



Penn Medicine

Glaucoma: A brief review

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Learning outcomes:

- Describe subtypes of glaucoma and their pathophysiology
- Review the treatment for the most common subtypes
- Identify and gain familiarity in common glaucoma medications
- Identify when to refer to ophthalmology





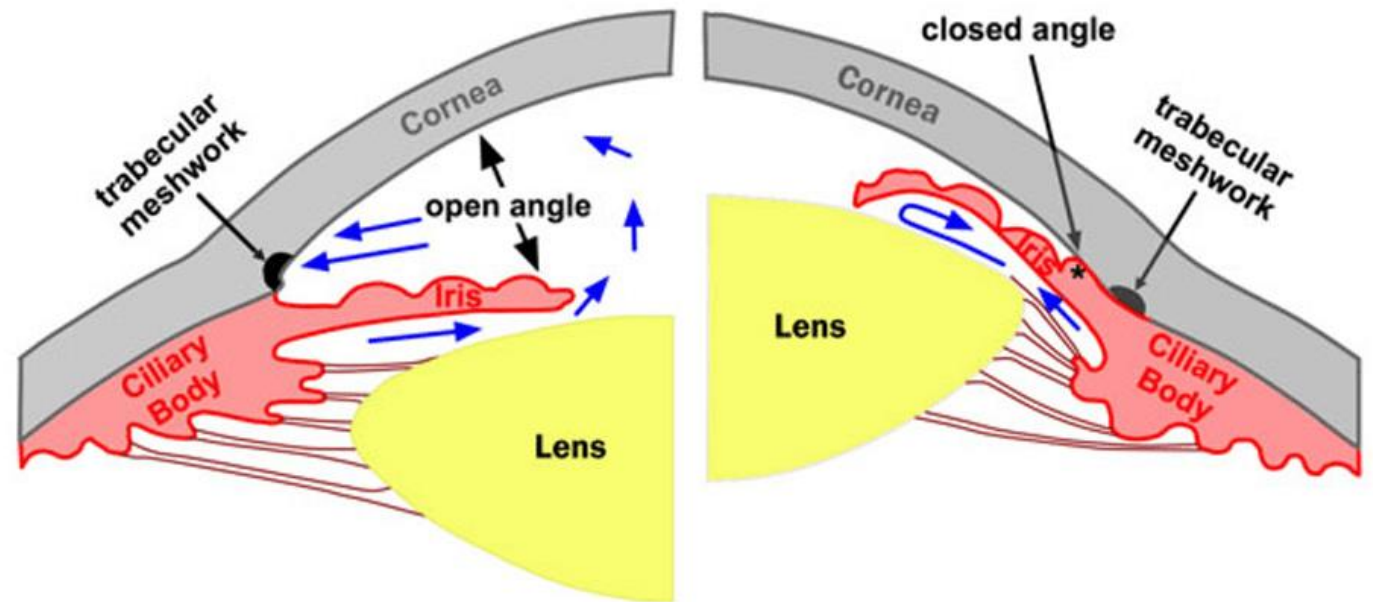
****mrw when I have to do a medrec on
my patients 8 different eyedrops****



me returning to Wood clinic and deciding I'm an ophthalmologist after a 5min lecture on glaucoma

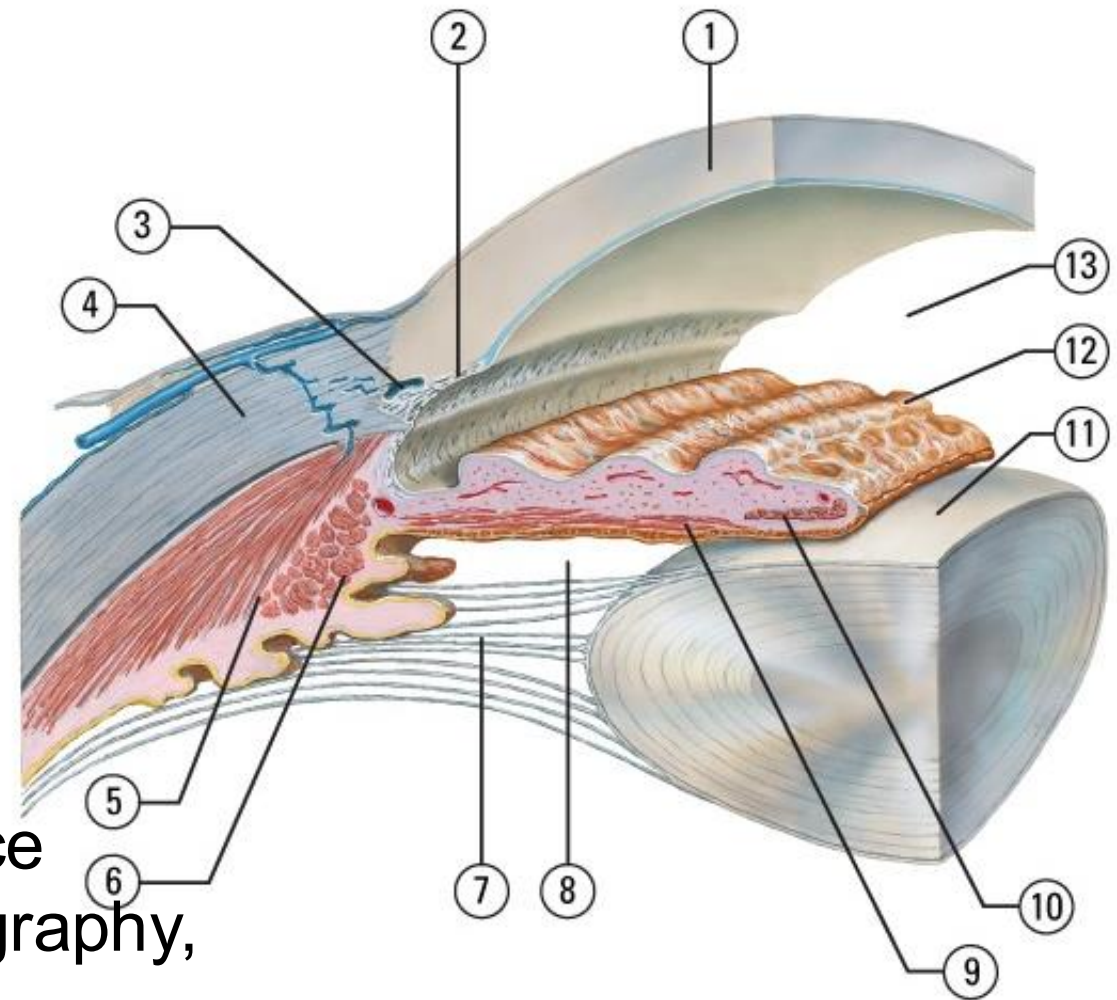
Glaucoma Intro and Subtypes

- ▶ Group of eye diseases characterized by optic neuropathy involving a characteristic atrophy of the optic nerve head, which may or may not be accompanied by elevated intraocular pressure (IOP)
- ▶ Results in vision loss (peripheral->central)
- ▶ Subtypes
 - Open angle
 - Closed angle
 - Others:
 - Normal tension
 - Congenital
 - Primary/secondary



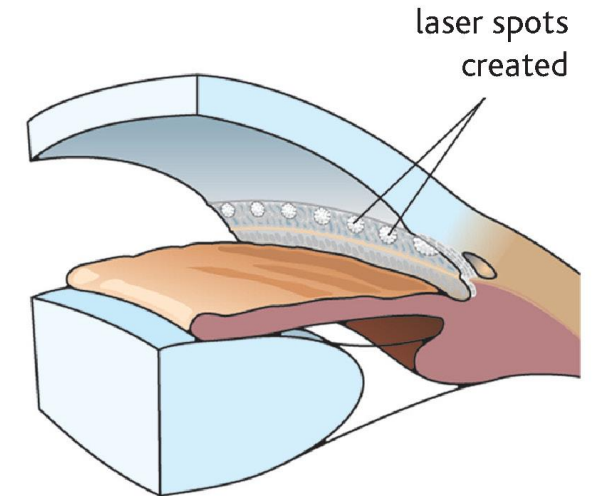
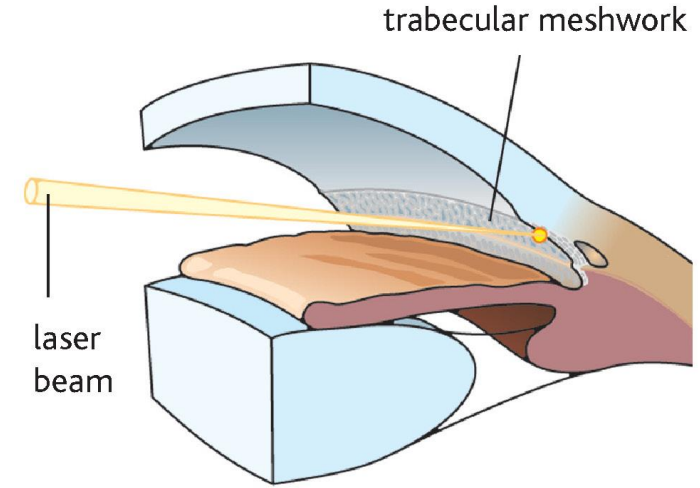
Open angle glaucoma

- ▶ Most common subtype
- ▶ Elevated IOP
- ▶ Diagnosis
 - Fundus examination
 - Visual field testing
 - Tonometry (IOP)
 - Others: Pachymetry, optical coherence tomography, Heidelberg retinal tomography, scanning laser polarimetry
- ▶ Treatment
 - Aimed at reducing IOP



Open angle glaucoma treatment

- ▶ Pharmacological management
 - Reduced aqueous inflow
 - Increased aqueous outflow
 - Dosed 1-4 times daily
 - E.g. latanoprost, timolol
- ▶ Laser therapy
 - Trabeculoplasty
- ▶ Surgery
 - Trabeculectomy



Trabeculoplasty

Open angle glaucoma treatment

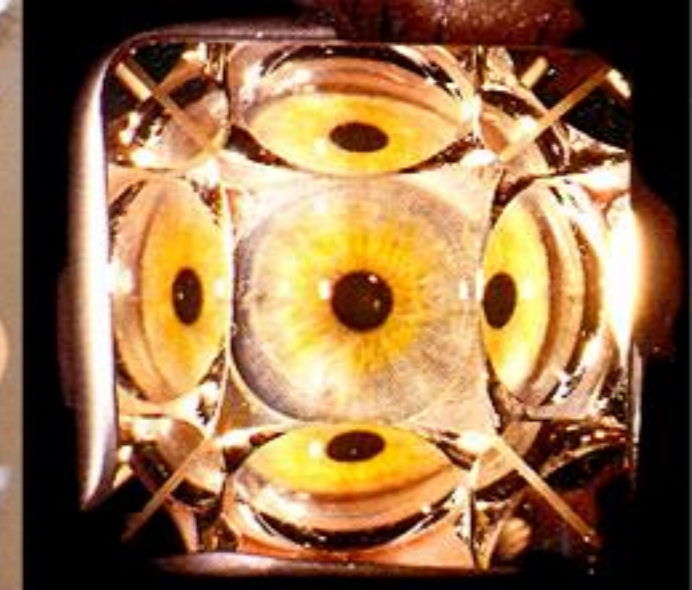
Agents that increase aqueous outflow		
Prostaglandin analogues, (prostamide)	Bimatoprost, latanoprost, tafluprost, travoprost, unoprostone*	Brown discoloration of iris, lengthening and darkening of eyelashes, ocular irritation and redness, macular edema or iritis in susceptible individuals
Alpha adrenergic agonists	Apraclonidine, brimonidine	Red eye and ocular irritation. CNS effects and respiratory arrest in young children (brimonidine). Caution in patients with cerebral or coronary insufficiency, Raynaud phenomenon, postural hypotension, hepatic or renal impairment.
Cholinergic agonists	Pilocarpine, carbachol	Ciliary spasm leading to headaches especially in younger patients, myopia, dim vision (small pupil). Cataracts and iris-lens adhesions in long term.
Rho kinase inhibitors	Netarsudil	Red eye and ocular irritation.

Open angle glaucoma treatment

Class	Examples	Side effects
Agents that suppress aqueous inflow		
Beta adrenergic blockers	Betaxolol, carteolol, levobunolol*, timolol	Ocular irritation and dry eyes. Contraindicated in patients with bradycardia, heart block, heart failure, asthma, or obstructive airway disease.
Alpha-2 adrenergic agonists	Apraclonidine, brimonidine	Red eye and ocular irritation. CNS effects and respiratory arrest in young children (brimonidine). Caution in patients with cerebral or coronary insufficiency, Raynaud phenomenon, postural hypotension, hepatic or renal impairment.
Carbonic anhydrase inhibitors	Dorzolamide and brinzolamide (topical), acetazolamide and methazolamide (oral)	Oral form can cause transient myopia, nausea, diarrhea, loss of appetite and taste, parasthesiae, lassitude, renal stones, and hematological problems. Topical forms much less likely to cause systemic side effects but can cause local irritation and redness.

Closed angle glaucoma

- ▶ An ophthalmological emergency
- ▶ Symptoms/signs
 - Eye pain
 - Sudden vision loss with halos around lights
 - Frontal headache
 - Fixed, mid-dilated pupil
- ▶ Management
 - Send to emergency department
 - Diagnosis: Tonometry, gonioscopy, ultrasound biomicroscopy
 - Treatment: topical drops of beta blockers (timolol), alpha agonists (apraclonidine), and pilocarpine. IV acetazolamide +/- mannitol. Subsequent laser/surgical peripheral iridotomy



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Thank You!

