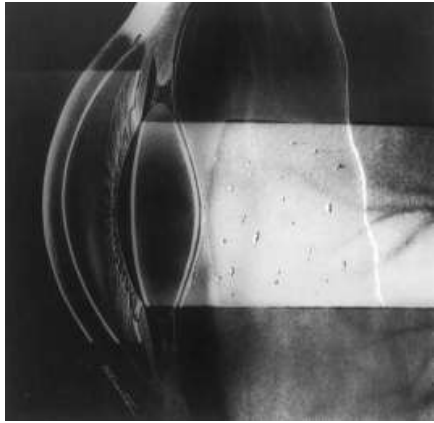
Formation of a retinal tear



Formation of a retinal detachment



...timecourse...





Macular Degeneration

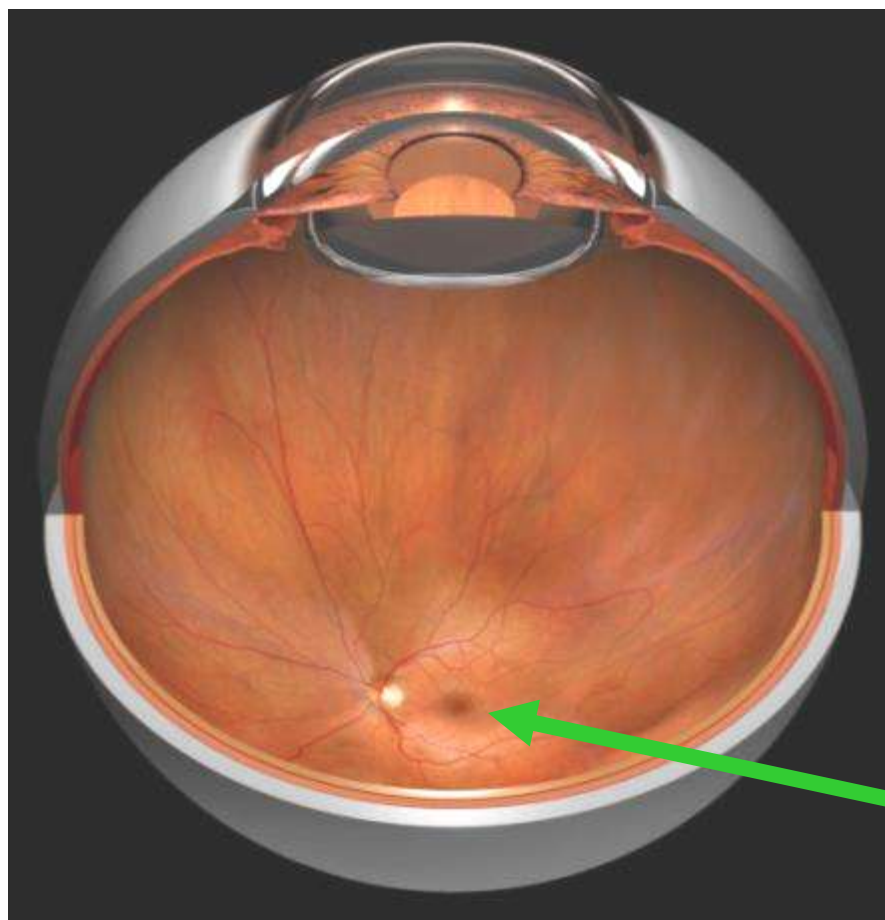




MACULAR
DEGENERATION
NEW ZEALAND
see our vision



What is the macula?



macula



What is Macular Degeneration (MD)?

- Progressive macula damage
- Loss of central vision for reading and driving
- Peripheral vision remains
- Not total (black) blindness





Key Facts in New Zealand

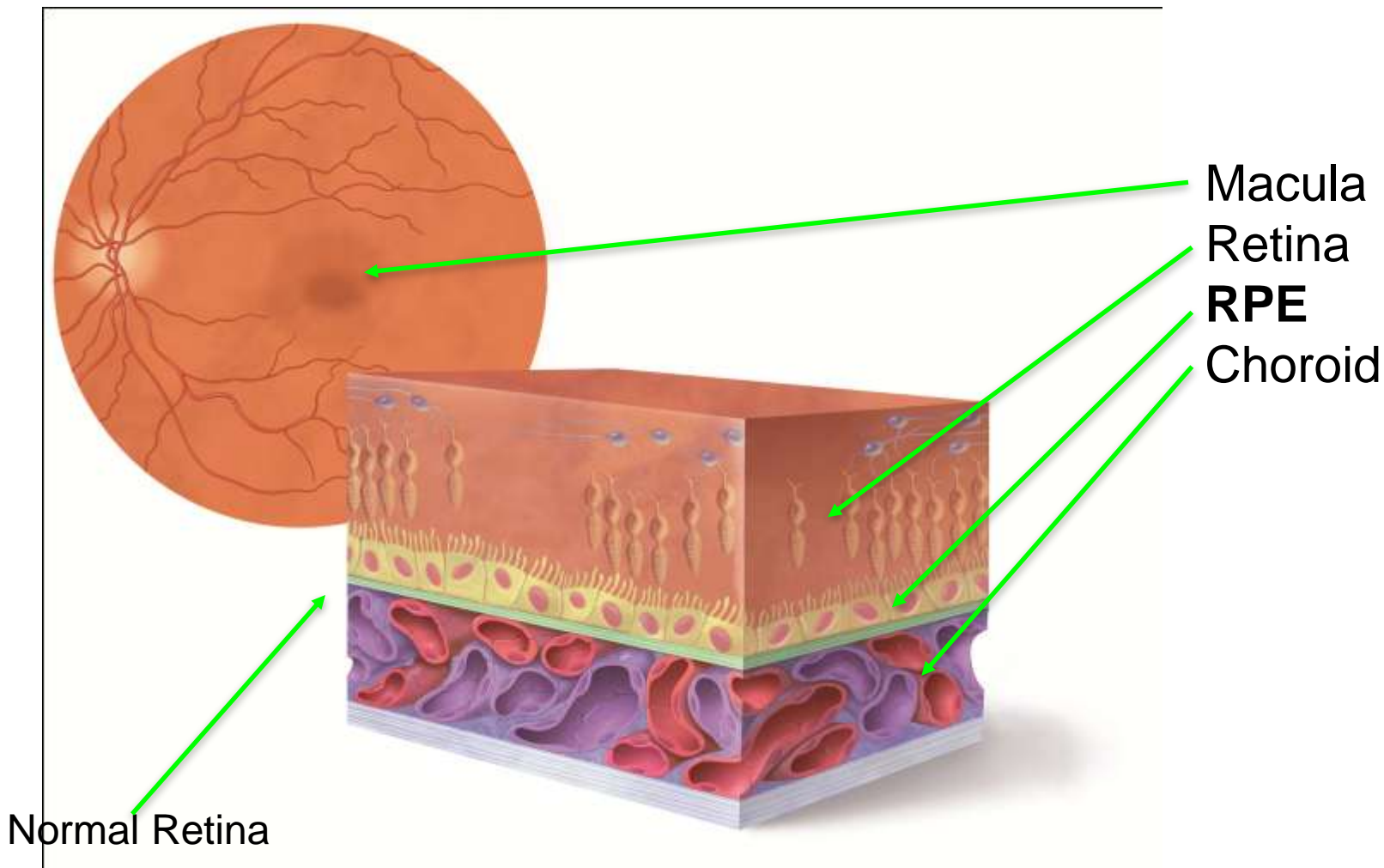
- MD is the leading cause of severe vision loss
- MD affects 1 in 7 people over 50 years
- Incidence increases with age – often referred to as Age-related Macular Degeneration or AMD



MACULAR
DEGENERATION
NEW ZEALAND
see our vision



How does MD Develop?



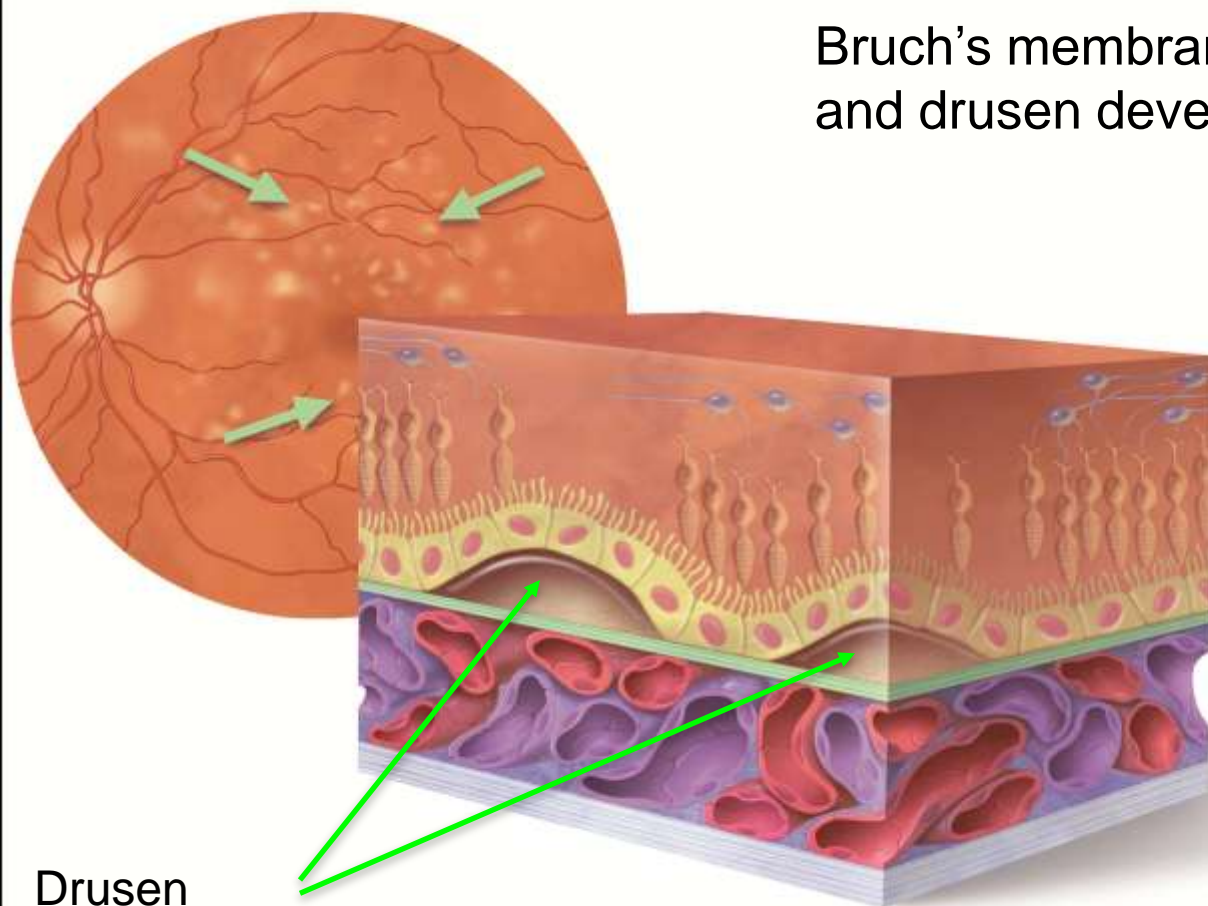


MACULAR
DEGENERATION
NEW ZEALAND
see our vision



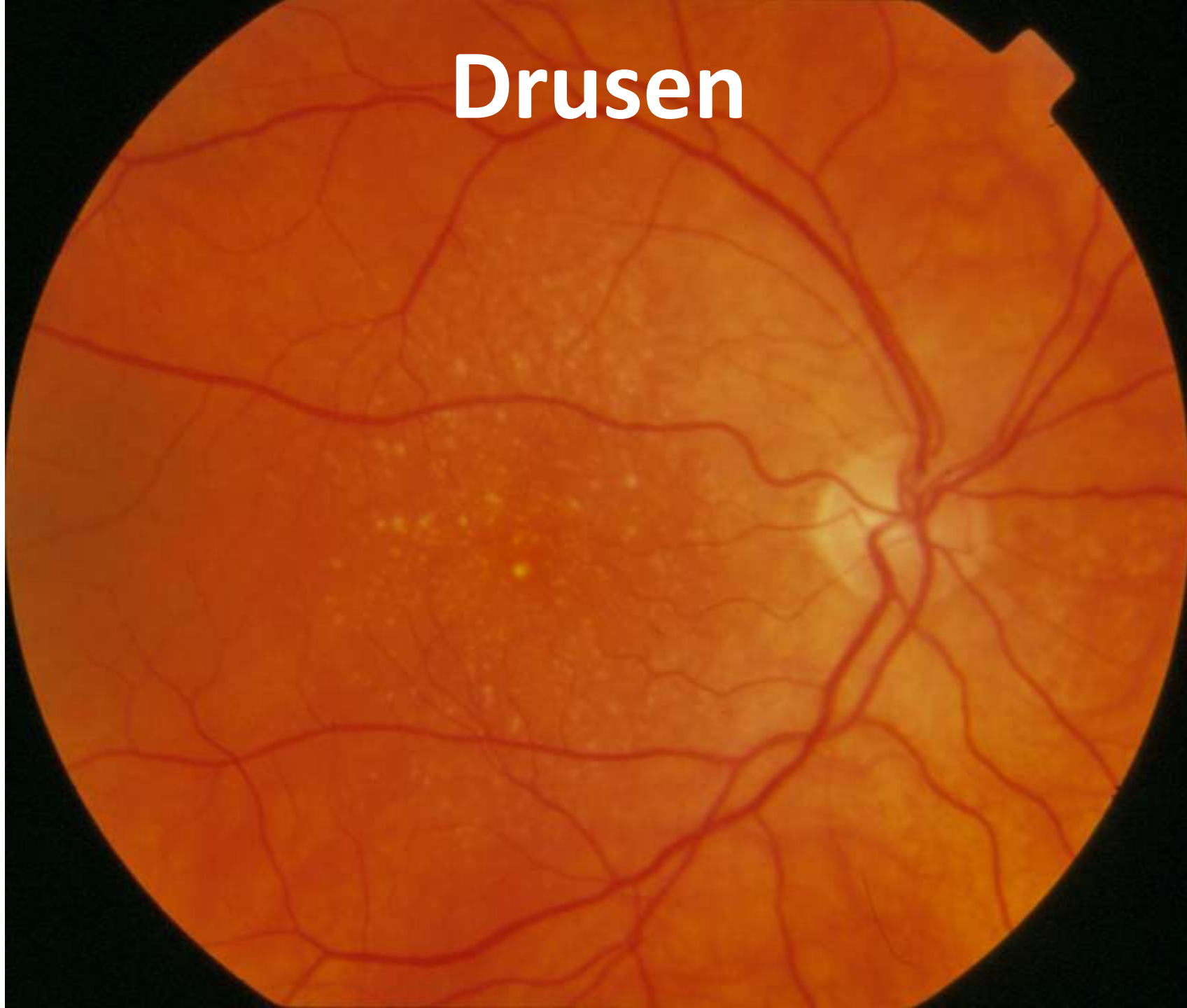
Early stages of MD

Bruch's membrane thickens
and drusen develop



Drusen

Drusen

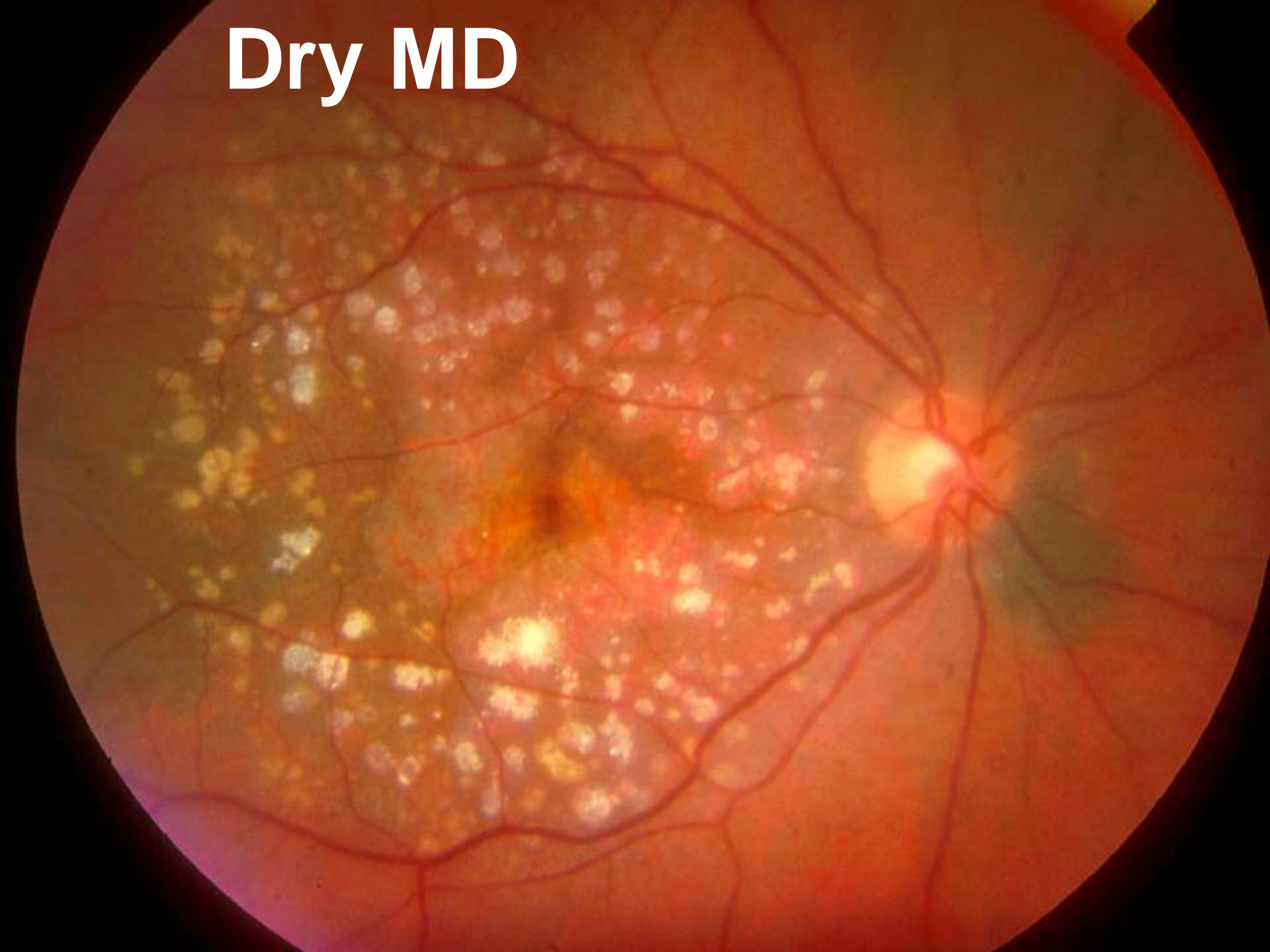




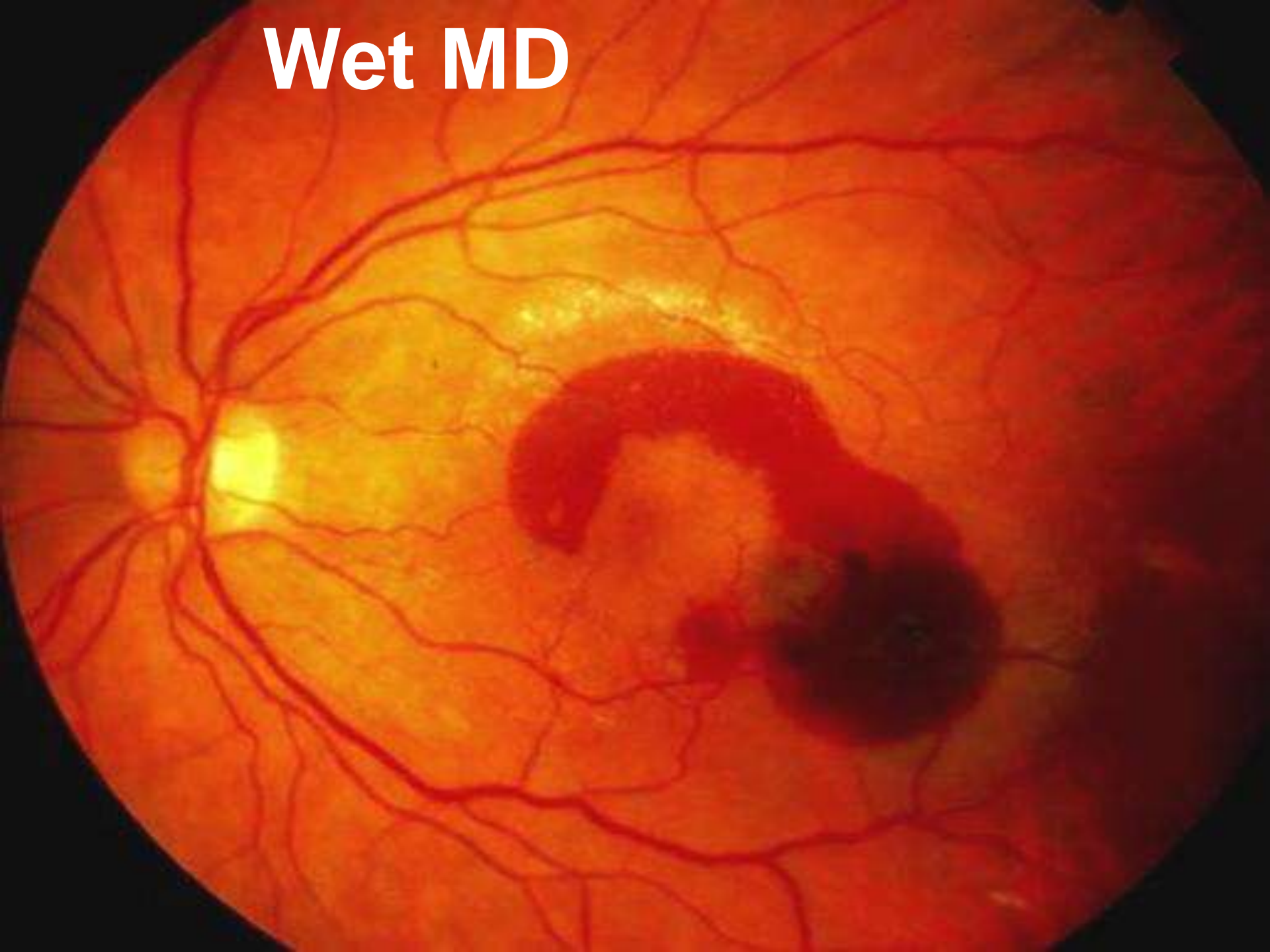
The types of MD

- Dry MD:
 - non-aggressive, slow, gradual
- Wet MD:
 - aggressive, sudden, can be severe

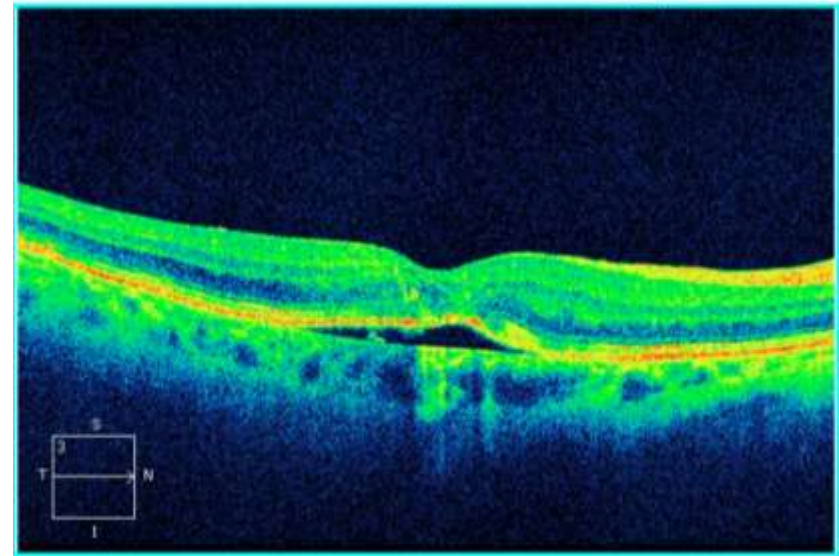
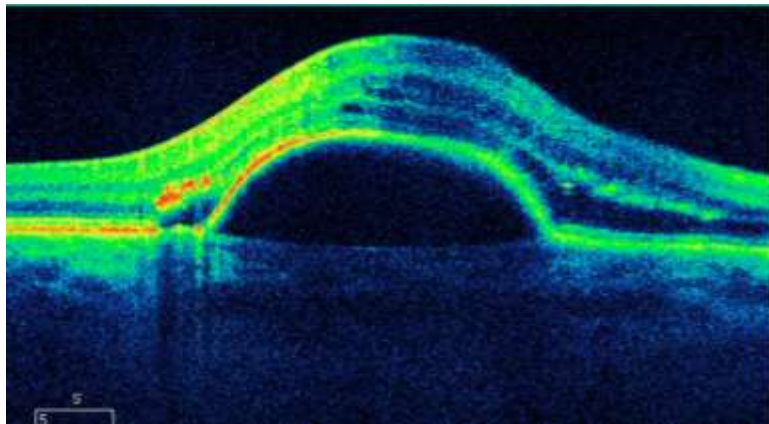
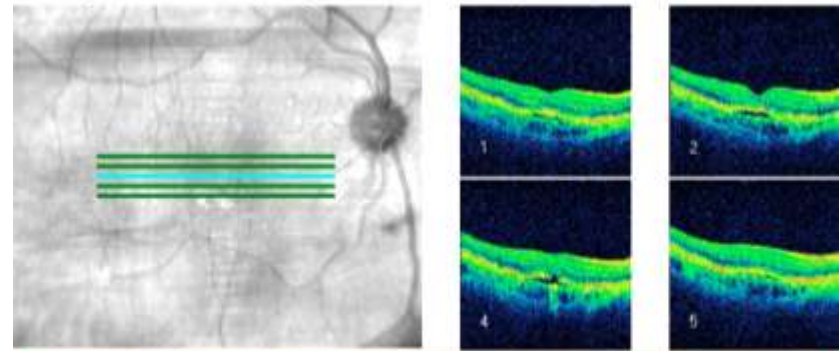
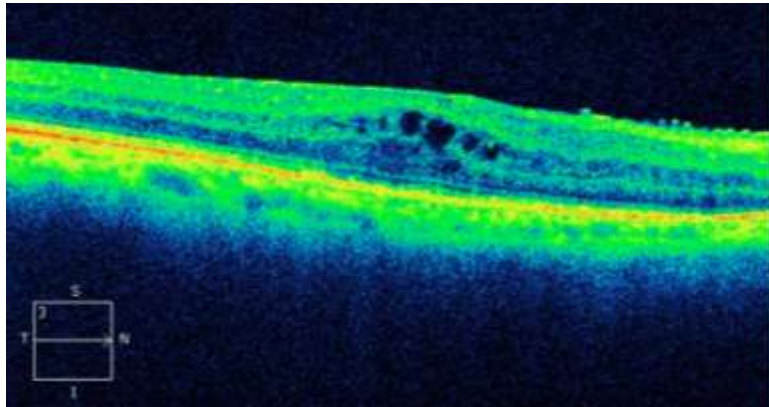
Dry MD



Wet MD



OCT





Symptoms of MD

- Early stages may not have symptoms!!
- Difficulty with detailed or fine vision even with glasses
- Distortion: straight lines appear wavy or bent





Symptoms of MD

- Dark patches or empty spaces appear in central vision
- Distinguishing faces and reading becomes a problem

ew things ne
s as they begin t
ds have been the
pear until early
nce, they are





MACULAR
DEGENERATION
NEW ZEALAND
see our vision



Natural History of Macular Degeneration



Normal 6/6



6/18



6/60



1/60



Current Treatment for Wet MD

- VEGF (a protein) causes blood vessels to grow into the retina.
- Anti-VEGF drugs (Lucentis and Avastin) block VEGF protein.
- Aim to stabilise vision and prevent further vision loss.





MACULAR
DEGENERATION
NEW ZEALAND
see our vision



Risk Factors

Age-related



Genetics





Risk Factors: smoking

**SMOKING CAUSES
BLINDNESS**

Health Authority Warning

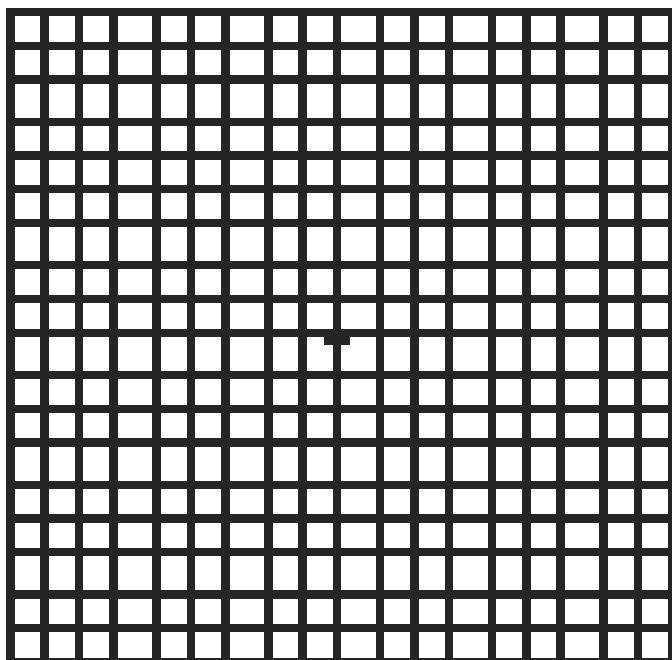


- Smokers increase risk by 3 times
- Smokers develop MD 10 years earlier

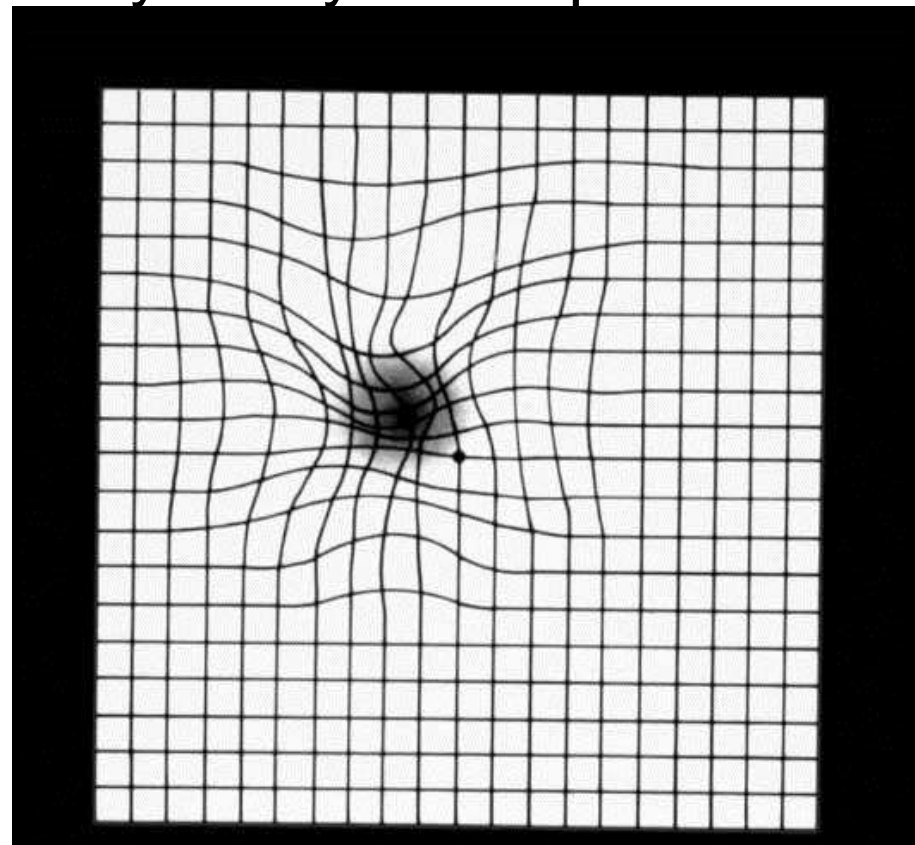


Use the Amsler Grid regularly

Normal vision



See your eye care professional



Dark green leafy vegetables and naturally yellow food

(remember: green and gold!)



Eat fish 2 to 3 times a week
(salmon, tuna, anchovies, sardines)



Eat a handful of nuts a week

(brazil nuts, pine nuts, walnuts, almonds)





Supplements for MD

ARED Study

- Vitamin C 500mg
- Vitamin E 400iu
- β -carotene 15mg
- Zinc 80mg
- Copper 2mg

4,757 Participants were followed for up to 10 years

People who smoke should not take beta-carotene supplements. This is the reason it is not in all AREDS supplement products.



Supplements for MD

AREDS Formula

For moderate or advanced MD, AREDS supplement can help to slow down the progression of MD.

Only take the AREDS formula if you have MD and on the advice of your doctor.

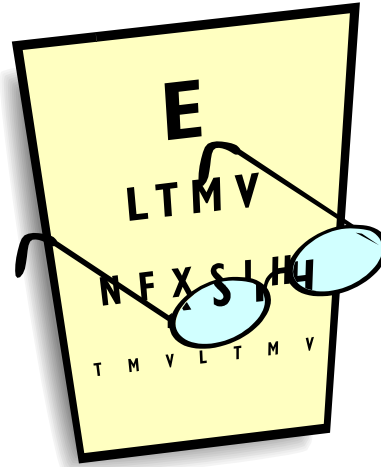
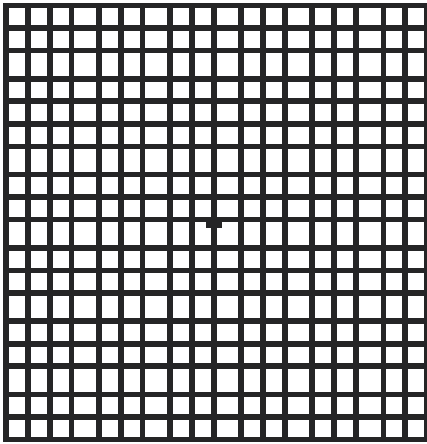
Lutein

Lutein is appropriate for everyone



Low Vision impacts on quality of life





Supplements
Ask your
Doctor!

