

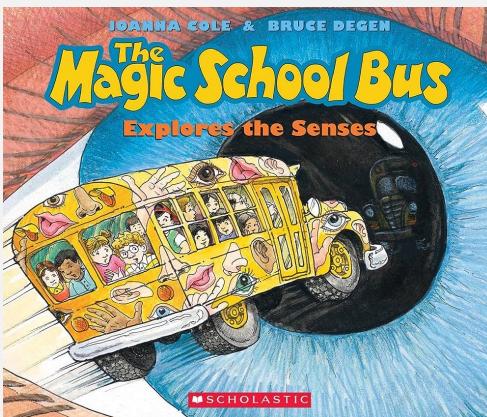
# OPHTHALMOLOGY MADE (KIND OF) EASY!

Lewis Weeda

# CONTENT

- Anterior to posterior

- The lids
- The red eye – anterior chamber



- Cataract
- Vitreous

- Retina
- Optic nerve
- The orbit

- Trauma
- Guess Who??



Eyes	Conjunctivitis/keratitis			✓	✓	✓	✓	✓	✓
	Refractive errors			✓	✓	✓			
	Blunt eye injuries			✓		✓			✓
	Aged related macular degeneration			✓		✓			
	Glaucoma			✓		✓	✓	✓	✓
	Cataracts			✓	✓	✓	✓		✓
	Diabetic retinopathy			✓		✓	✓		
	Herpetic keratitis			✓		✓			✓
	Anterior uveitis			✓		✓			
	Eye foreign body			✓		✓		✓	✓
	Strabismus			✓	✓				
	Amblyopia					✓			

Eyes	Chronic infection such as trachoma			✓			
	Hypertensive retinopathy			✓		✓	
	Retinal detachment and vitreous haemorrhage			✓		✓	✓
	Eye effects of RA, SLE, thyroid disease,			✓			
	Ocular motor nerve dysfunction			✓		✓	✓
	Optic neuropathy			✓			
	Visual field defects						✓
	Dacryocystitis			✓			
	Penetrating eye injuries, endophthalmitis			✓		✓	✓
	Retrobulbar haematoma			✓			
	Acute retinal artery and vein occlusions			✓		✓	✓
	Dry eye syndrome			✓			
	Eyelid BCC and SCC			✓			
	Pterygium			✓			
	Welding flash injury						✓
	Lid mal-position, eg entropion, ectropion and trichiasis						
	Chalazion and stye			✓			
	Retinoblastoma					✓	



# APPROACHING OPHTHAL EXAM

Practice direct ophthalmoscopy on the UWA eyeballs

Optic nerve assessment:

- Visual acuity (Snellen chart @ 6m → 3m → count fingers → hand movements → light)
- Visual fields
- Pupils (RAPD)
- Colour (Ishihara plates)
- Fundoscopy

Describing images:

- Learn the keywords
- Only describe what you can see

Examiner: Could you please perform ophthalmoscopy



made with mematic



# BLEPHARITIS

- **History**

- **Chronic, bilateral**, middle aged/elderly
- Grittiness, burning, watering, **intermittent blurring**

- **Aetiology**

- Lid margin inflammation (Staph toxins) + Meibomian gland dysfunction (**well not always**)

- **Examination**

- Lid erythema, conjunctival injection, punctate staining
- Dandruff-like flakes on eyelashes, blocked meibomian glands

- **Management**

- **Lid hygiene, warm compress, lubricating eye drops**
- Oral omega-3 fatty acids
- Ophthalmology PRN: topical antibiotic/steroid, oral doxy/minocycline, thermal pulsation

## Complications:

- Marginal keratitis
- 50% of staphylococcal blepharitis have **dry eyes**



EyeRounds.org



Different forms of blepharitis: (A) seborrheic blepharitis, (B) staphylococcal blepharitis, (C) meibomian gland dysfunction. Adapted from images copywritten 2014 one.aoa.org



# DRY EYES

## History

- Burning, itching, stinging, red – often **watery eyes**

Aetiology (many) – loss of tear film (mucin, aqueous & lipid)

- Allergic
- Aging (decreased hormones)
- Sjogren's
- Idiopathic

## Exam

- Tear break up time (10 seconds)
- **Punctate epithelial erosions** (same as exposure keratitis)
- Shirmer's test (poor wetting litmus paper)

## Mx:

- **Lubricating** drops/ gel
- Fix cause
- ?Fish oil
- ?short term topical steroids





## GUESS WHO?

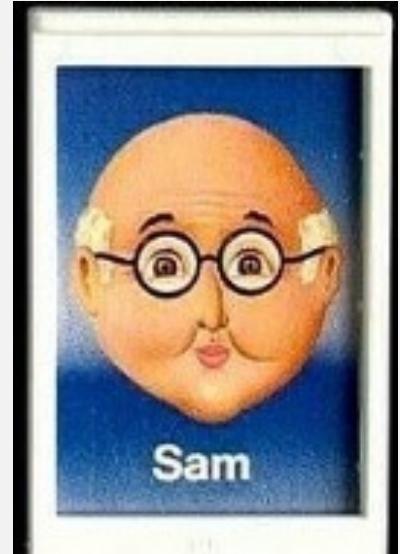
72-year-old man with weird painless lump on lower left eyelid

Dx: Basal cell carcinoma

- **Most common** malignant tumour of eyelid
- Occurs mainly in lower lid
  - Most **sunlight** exposure
- O/E: Pearly rounded edge with necrotic centre

MX

- urgent referral, excision under LA (uncomplicated)
- radiotherapy if periorbital disease





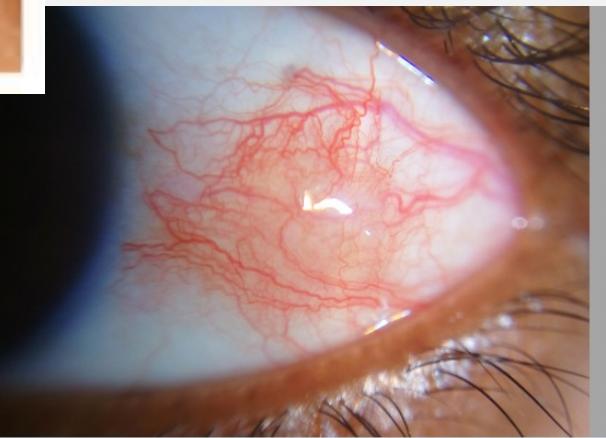
# CONJUNCTIVITIS

- Allergic = most common (and biggest in lectures)

Bacterial	Viral	Allergic
<p>Caused by:</p> <ul style="list-style-type: none"><li>• <i>S. aureus</i>, <i>S. pneumoniae</i>, <i>H. influenzae</i>, <i>M. catarrhalis</i></li><li>• <i>Neisseria gonorrhoeae</i> (neonates or sexually active)</li><li>• <i>Chlamydia trachomatis</i> (neonates)</li></ul> 	<p>Commonly associated with URTI. Usually caused by:</p> <ul style="list-style-type: none"><li>• Adenovirus</li></ul> 	<p>Atopy → Associated with rhinitis, asthma, dermatitis, hayfever</p> 
<p><b>History:</b></p> <ul style="list-style-type: none"><li>• Initial unilateral red uncomfortable eye with purulent discharge</li><li>• Infection may spread to other eye, and there may be a contact history with similar symptoms</li></ul> <p><b>Signs:</b></p> <ul style="list-style-type: none"><li>• Purulent discharge</li><li>• Lid swelling</li><li>• Papillae</li></ul>	<p><b>History:</b></p> <ul style="list-style-type: none"><li>• URTI symptoms</li><li>• Initially unilateral red uncomfortable eye with serous discharge, often progressing to bilateral</li></ul> <p><b>Signs:</b></p> <ul style="list-style-type: none"><li>• Preauricular lymphadenopathy</li><li>• Palpebral follicles</li><li>• Pseudomembranes</li></ul>	<p><b>History:</b></p> <ul style="list-style-type: none"><li>• Seasonal (pollen, grass) or allergen exposure (dust mites, animals) in a person with history of atopy</li><li>• Bilateral itchy red eyes</li></ul> <p><b>Signs:</b></p> <ul style="list-style-type: none"><li>• Large superior palpebral cobblestones</li><li>• Chemosis</li></ul>
<p><b>All conjunctivitis types tend to display conjunctival injection with limbal pallor</b></p> <p><b>Treatment:</b></p> <ul style="list-style-type: none"><li>• Topical broad-spectrum antibiotic (chloramphenicol)</li><li>• Usually self-limited infection of 10-14 days without treatment, 1-3 days with treatment</li></ul>	<p><b>Treatment:</b></p> <ul style="list-style-type: none"><li>• Cool compress, topical lubrication or antihistamines for itch</li><li>• Usually self-limiting illness (7-12 days)</li><li>• Extremely contagious so strict hygiene measures advised</li></ul>	<p><b>Treatment:</b></p> <ul style="list-style-type: none"><li>• Cold compress, topical lubrication or antihistamines for itch</li><li>• Topical steroids are effective but should not be used regularly</li></ul>

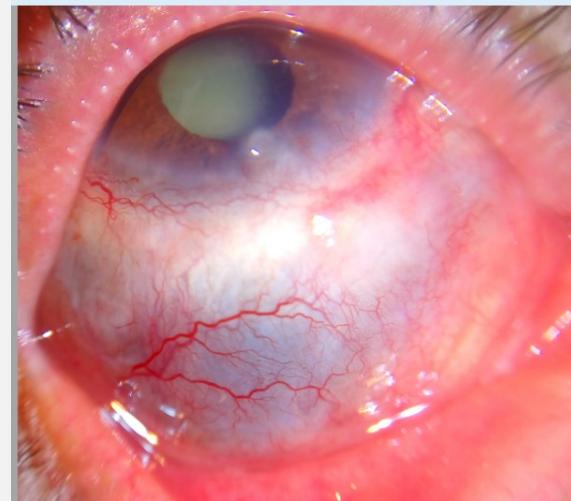
## SUBCONJUNCTIVAL HAEM

- ?Trauma
- ?Sneezing
- Just wait it out



## ★ EPISCLERITIS

- Superficial vessels
- **NSAIDS** (steroids sometimes controversial – rebound)



Episcleritis

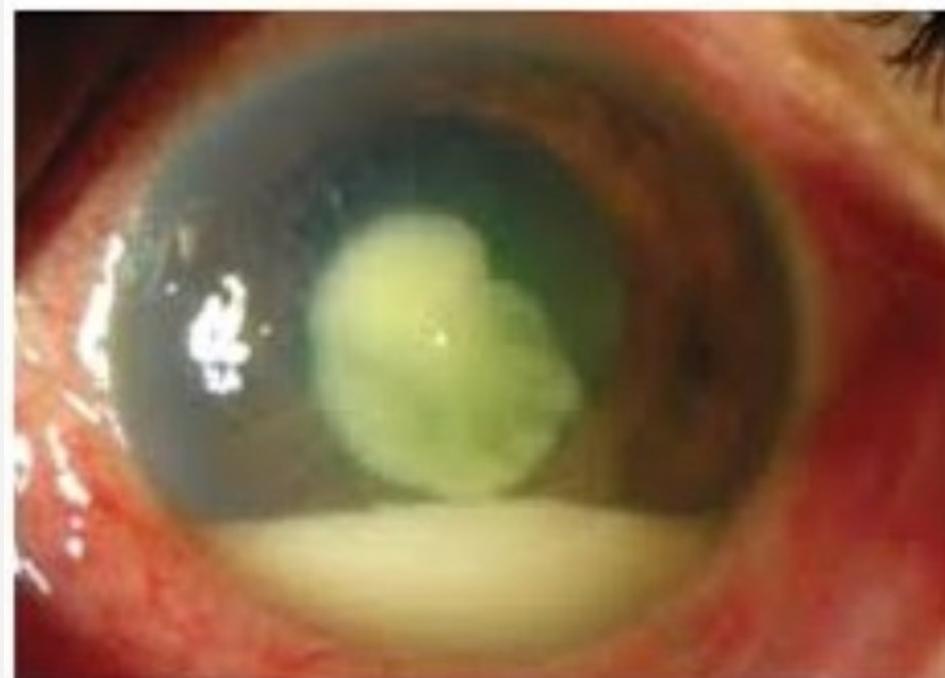
## ★ SCLERITIS

- Severe pain
- Scleral translucency, vessels immobile, nil epinephrine effect
- NSAIDS, **steroids**, fix trigger/ cause



# BACTERIAL KERATITIS

- Subacute (mins-hours)
- Severe painful red eye (injected)
- Mechanism:
  - Foreign body → corneal abrasion → infection with commensals
- **Pseudomonas infections** are urgent (contact lens wearer) – can cause rapid thinning of the cornea
- Management:
  - Analgesia
  - If contact lens wearer – take out, culture lens
  - Culture wound for MC+S
  - Urgent referral to ophthalmology – inpatient admission for intensive
  - **antibiotic drops** (Cephalexin vs Ciprofloxacin)



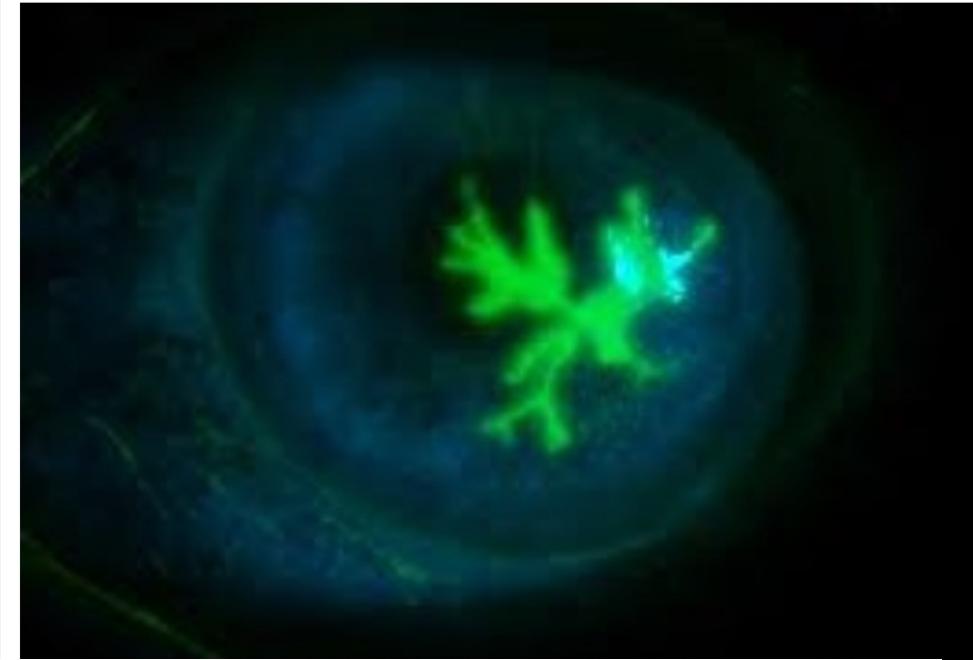


## HSV/ VZV KERATITIS

- Type I HSV or Varicella
- Cold sores → HSV
  - Treat with **topical acyclovir** for 5/7
- Shingles → Varicella ('Herpes Zoster Ophthalmicus')
  - Treat with **PO acyclovir**
  - **Hutchinson's sign** suggestive of ophthalmic involvement (nasociliary nerve!)

Do not treat with topical steroids!!!

Refer to Ophthal

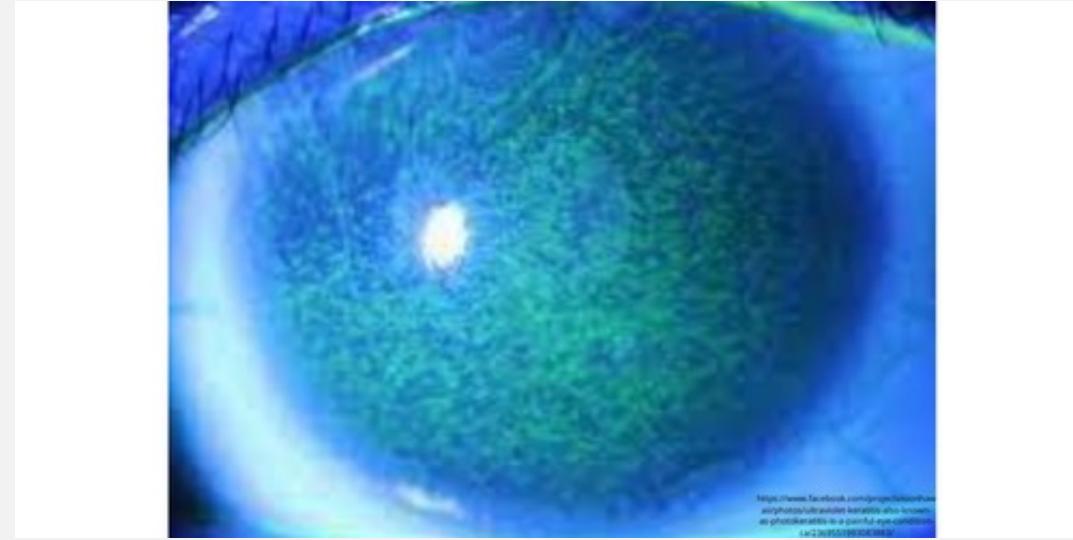


## OTHER KERATITIS



### UV keratitis (AKA photokeratitis)

- Person on boats all day or in the snow
- **Welding flash**

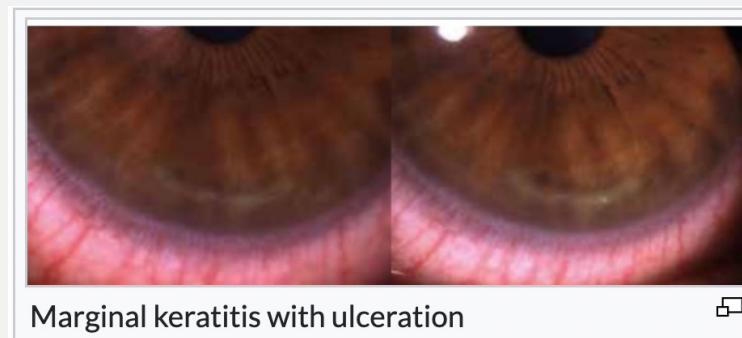


### Exposure keratopathy/ keratitis

- Cranial nerve palsies
- Lagophthalmos (age related, mechanical, floppy eyelid syndrome)
- Ectropion
- Mx = **tape at night, lubricating gel**  
→ surgery

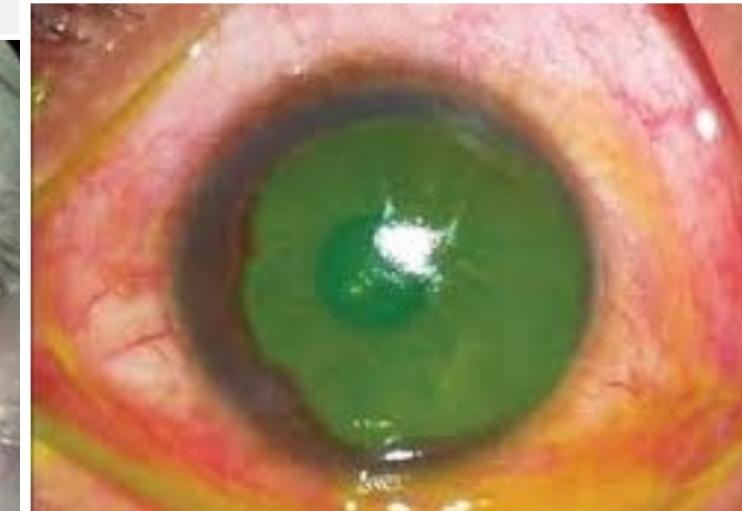


### Marginal keratitis (staph antigens/ toxins)



# CHEMICAL INJURY

- **ALKALINE WORSE THAN ACID**  
Continues to penetrate the cornea
- Most commonly from worksites – plaster/lime/cor (tradies, cleaners)
- Often have associated corneal abrasion
- You must evert the eyelid and do a conjunctival sweep
- Management
  - Determine chemical, get baseline pH (litmus paper)
  - **IRRIGATE.** Sterile solution, at least 1-2L. Can use a Morgan lens
  - Topical anaesthetic drops
  - Analgesia
  - Refer to ophthalmology
- Complications: opacification of the cornea



Roper-Hall classification

Grade	Prognosis	Limbal ischemia	Corneal involvement
I	Good	None	Epithelial damage
II	Good	Less than 1/3	Corneal haze, iris details visible
III	Guarded	1/3 to 1/2	Total epithelial loss, stromal haze, iris details obscured
IV	Poor	Over 1/2	Cornea is opaque, iris and pupil are obscured

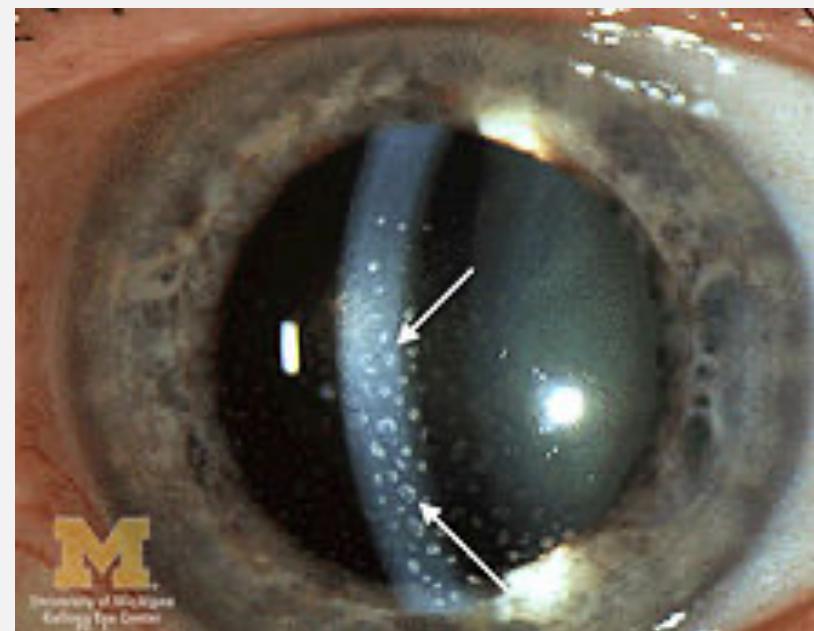


# UVEITIS

- Can be anterior (iris), intermediate (ciliary body), posterior (choroid), or panuveitis (all of the uvea)
  - More commonly anterior
- Young person with unilateral red eye, glare and sensitivity, history of ankylosing spondylitis/immune condition, and recent viral condition
- Can have reduced visual acuity
- Slit lamp: Cells and flare, keratin precipitates, posterior synechiae

Mx

- Steroid eye drop
- **Dilating eye drop** (stop synechiae)
- Refer to ophthal

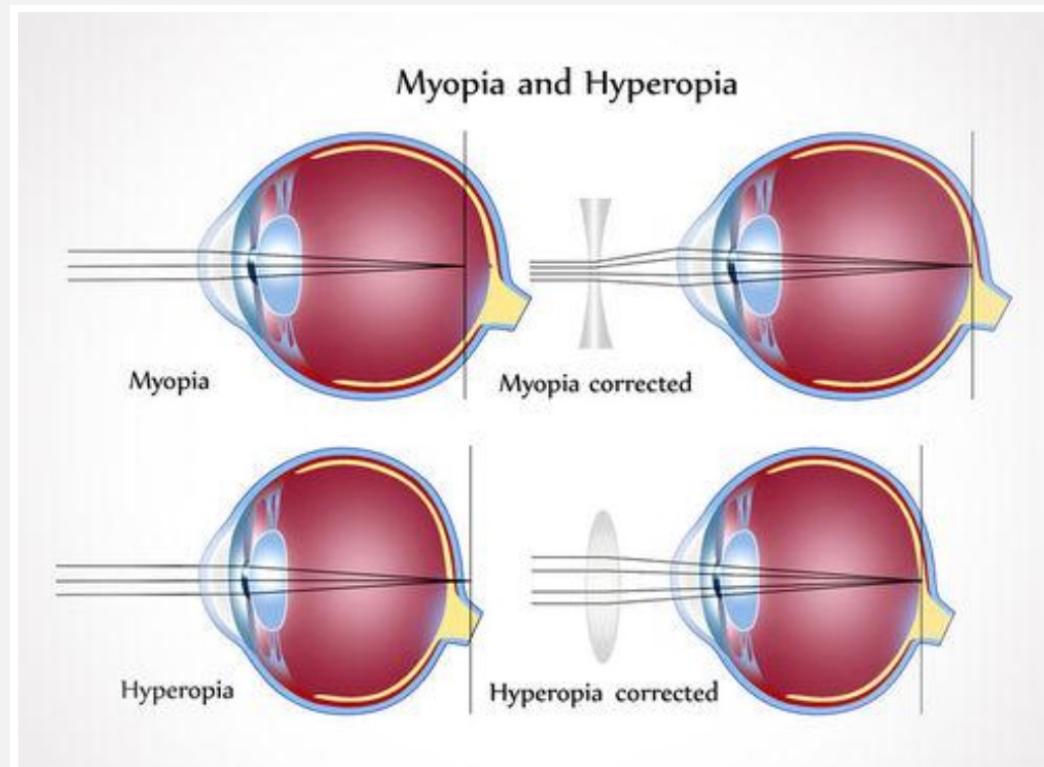




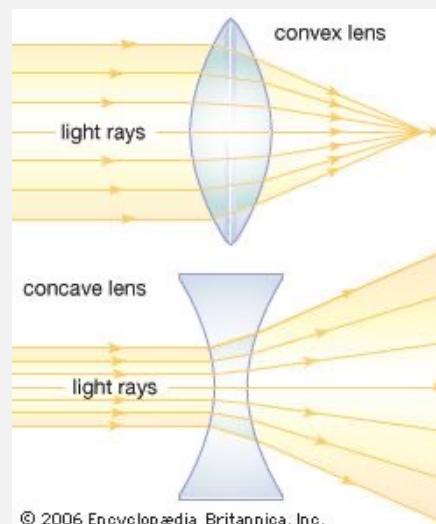
# REFRACTIVE ERRORS

- Myopia = short-sighted
  - High myopia susceptible to **retinal detachment**, macular degeneration, and primary open angle glaucoma
- Hypermetropia = longsighted eye
  - Can achieve clear image by accommodating
  - Ability to accommodate fails with age – may require glasses for both distant and near
  - More susceptible to **closed angle glaucoma**
- Presbyopia – loss of accommodation, from 40 onwards
  - Fine detail cannot be discerned up close
- Astigmatism = Cornea has uneven curvature
  - Fixed by specialised spectacle and/or intraocular lenses

What lens do I need?



Zonular contraction - more lens curvature → greater refractive power

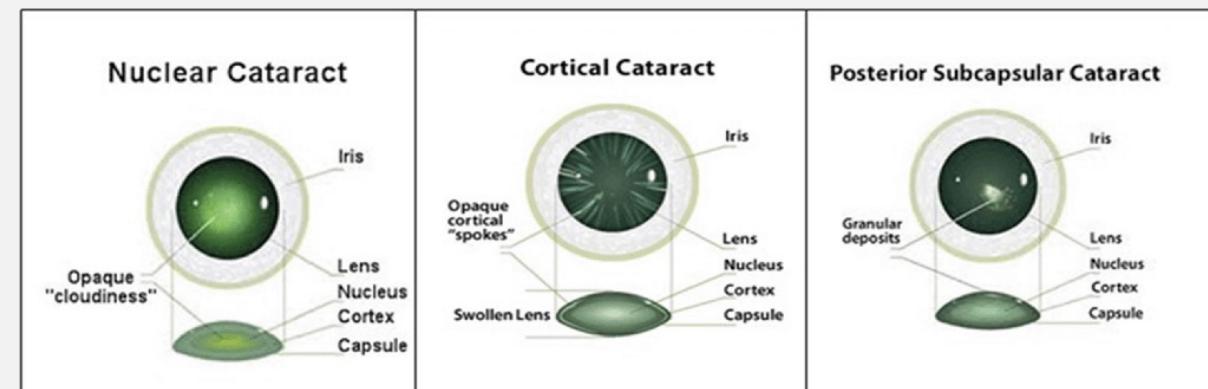




# CATARACT

- Opacification of the lens
- Slowly progressing blurred vision – loss of clarity, contrast, or ‘cloudy’ vision
- **Halos and glare** from oncoming headlights at night
- Risk factors: older age, trauma, post surgery (e.g. post vitrectomy), drugs (steroids), congenital
- Management: monitor, refer for cataract surgery when vision interferes with driving and ADLs

- **Second sight** in the myopic





# GUESS WHO?

80-year-old man with sudden onset painless loss of vision in left eye.  
Reports seeing flashes 30 minutes prior to vision loss.

Dx = retinal detachment

History:

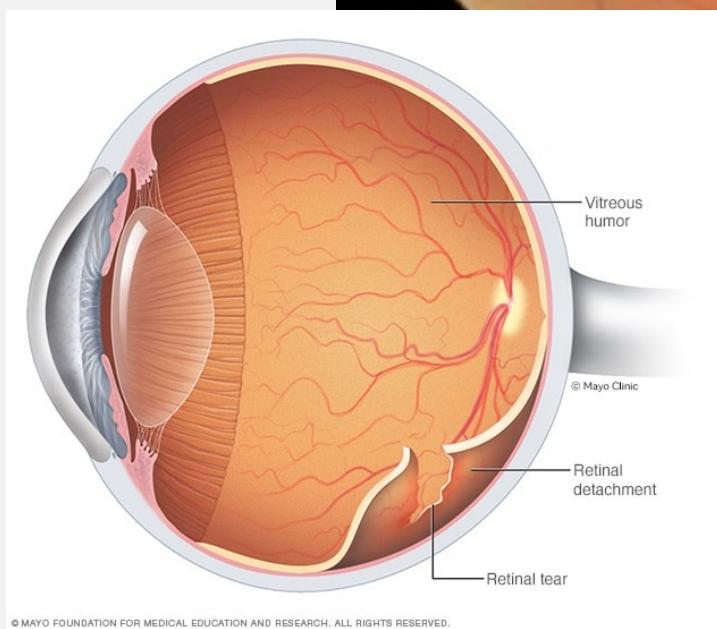
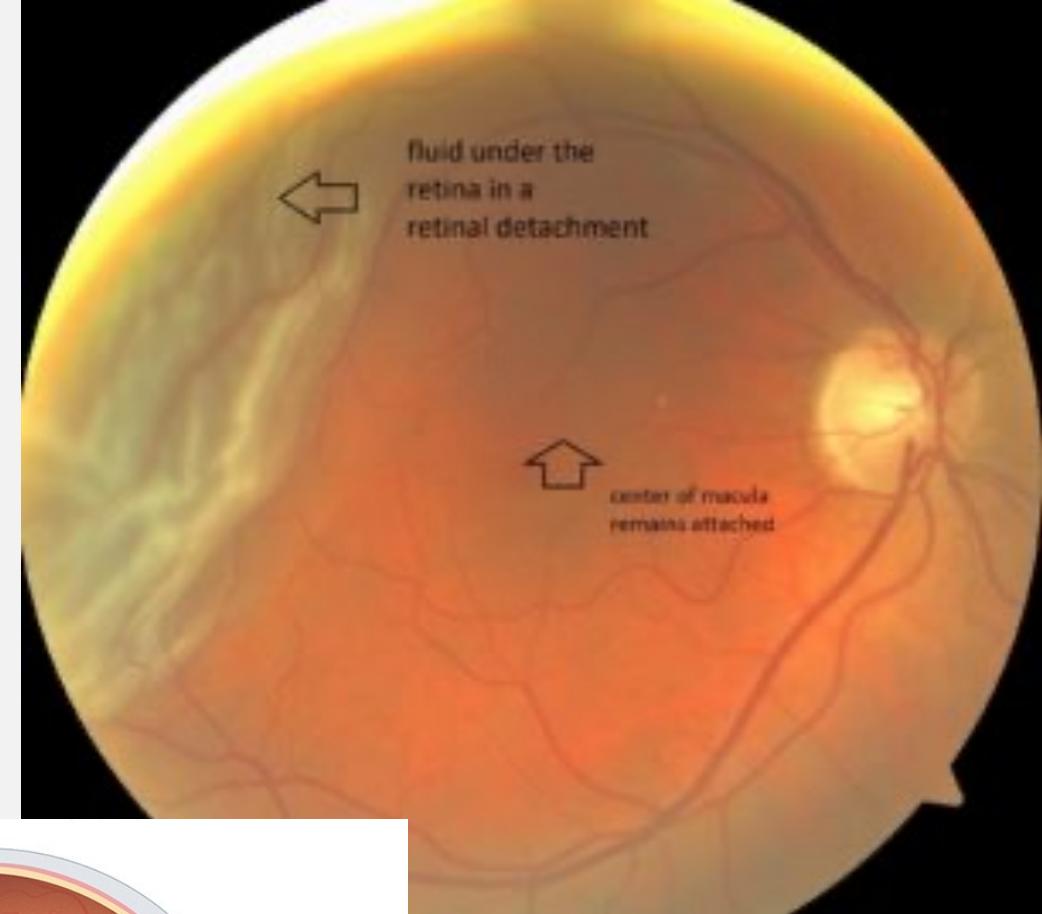
- **Curtain/ arcuate scotoma**
- **High myopia**
- Last 2 hours
- **Flashes + floaters**

Exam – see retinal image

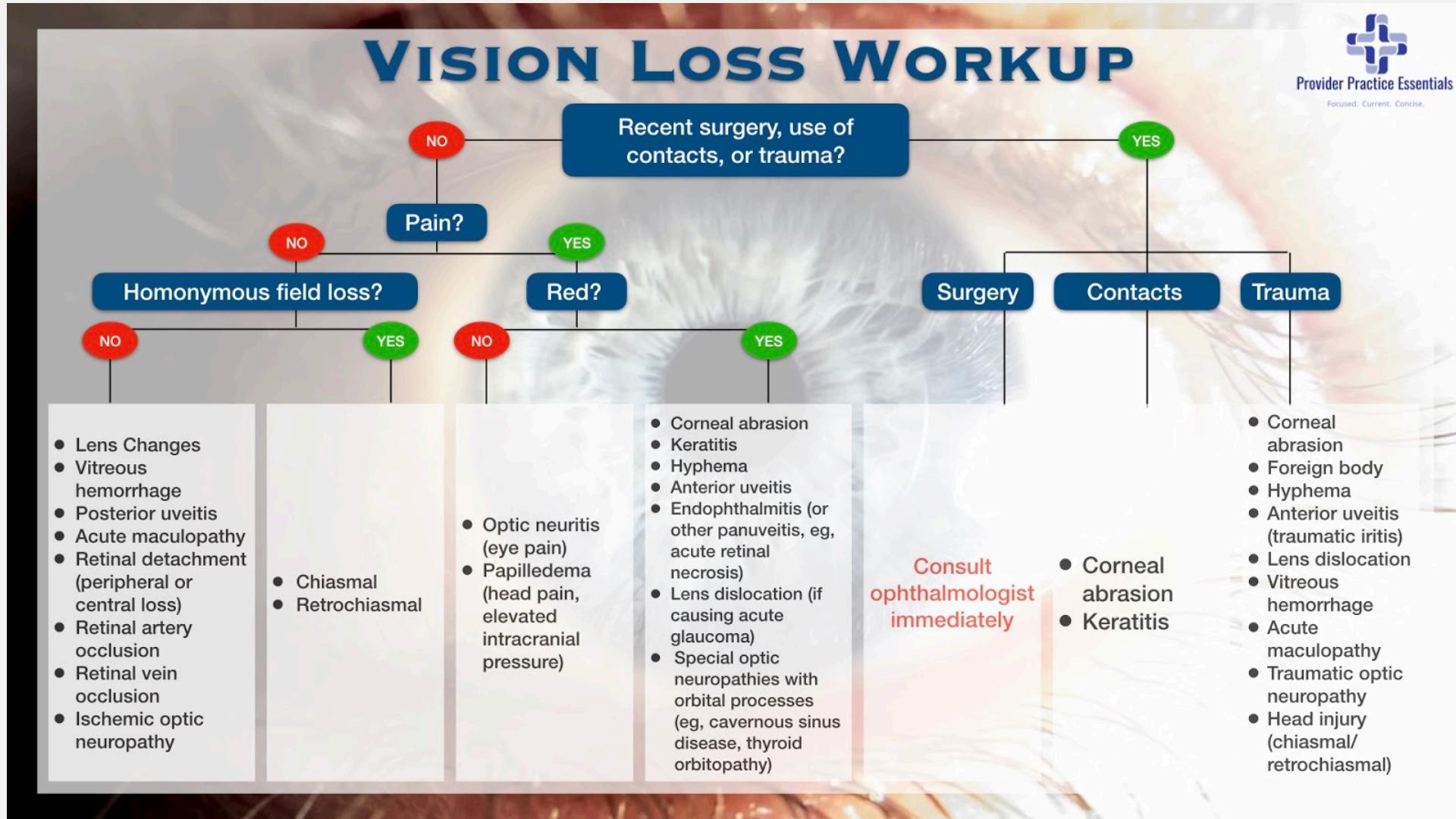
- **Macula on or off?**

Mx:

- Emergency surgery (laser, scleral buckle + vitrectomy)



# APPROACHING VISUAL LOSS

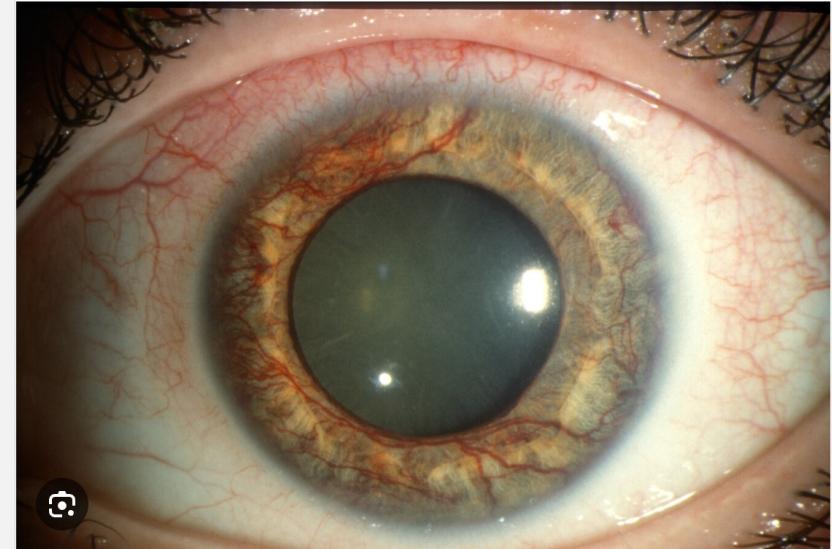




# DIABETIC RETINOPATHY

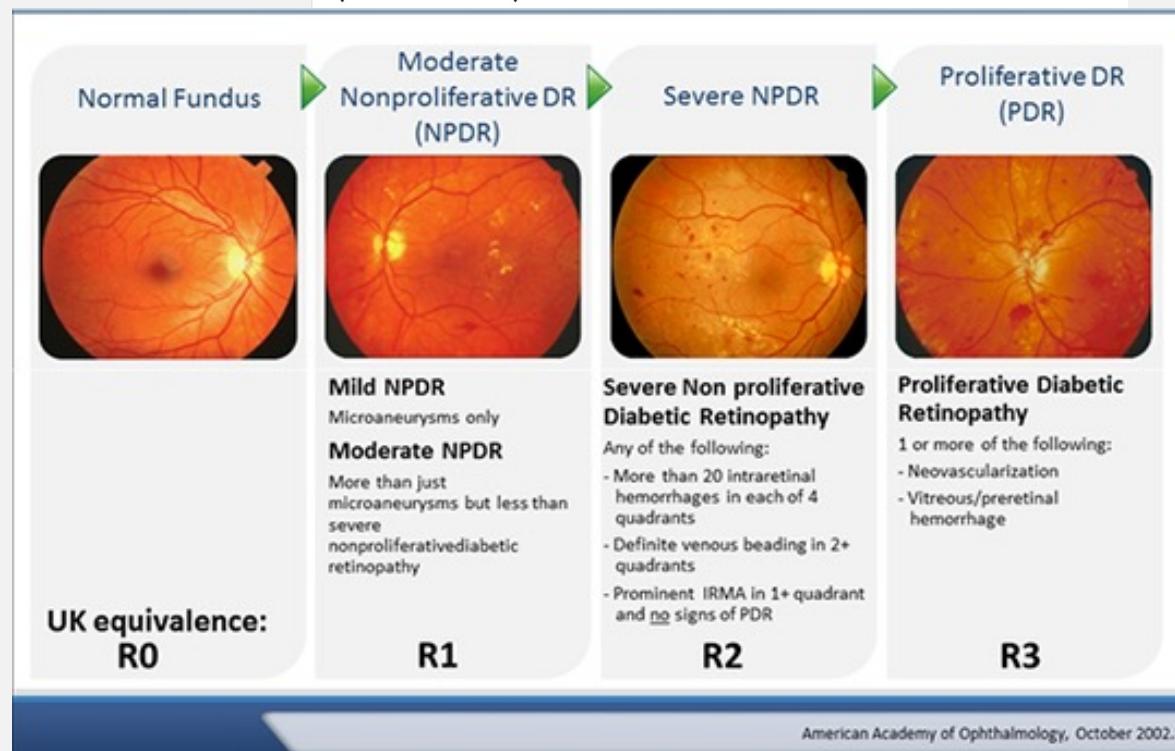
- Leading cause of blindness in working-age adults worldwide (NOT overall cause in Aus = ARMD)
- RFs: longer duration of diabetes (>10yrs), poor glycaemic control, systemic HTN, dyslipidaemia, anaemia, pregnancy, renal disease
- Pathophys: microvascular changes → retinal ischaemia and leaky vessels
- Patients remain asymptomatic for a long time
- **3 types:**
  - Non-proliferative
  - Proliferative
  - Diabetic macula oedema
- Diabetic patients should have fundus exam **annually**

How do I differentiate from HTN????



Moran CORE | Neovascularization of the Iris  
(Rubeosis Iridis)

[Visit >](#)





# HTN OR DIABETIC??

## HTN

- Flame hemorrhages
- Copper/ silver wiring
- More cotton wool
- AV nicking



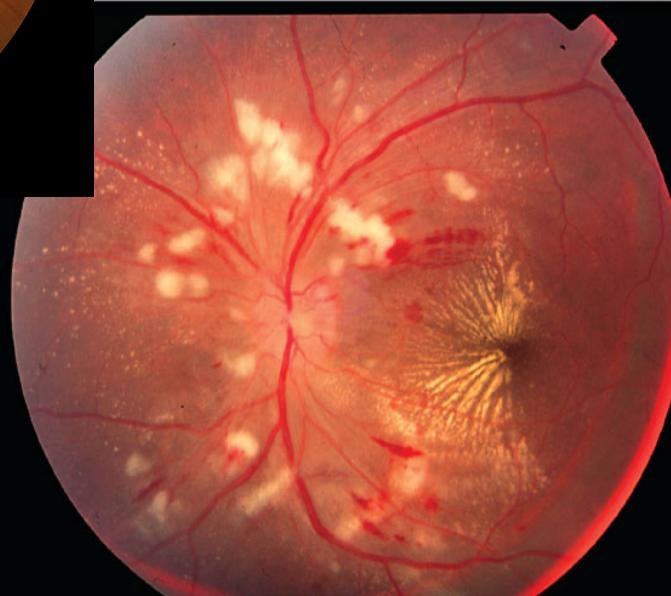
## Diabetic retinopathy

- Proliferation of vessels
- Vitreous hemorrhage
- Microaneurysms
- Previous laser

One



Three





## MANAGEMENT OF DIABETIC RETINOPATHY

### Non-proliferative

- Strict diabetes control

### Proliferative

- PRP (pan-retinal photocoagulation - laser)
- Anti-VEGF
- If really bad = vitrectomy

### Diabetic macular oedema

- Anti-VEGF
- +/- laser





# ARMD

- Chronic, slowly-progressing, atrophic change of macula – drusen
- Increased incidence with age
- **Most common cause of blindness in Australia**
- Risk factors: age, female, smoking, genetics, Caucasians, HTN, hypercholesterolaemia, sun exposure
- Symptoms & signs: central blurring of vision, distortion
- Mx
  - Monitor – amsler grid
  - Lifestyle factors – smoking cessation
  - Anti-VEGF if wet
  - Nutrition (Mediterranean diet) can slow progress

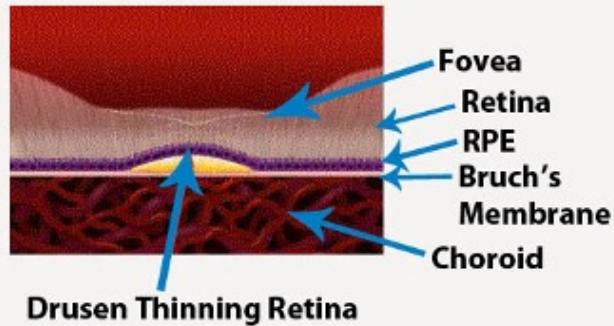
## Non-neovascular ARMD Treatments

### Antioxidant and mineral supplementation

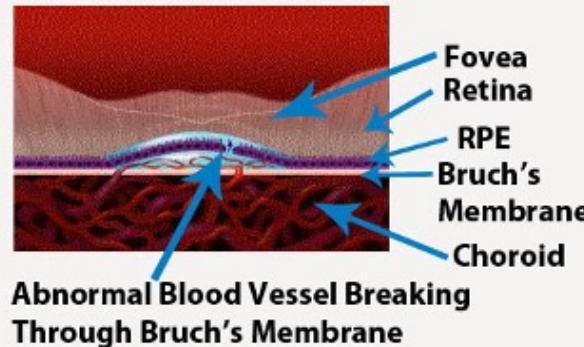
Antioxidant and mineral supplementation has been shown to reduce the risk of progression in ARMD.<sup>[67]</sup> The daily amounts of antioxidants and zinc in the AREDS formulation is<sup>[68] [4]</sup>:

- 500 milligrams of vitamin C
- 400 International Units of vitamin E
- 15 milligrams of beta-carotene (equivalent of 25,000 International Units of vitamin A)
- 80 milligrams of zinc as zinc oxide
- 2 milligrams of copper as cupric oxide

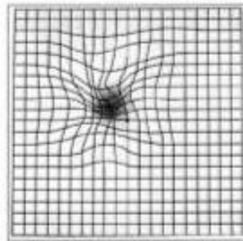
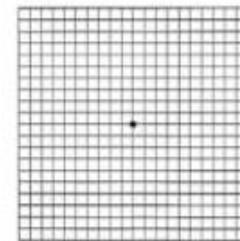
## Cross Section of Macula with Dry AMD



## Cross Section of Macula with Wet AMD



Amsler Grid in Macular Degeneration



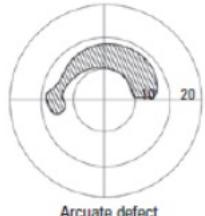
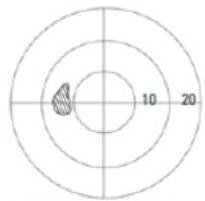
Normal

Abnormal

<https://www.eye-surgical.com/>



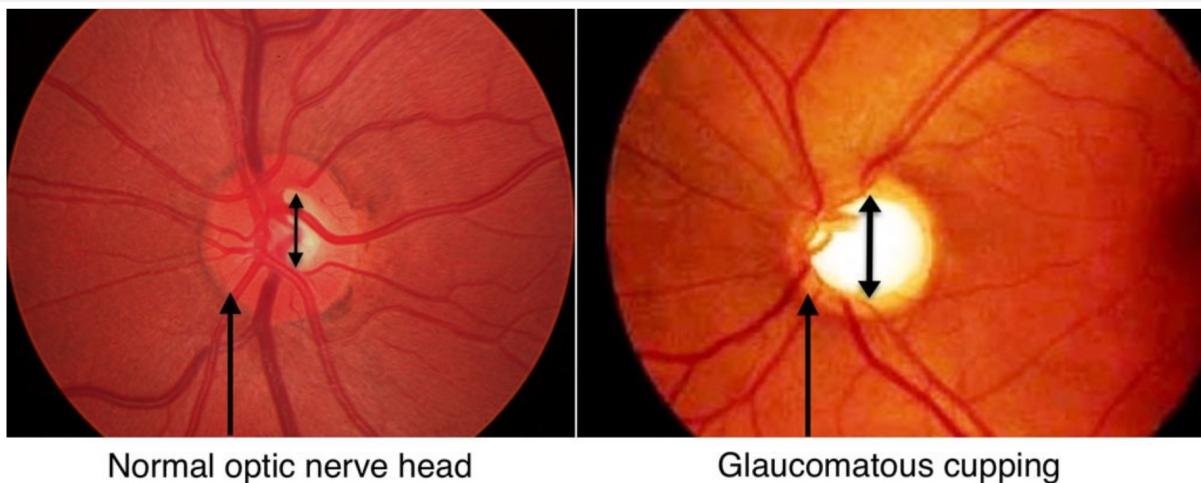
# GLAUCOMA – PRIMARY OPEN ANGLE (POAG)



- Most common form of glaucoma = 95% of cases
- “Obstruction of aqueous drainage through the trabecular meshwork/Canal of Schlemm leads to insidious and often asymptomatic visual loss” → **It's an optic neuropathy!**
- **RISK FACTORS** = Raised intraocular pressure(>21mmHg), African ethnicity, Family history
- Minor risk factors = Myopia, hypertension, diabetes, hyperthyroidism, topical steroid use, previous ocular trauma
- Usually asymptomatic until disease is advanced
  - Slow progressive loss of peripheral vision ('tunnel vision')
  - Arcuate scotoma

## EXAM

- Raised intraocular pressure (usually) = >21 and <40mmHg
- Open angle on gonioscopy
- Vertical **cup:disc ratio >0.5** (normal ≤0.3) → cupping increases with nerve fibre atrophy





# GLAUCOMA – PRIMARY OPEN ANGLE (POAG)

## TREATMENT

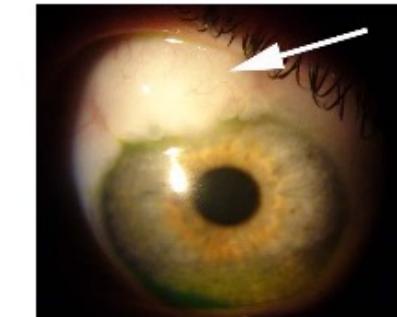
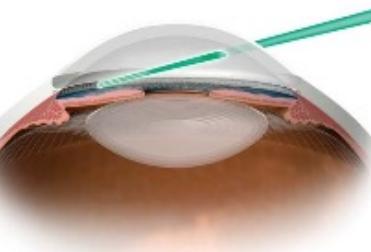
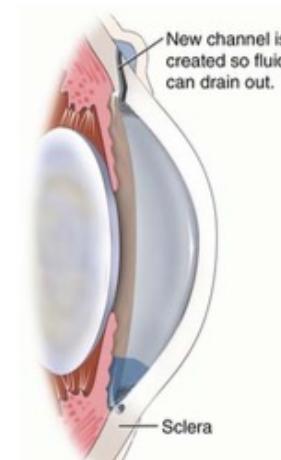
Intraocular pressure is the **only** treatable risk factor

### Medical

- Topical  $\beta$ -blockers (timolol)
  - ➔ Reduces aqueous production
  - ➔ SE: Bronchospasm (careful in asthma/COPD), bradycardia, hypotension, impotence
- Topical prostaglandin analogue (latanoprost, bimatoprost)
  - ➔ Increases uveoscleral outflow
  - ➔ SE: Iris colour change, periorbital skin pigmentation, lash growth
- Topical  $\alpha$ -adrenergic agonists
  - ➔ Non-selective (epinephrine): reduces aqueous production and increases trabecular meshwork outflow
  - ➔ Selective (brimonidine): reduces aqueous production and increases uveoscleral outflow
  - ➔ SE: Mydriasis, tachycardia
- Carbonic anhydrase inhibitor
  - ➔ Topical – dorzolamide/brinzolamide
  - ➔ Systemic – acetazolamide
  - ➔ Reduce aqueous production
  - ➔ SE: Sulfa allergy, diuresis, fatigue, paraesthesia, GI upset

### Surgical

- Trabeculoplasty
- Trabeculectomy ( $\pm$  antimetabolites e.g. 5-fluorouracil)





# GLAUCOMA – ACUTE ANGLE CLOSURE (AACG)

- Acute angle closure glaucoma is a sudden elevation in intraocular pressure that occurs when the lens apposes the back of the iris, blocking the trabecular meshwork and preventing drainage of aqueous.

## RISK FACTORS

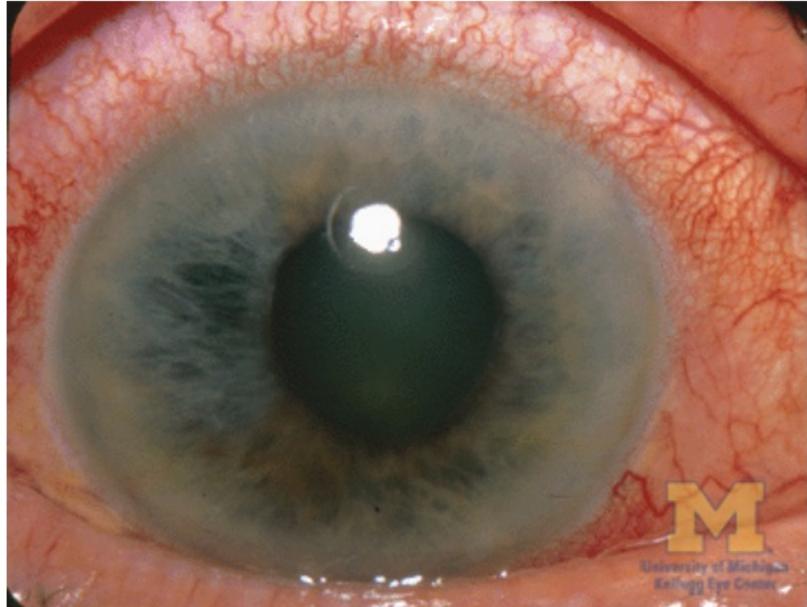
- Older age(>70years)
- Hyper metropia (long-sighted people)
- Female
- Asian descent

## SYMPTOMS:

- Red painful loss of vision (or blurred)
- Halos around lights
- Headache
- NV

## Exam

- Fixed mid-dilated pupil**
- Reduced visual acuity
- Red eye
- Hazy cornea**
- Raised intraocular pressure**
- Closed irido-corneal angle on gonioscopy



## TREATMENT:

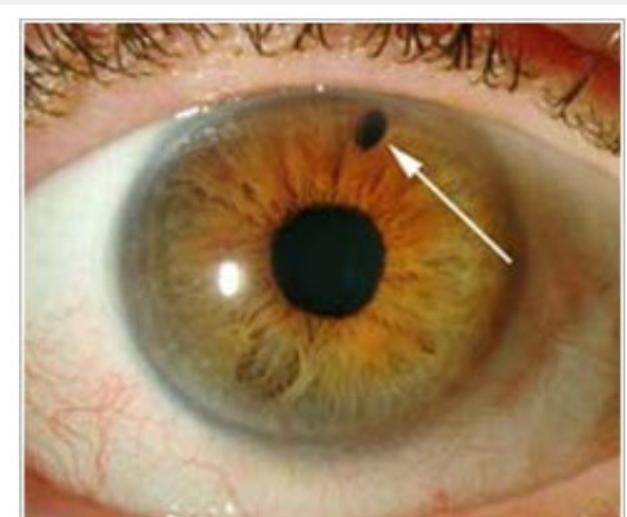
If treatment is delayed, **peripheral anterior synechiae** can form (adhesions between iris and cornea)

## Medical:

- Topical =  $\beta$ -blockers (timolol), cholinergic antagonist (pilocarpine)
- Systemic = Carbonic anhydrase inhibitor (acetazolamide)

## Surgical:

- Peripheral iridotomy





## GUESS WHO?

60-year-old woman with painless sudden onset total right eye visual loss on b/g  
HTN, hyperlipidemia and MI

Dx: central retinal artery occlusion (CRAO)

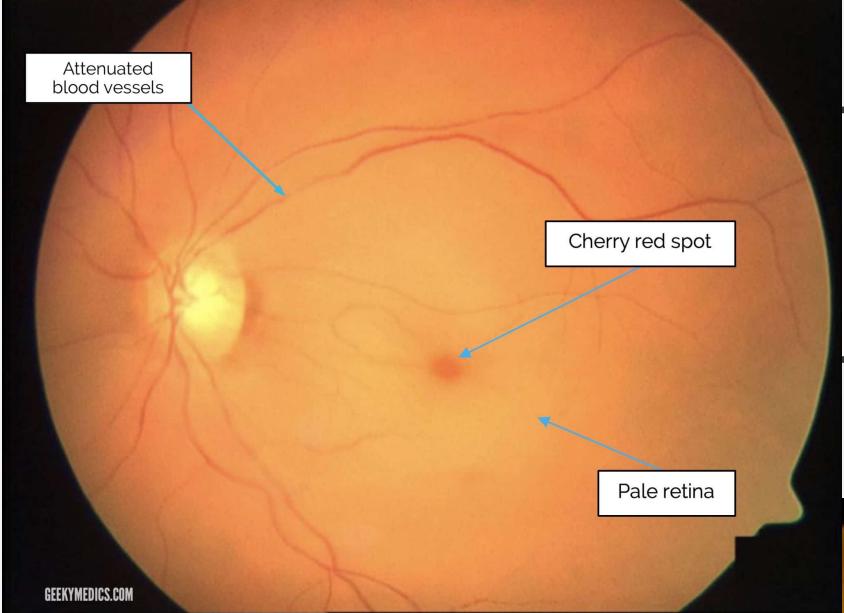
Exam:

- Pale disc
- Cherry red spot

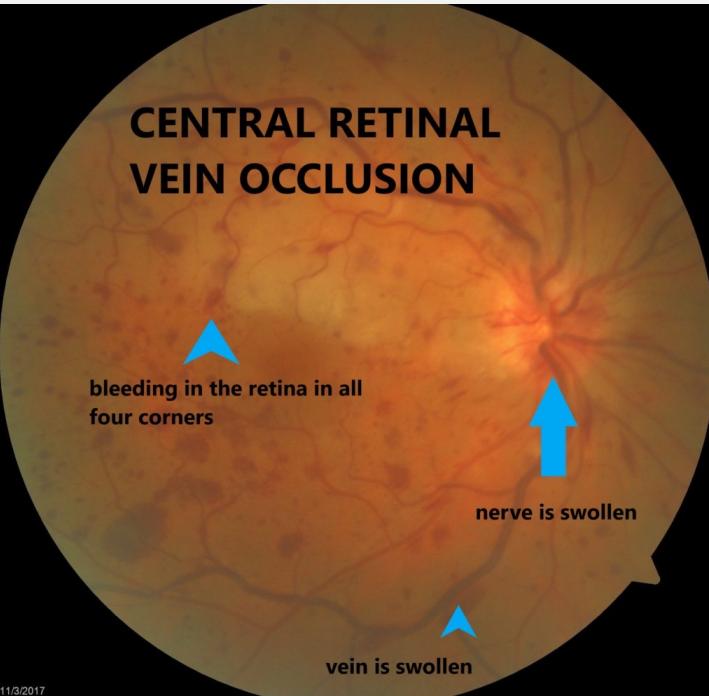
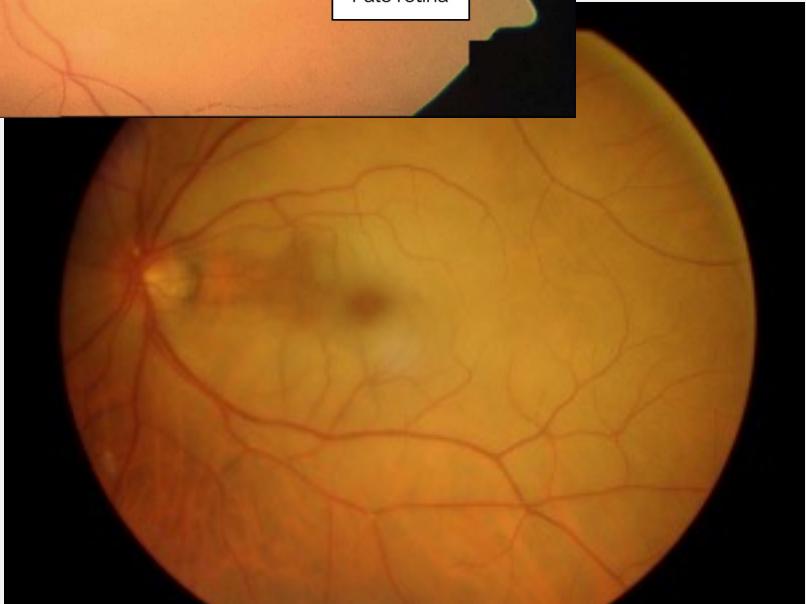
Mx

- Emergency Ophthal referral
- Not much else – ocular massage, CO<sub>2</sub> rebreathing
- Stroke work-up and prevention





# CRAO VS CRVO



## Central retinal vein occlusion

- Blood and thunder
- ++ blot and flame haemorrhages
- Tortuous vessels

## Central retinal artery occlusion

- Pale retina
- Cherry red spot
- Sometime cilioretinal artery sparing



# AMBLYOPIA VS STRABISMUS

## Amblyopia

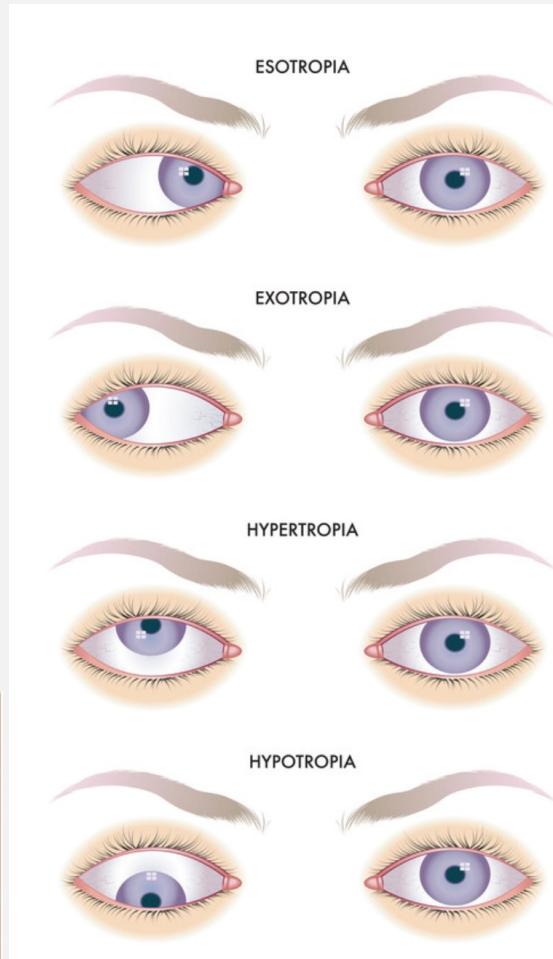
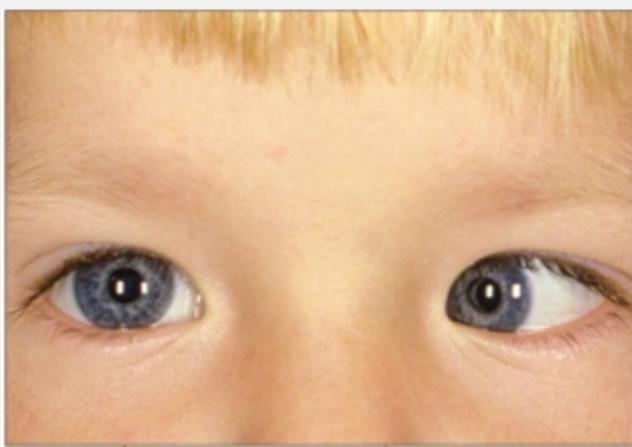
- **Abnormal visual development**

## Causes

- Strabismus
- Refractive error
- Congenital cataract

## Treatment (up to 7 years of age)

- Correct refractive error
- Patching



## Strabismus

- **Misaligned visual axis**

## Causes

- Muscle over-/under- activity

## Treatment (up to 7 years of age)

- Prisms
- Botox
- Surgery
- Treat refractive error

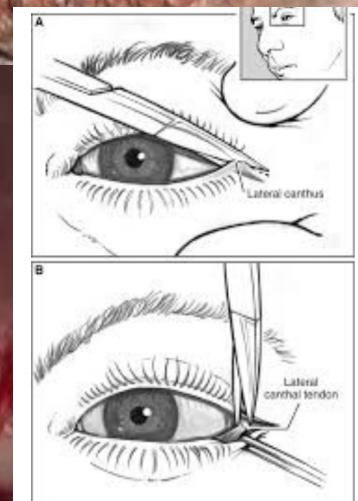
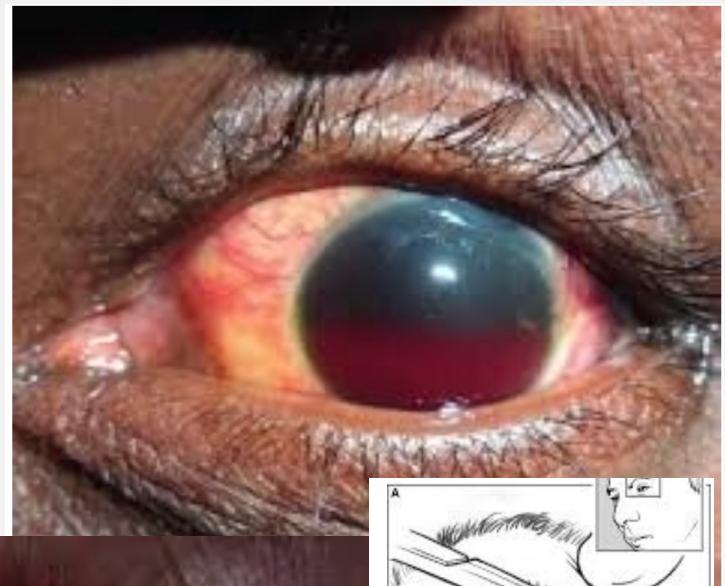
**TRAUMA!**



# BLUNT EYE INJURY

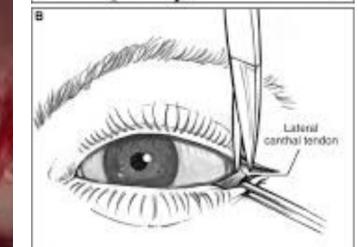
## Traumatic hyphaema

- Beware 2° AACG
- Mx = steroids, pressure lowering drops, possible surgery (AC washout)



## Retrobulbar haemorrhage

- Orbital compartment syndrome
- Lateral canthotomy/ cantholysis → relieve pressure



## Orbital floor fracture

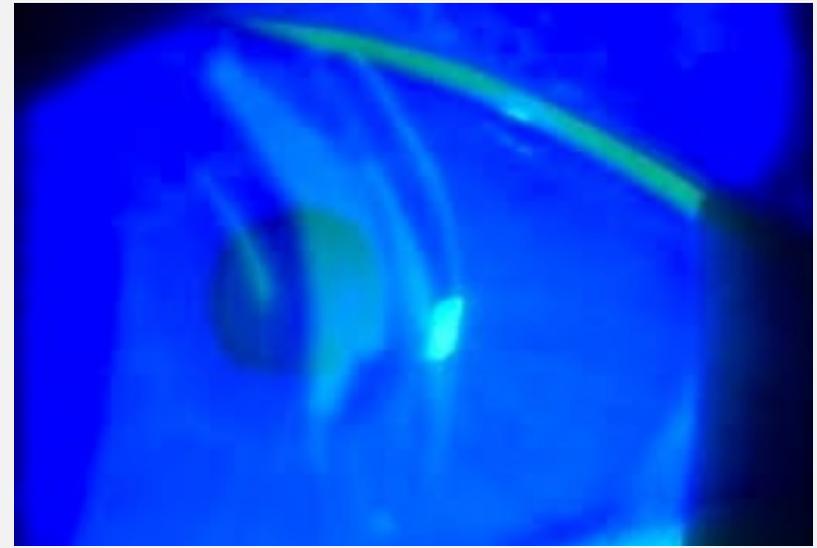
- **Diplopia upward gaze** (inf. Rectus trapping)
- Ix = CT
- Mx = refer ophthal/ maxfax, avoid sneezing → surgery
- Beware **bradycardia** (vagal response)





# FOREIGN BODY

- Painful red eye → causes a corneal abrasion
- Occupational history important - E.g. Tradie and angle grinder
- **Linear corneal abrasions** – think subtarsal foreign body
- You must EVERT the eyelid on examination
- Management
  - Remove foreign body (+ metal rust)
  - Topical antibiotic
  - Analgesia
  - **Refer ophthal if visual axis or concerns**





## GUESS WHO?

34-year-old with intermittent double vision on downward gaze (especially when goes down steps) – all started after she got hit in the head by a soccer ball



Dx: Trochlear (CN 4) palsy

- CN 4 has longest intracranial course – most susceptible to traumatic damage
- Head tilt test

Mx:

- Wait and watch (traumatic is harder)
- Prism





# CRANIAL N. PALSIES

CN 3 = “down and out”

CN 4 = diplopia on downward gaze (or just weird intermittent diplopia)

CN 6 = loss of lateral gaze (abducens)

- abducens is most susceptible to raised ICP – Dorello’s canal

Cranial nerve palsy	Exam findings – evidence of incomitance (i.e. angle of squint varies with position of gaze)		
Right 3 <sup>rd</sup> nerve palsy	 Smaller angle of horizontal squint	 Right eye turns downwards & outwards	 Unable to adduct right eye Larger angle of squint Double vision further apart
Right 4 <sup>th</sup> nerve palsy	 No obvious squint	 Right eye turns upwards	 Right eye elevates more as it moves medially Double vision further apart
Right 6 <sup>th</sup> nerve palsy	 Unable to abduct right eye Larger angle of squint Double vision further apart	 Right eye turns inwards	 Able to adduct right eye No obvious squint

# QUESTIONS??

## Resources

- If you're confident with your ophthal slides, you will be fine
- Eyewiki = [https://eyewiki.org/Main\\_Page](https://eyewiki.org/Main_Page)

Make sure you're also comfortable with

- Giant cell arteritis/ temporal arteritis
- Retinoblastoma (always beware in a newborn with leukocoria/ loss of red reflex)
- Orbital cellulitis (pre-septal vs post-septal)
- Chalazion vs Stye (stye is infective and chalazion is not)



**YOU GOT THIS**

quickmeme.com