

# Around the Globe: Update in Ophthalmology



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# Outline

- Update on eye care delivery system in the 21st century
- Review of common eye exam screening recs
- Systemic medications with ocular effects
- Around the Globe update in Ophthalmology

# Eyecare Word Salad

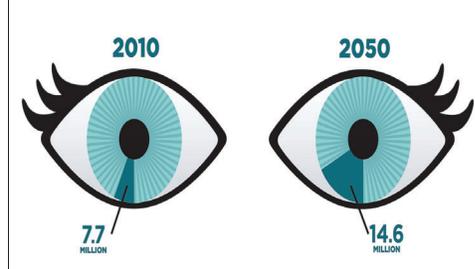
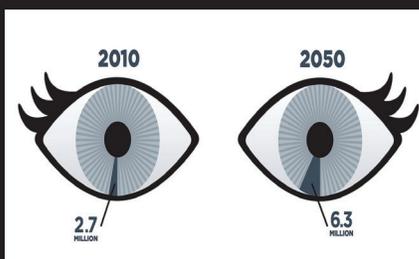
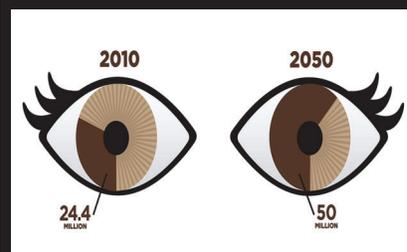
- Ophthalmologist
- Optometrist
- Optician
- Ophthalmic Assistant

# Eyecare Word Salad

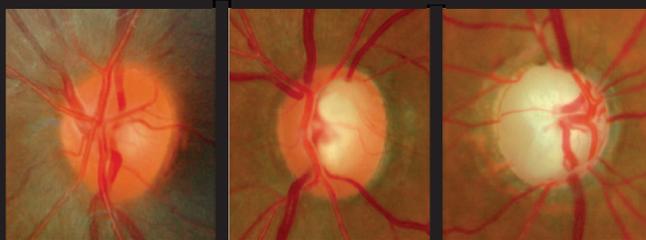
- **Ophthalmologist**
  - Surgical and complex medical management
  - +/- primary eye care
- **Optometrist**
  - Primary eye care
  - Mild to moderate disease management monitoring
- **Optician**
  - Assists in delivery of optical correction to patients
- **Ophthalmic Assistant**
  - Similar to MA in traditional medical practice

# What is Primary Eyecare

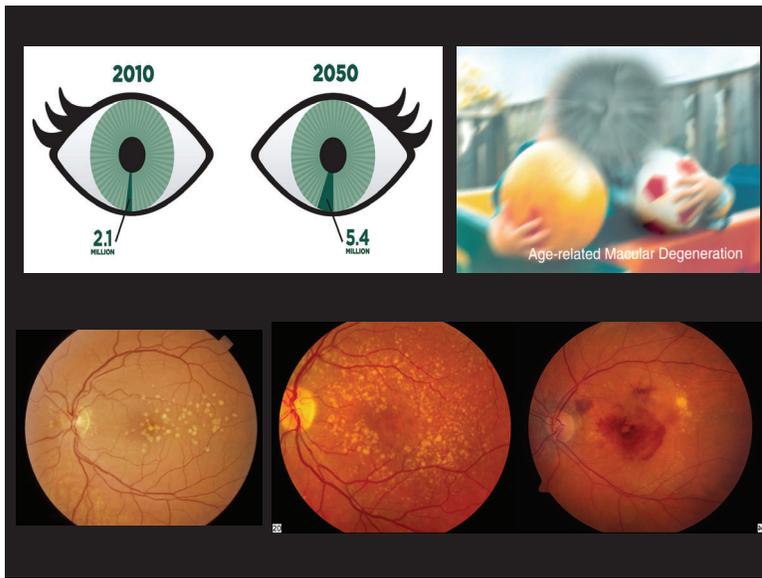
- **Glasses and Contact Lens Appointments**
- **General eye health screening exam**
  - Screening for diabetic retinopathy
  - Screening for glaucoma, age related macular degeneration (ARMD), cataract
- **Triage Patients**
  - Identify patients in need of more specialized care and refer to specialist as needed
- **Identify ocular manifestations of systemic diseases**
- **Recognize and manage local effects of drug therapy**



# Diabetic Retinopathy



© SAOUD PANGAM FOFI



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## AOA Child Screening Recs:

Patient age (years)	Asymptomatic/low risk	At-risk
Birth through 2	At 6 to 12 months of age	At 6 to 12 months of age or as recommended
3 through 5	At least once between 3 and 5 years of age	At least once between 3 and 5 years of age or as recommended
6 through 17	Before first grade and annually thereafter	Before first grade and annually, or as recommended thereafter

- Prematurity, low birth weight, prolonged supplemental oxygen at birth.
- Family history of myopia, amblyopia, strabismus, retinoblastoma, congenital cataracts, metabolic or genetic disease.
- Infection of mother during pregnancy (e.g., rubella, toxoplasmosis, venereal disease, herpes, cytomegalovirus or human immunodeficiency virus).
- **High or progressive refractive error.**
- Strabismus.
- Anisometropia.
- **Academic performance problems.**
- Systemic health conditions with potential ocular manifestations.
- Wearing contact lenses.

## AOA Adult Screening Recs:

Patient age (years)	Asymptomatic/low risk	At-risk
18 through 39	At least every two years	At least annually, or as recommended
40 through 64	At least every two years	At least annually, or as recommended
65 and older	Annually	At least annually or as recommended

- **A personal or family history of ocular disease.**
- **Systemic health conditions with potential ocular manifestations.**
- Taking prescription or nonprescription drugs with ocular side effects.
- Functional vision in only one eye.
- Wearing contact lenses.
- Eye surgery or previous eye injury.
- High or progressive refractive error.

## ICO/ADA DM Recs

How?	When?	Follow-Up Eye Exam Schedule
 Dilated comprehensive eye exam   Retinal photography*	 For people with type 1 diabetes: within 5 years after the onset of diabetes   For people with type 2 diabetes: at the time of diabetes diagnosis	<ul style="list-style-type: none"> <li>At least annually for people with any level of retinopathy</li> <li>Every 1-2 years for those with no retinopathy for one or more annual exams and well-managed glycemia</li> <li>More frequently for those with progressing or sight-threatening retinopathy</li> </ul> 

\*Retinal photography with remote reading or use of an authorized artificial intelligence tool can expand access to screening where qualified eye care professionals are not available. When abnormalities are detected, in-person exams will be needed.

**Treatment**  
 Promptly refer to an ophthalmologist who is knowledgeable and experienced in managing DR any individuals with:

- Any level of diabetic macular edema
- Moderate or worse nonproliferative DR (a precursor of proliferative DR)
- Any proliferative DR

## ICO/ADA DM Recs

Classification	Re-examination or Next Screening Schedule
Diabetic Retinopathy (DR)	
No apparent DR, mild nonproliferative DR, and no DME	Re-examination in 1-2 yrs
Mild nonproliferative DR	1-2 yrs
Moderate nonproliferative DR	6-12 mos
Severe nonproliferative DR	<3 mos
Proliferative DR	<1 mo
Diabetic Macular Edema (DME)	
Non-center-involving DME	3 mos
Center-involving DME	1 mo

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## Hydroxychloroquine

- Malaria, lupus, rheumatoid arthritis
- Dose:
  - <6.5mg/kg/day
  - <1000gm total dose

### Testing:

- Baseline Testing
- Annual screen after 5 years

Ocular SE: Macular changes



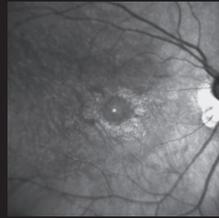
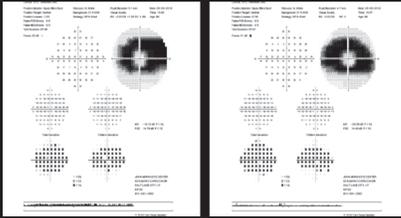
## Hydroxychloroquine

Patients to beware of:

- High BMI
- Liver or renal dysfunction
- Age >60
- Previous retinal pathology

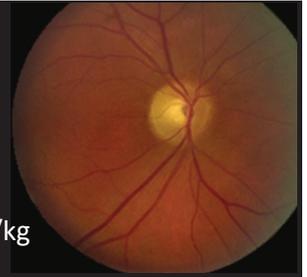
Testing

- Fundus Exam
- HVF 10-2
- ERG, OCT or AF



## Ethambutol

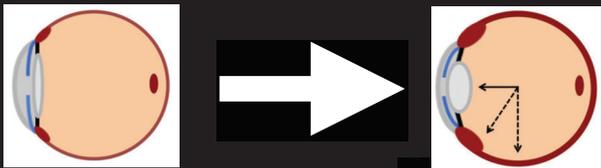
- Mycobacterium
- Dose:
  - 6% toxicity if >25mg/kg
  - Rare complication if <15mg/kg



- Ocular SE: optic neuritis color vision change, HVF change
- Onset is usually 3-6 months post initiating therapy
- 30-60% may slowly recover over 12 months

## Topiramate

- Migraine and epilepsy
- Ocular SE:
  - Bilateral choroidal swelling leading to bilateral angle closure
  - VERY rare: 3 per 100,000
  - Treatment opposite of usually treatment for angle closure



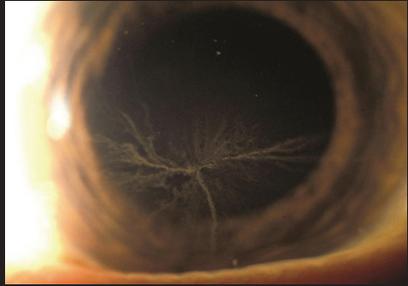
## Tamsulosin

- Benign prostatic hyperplasia
- Ocular SE:
  - IFIS: Intraoperative Floppy Iris Syndrome
  - Permanent change to iris structure that increases risk of cataract surgery slightly
  - Stopping medication does not change risk



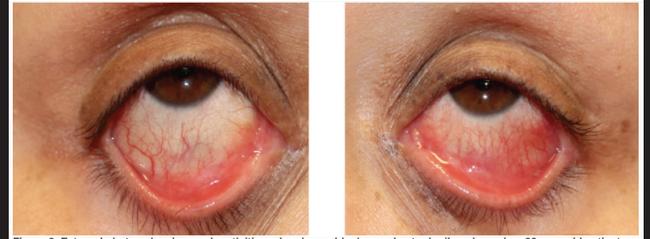
## Amiodarone

- Cardiac arrhythmias
- Ocular SE:
  - Vortex keratopathy (reversible)
  - VERY rare optic neuropathy



## Dupilumab (Dupixent)

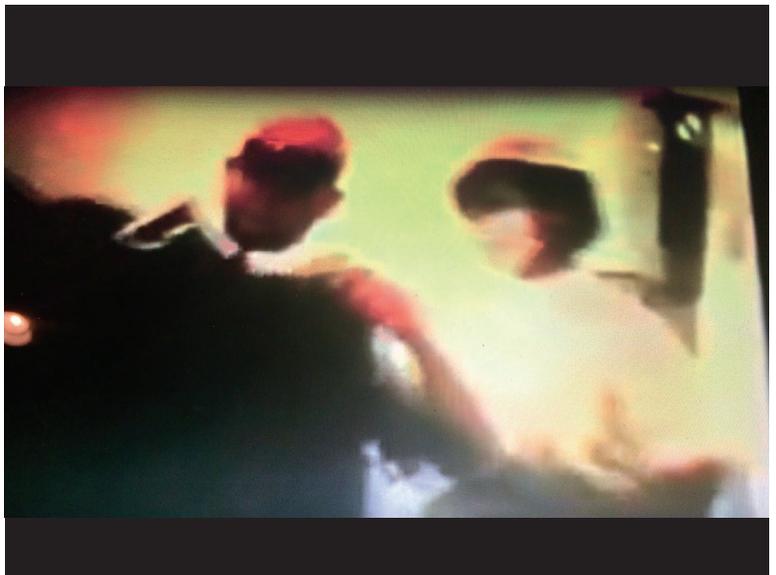
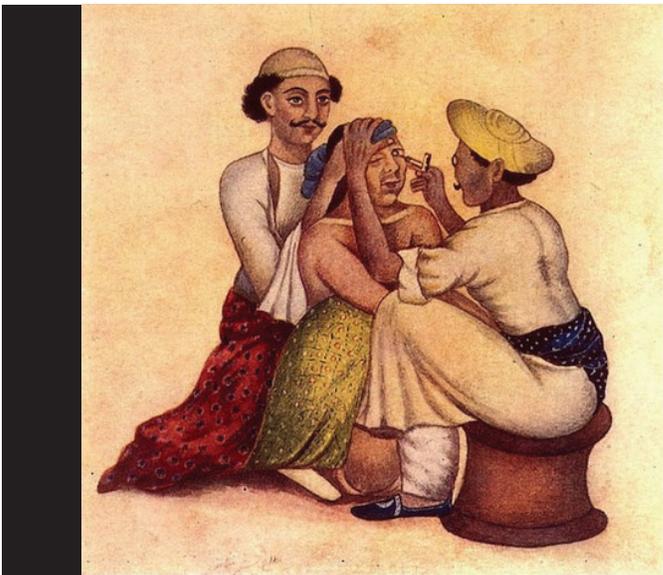
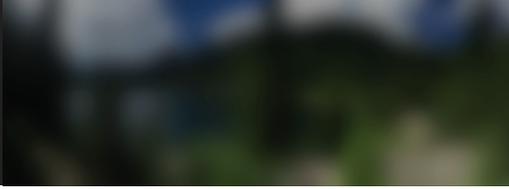
- IL-4 receptor inhibitor administered by SC injection
- Atopic dermatitis, Asthma, Eosinophilic Esophagitis
- Ocular SE: Conjunctivitis, dry eye, cicatricial ectropion, symblepharon



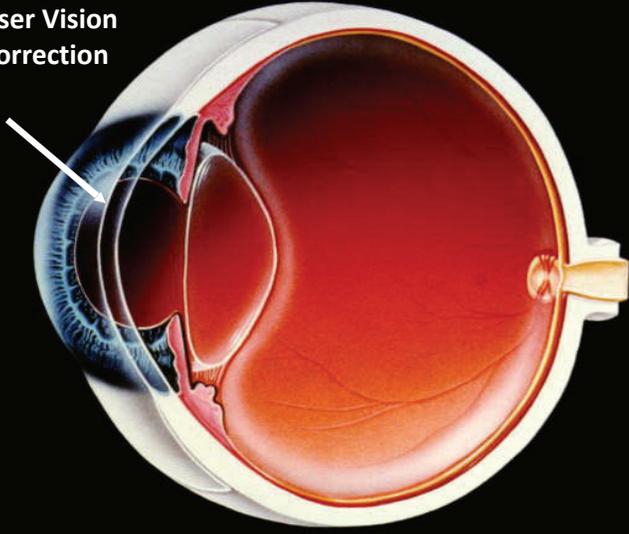
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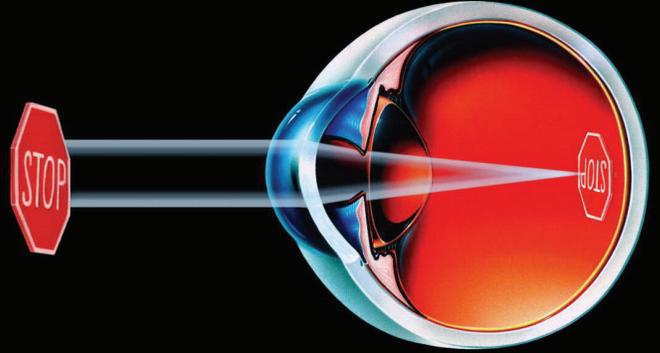




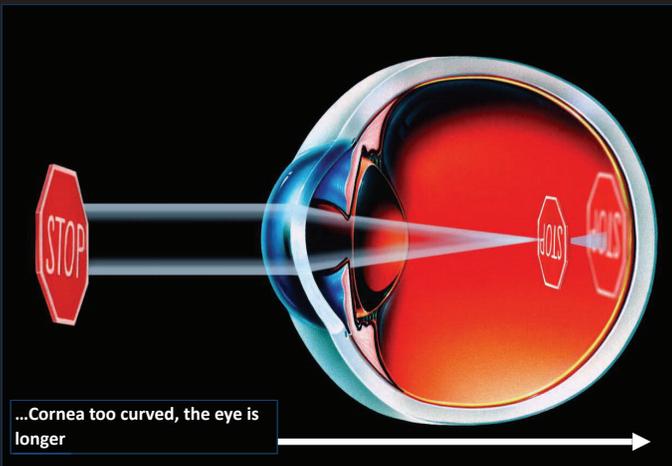
Laser Vision Correction



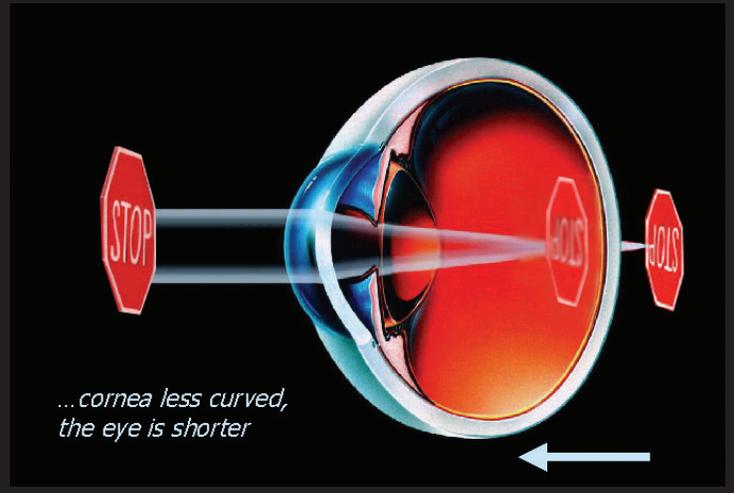
Normal Eye



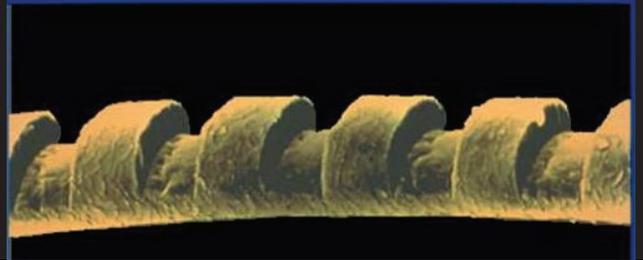
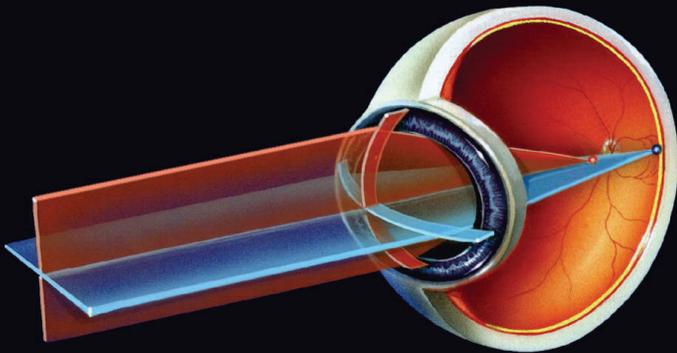
Nearsighted Eye (Myopia)



Farsighted Eye (Hyperopia)



# Astigmatism



## Laser Vision Correction

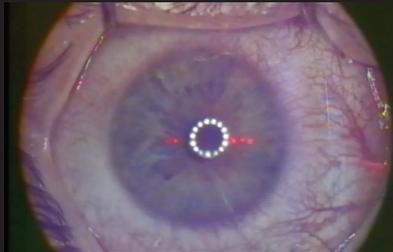
**Myopia** = Nearsightedness 0-12 D

**Hyperopia** = Farsightedness 0-6 D

**Astigmatism** = Astigmatism 0-6 D



PRK: surface laser

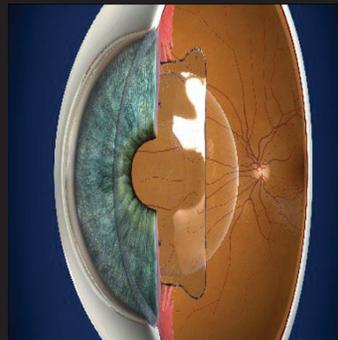


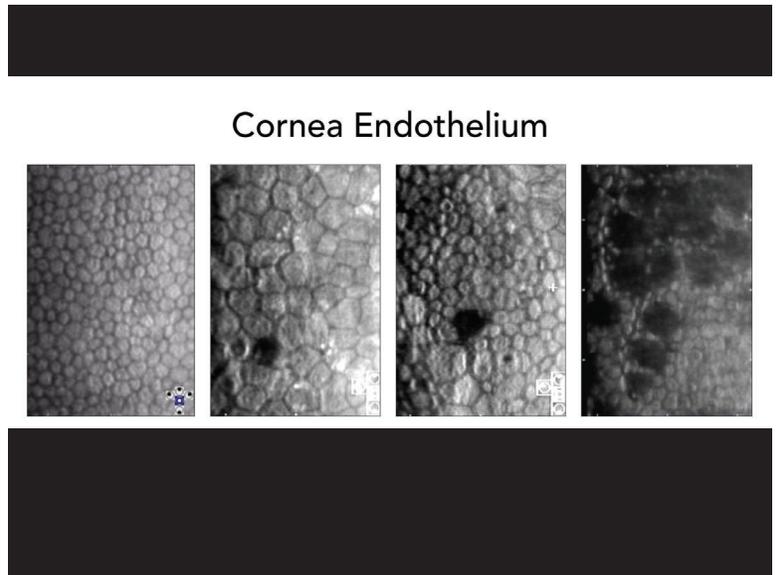
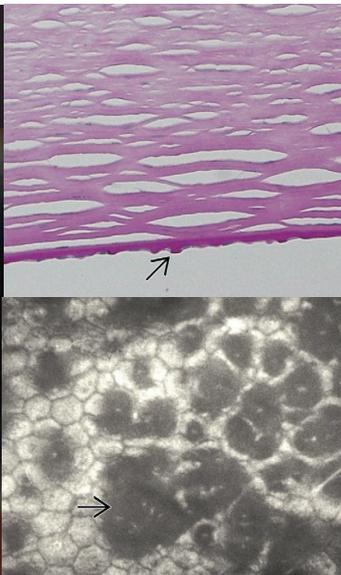
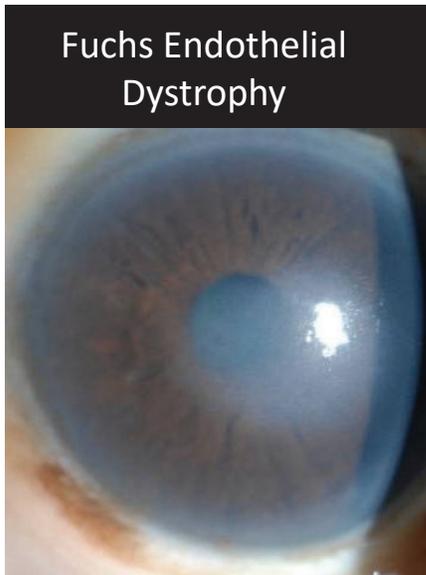
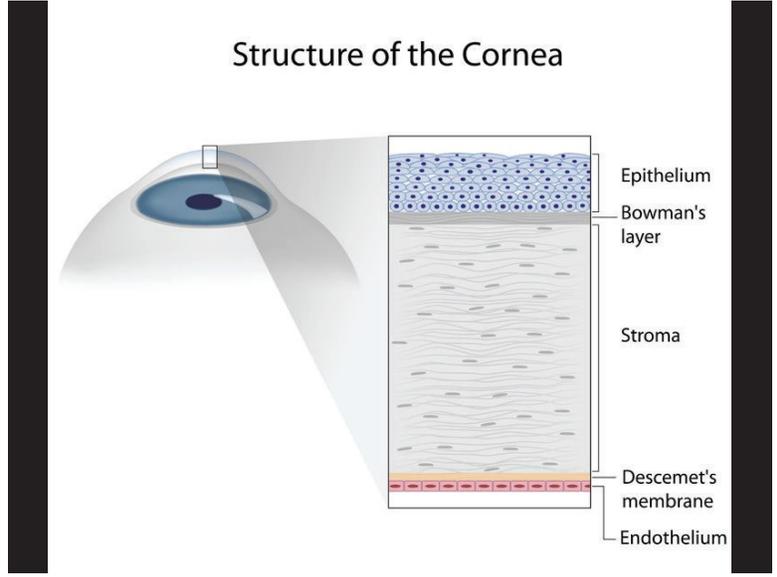
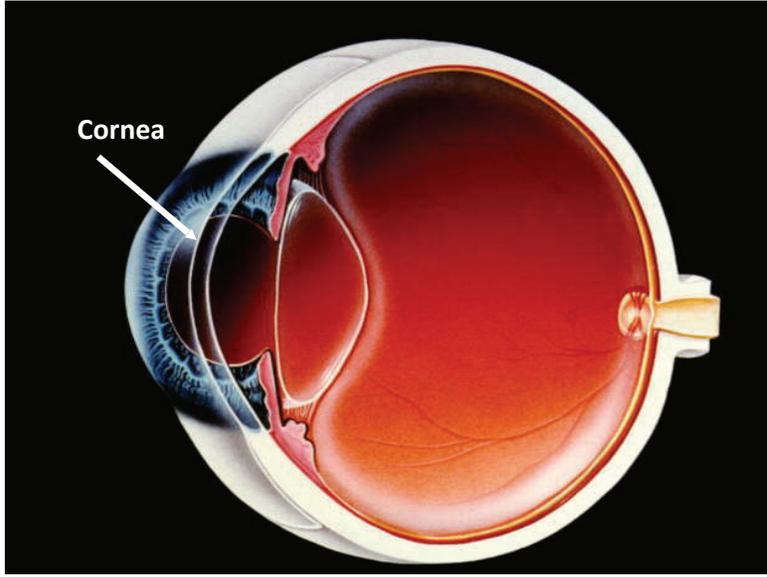
LASIK: flap and laser

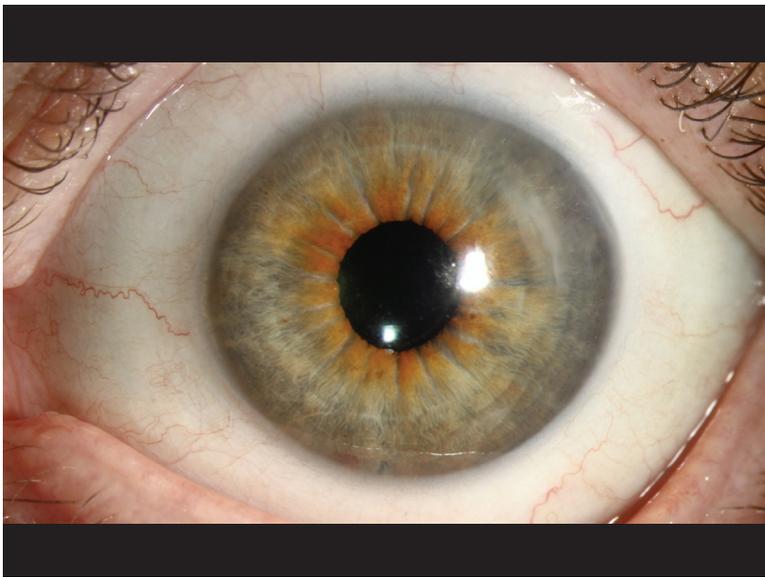
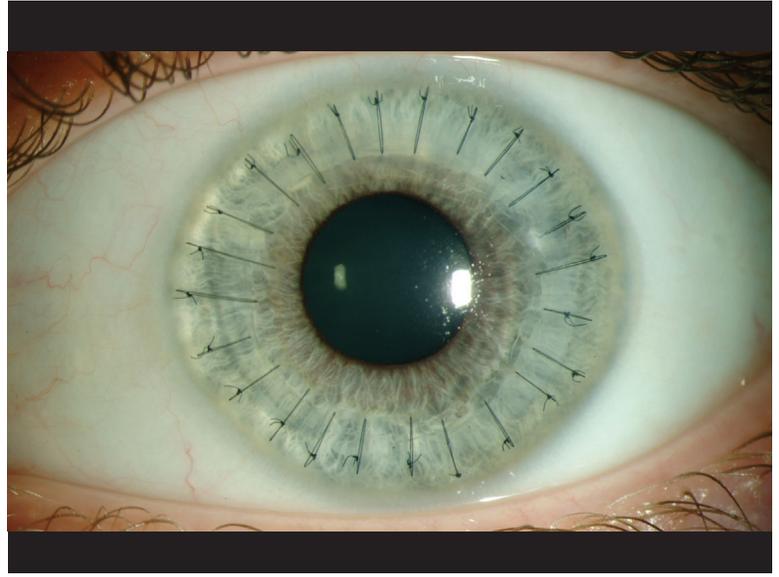
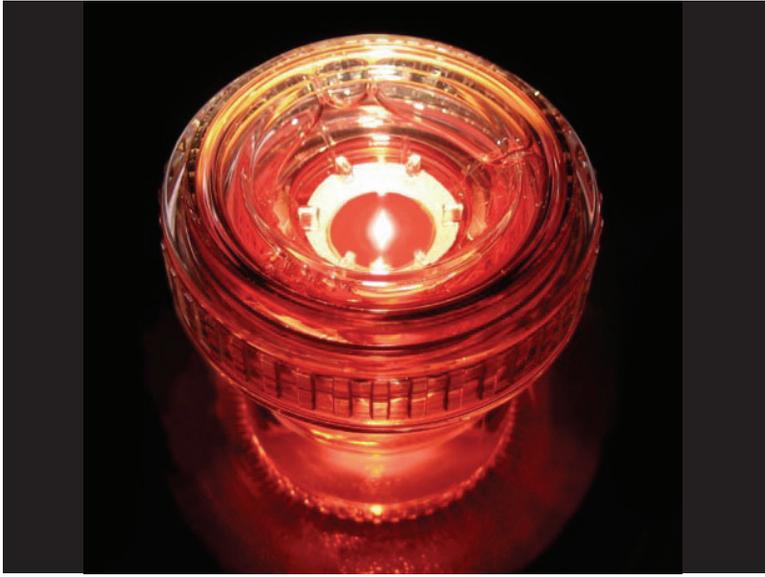
## Implantable Contact Lens: ICL

**Myopia** = Nearsightedness 3-16 D

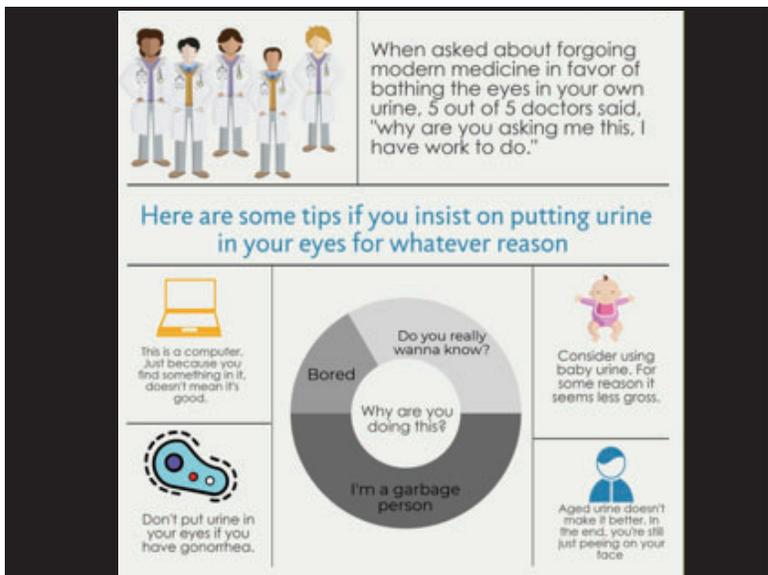
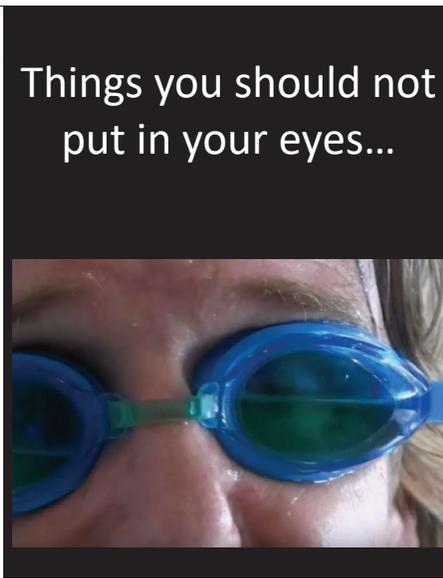
**Astigmatism** = Astigmatism 0-3 D





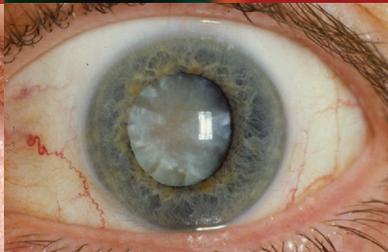
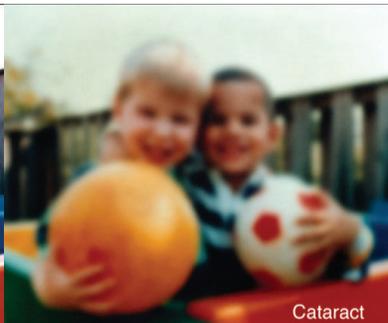
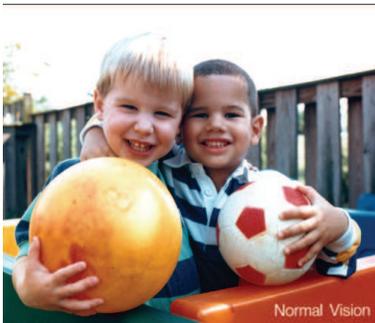
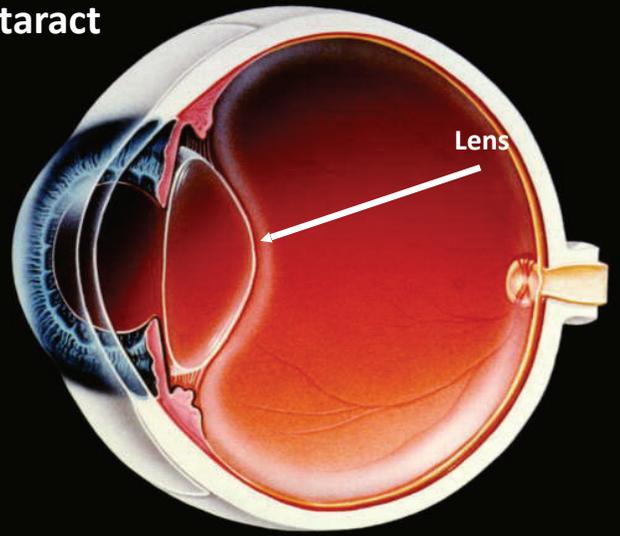


Intermission



Back to Business...

Cataract

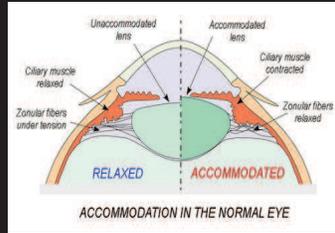
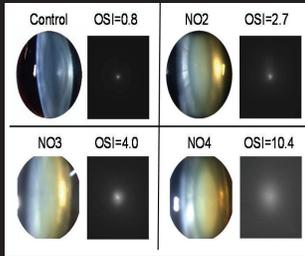


What is 'Standard' Cataract Surgery...



KEEP IT SIMPLE

# Clarity & Flexibility



## Cataract



## Refractive Cataract Surgery

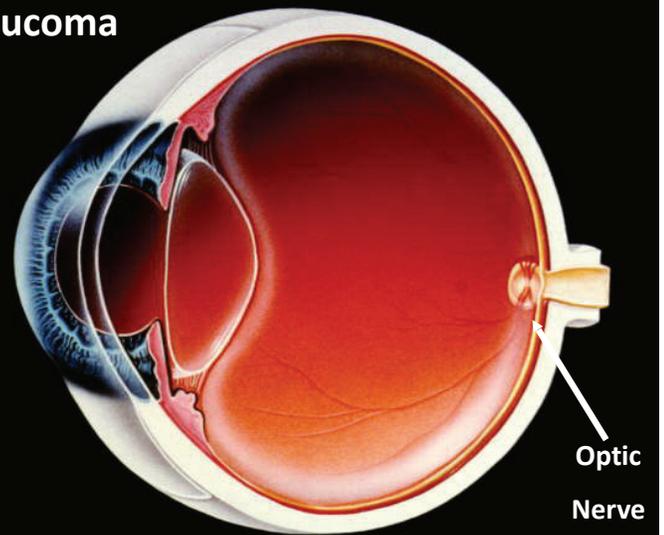


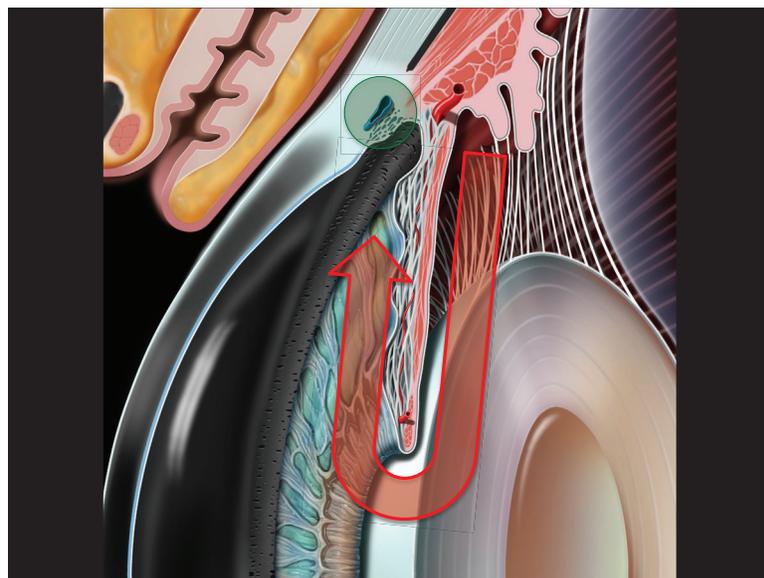
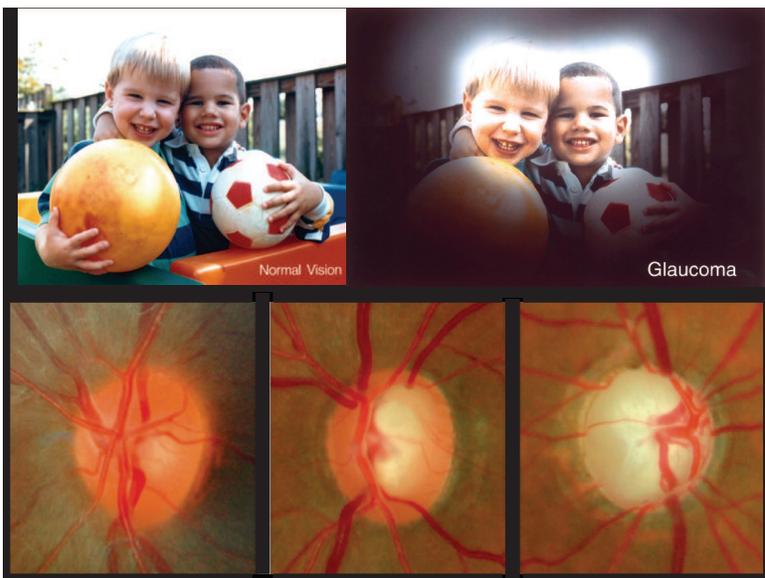
Panoptix Synergy Clearview Symphony Vivivity Aphera LAL

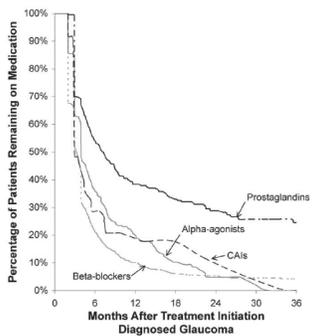
Multifocal EDOF Adjustable

Alcon

## Glaucoma





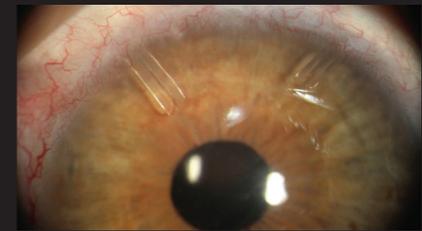
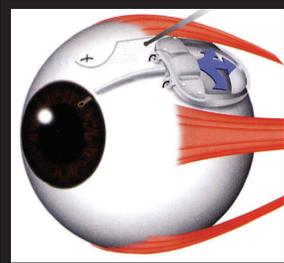


More than **90%** of patients are nonadherent to their ocular medication dosing regimens, and nearly **50%** discontinue taking their medications before 6 months

Nordstrom BL. Persistence and adherence with topical glaucoma therapy. *Am J Ophthalmol.* 2005;140:598-596



## Traditional Incisional Glaucoma Surgery



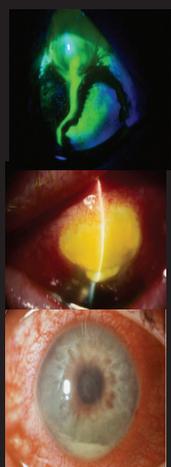
## Traditional Incisional Glaucoma Surgery

### Trabeculectomy:

- 50% fail
- 43% lost  $\geq 2$  lines vision

### Glaucoma Tube Shunt:

- 33% fail
- 46% lost  $\geq 2$  lines vision



## Some Things are Just a Bad Idea





## Minimally Invasive Glaucoma Surgery: MIGS

### Safety First

Many as Safe as Cataract

Similar Recovery



*iStent inject*<sup>®</sup>



Schlemm's Canal	Type
Stents	iStent Inject
	iStent Infinite
	Hydrus
Canaloplasty	OMNI
	iPrime
	Streamline
	iTrack
	GATT
Trabecular Excision	KDB
	Trabectome
	BaNG Procedure
	iAccess
	Trabex
	Sion

Suprachoroidal	Type
Stents	*Cypass
	*Supra
	*MINIject

Transscleral	Type
	Xen
	*InnFocus
	*MIMS
	BAM

Cilioablative	Type
External	
	Micropulse
Internal	
	ECP

## Canaloplasty

OMNI



ITRACK



GATT



STREAMINE



## Trabecular Excisional Devices

TRABECTOME



KAHOOK DUAL BLADE



TRABEX



SION

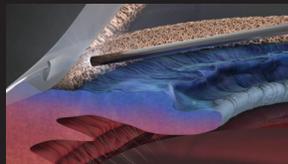


## Trabecular Excisional Devices

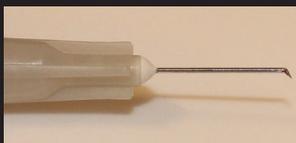
IACCESS



ELIOS EXCIMER



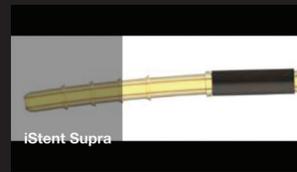
BANG



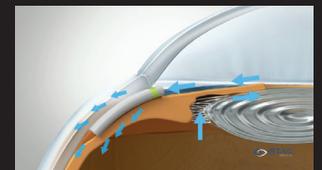
308 nm excimer laser  
 Delivered by fiberoptic cable  
 Short pulse energy  
 1.2 – 1.3 mJ  
 80 ns duration  
 200 um spot size

## SUPRACHOROIDAL DEVICES

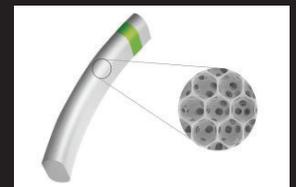
ISTENT SUPRA



MINIJECT



CYPASS



## TRANSCLERAL DEVICES

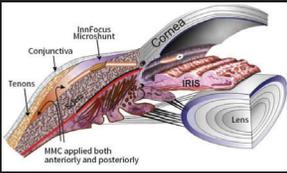
XEN



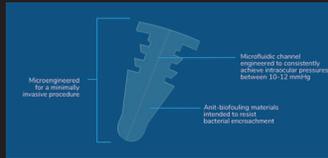
MIMS



PRESERFLO



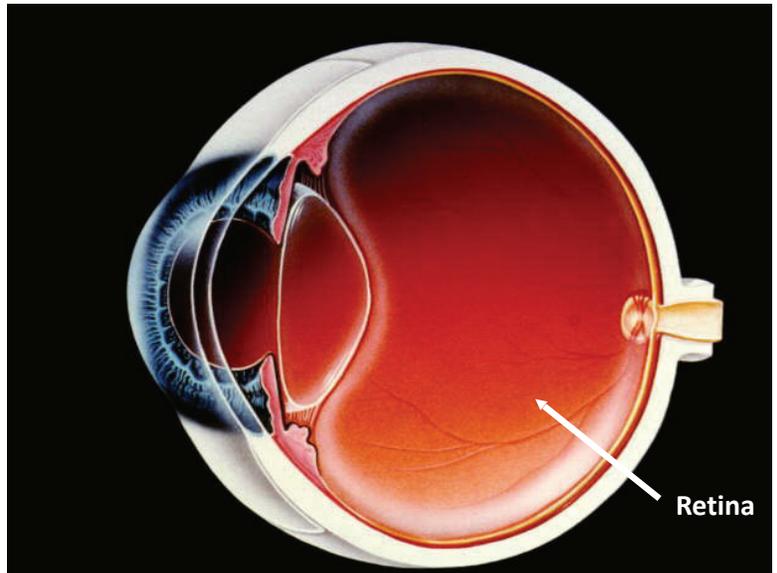
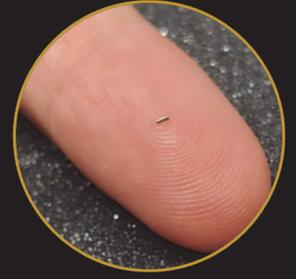
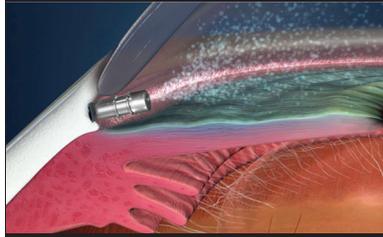
BEACON AQUEOUS MICROSHUNT (BAM)



## iDose: Travoprost Intraocular Implant



- Length: 1.8 mm
- Diameter: 0.5 mm
- Implanted into the anterior chamber angle
- Reservoir resides in the anterior chamber



# Is a retina detachment a surgical emergency???

## Timing of acute macula-on rhegmatogenous retinal detachment repair

Rita Ehrlich <sup>1</sup>, Rachael L. Niederer, Nadeem Ahmad, Philip Pokinghorne

Affiliations + expand  
PMID: 22990323 DOI: 10.1097/AE.0b013e318263acea

### Abstract

**Purpose:** To determine if same-day or next available surgery changed the outcome of patients presenting with acute macula-on rhegmatogenous retinal detachments.

**Methods:** A retrospective review of patients presenting with acute macula-on rhegmatogenous retinal detachments treated with small-gauge vitrectomy was performed. Data collection included subjects' demographics, duration of symptoms, location and extent of the retinal detachment, and timing of surgery. The primary outcome was anatomical and functional success rate for patients having same-day surgery compared with those for whom surgery was delayed.

**Results:** One hundred and fourteen patients were included in this study. Sixty-two patients operated on day of presentation, 46 patients operated the day after presentation, and in 6 patients surgery was delayed from 2 to 5 days. Time to surgery in hours ranged between 1 and 120 hours (mean 14.5 ± 15.05 hours). Retinal reattachment was achieved in 95.6% of patients, with 80% requiring only one procedure. Mean initial visual acuity was logarithm of the minimum angle of resolution 0.42 (SD 0.6), and mean final visual acuity was logarithm of the minimum angle of resolution 0.39 (SD 0.67) (P = 0.53). Time to surgery was not found to effect final anatomical outcome (P = 0.56). No statistically significant association was observed between change in visual acuity and time to surgery (P = 0.99).

**Conclusion:** Modest delay in timing of surgery for macula-on rhegmatogenous retinal detachment did not adversely impact on patients' outcome.

## IMPACT OF FOVEAL STATUS AND TIMING OF SURGERY ON VISUAL OUTCOME IN RHEGMATOGENOUS RETINAL DETACHMENT

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Affiliations + expand  
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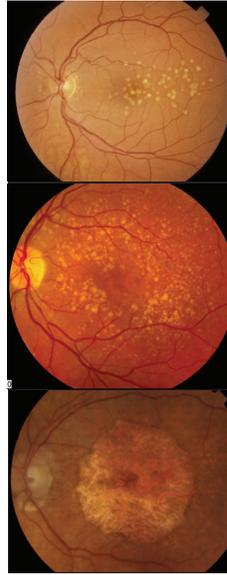
### Abstract

**Purpose:** To investigate the impact of surgical timing on visual acuity outcomes in retinal detachments based on the preoperative foveal status.

**Methods:** A retrospective multicenter cohort study was conducted. Cases were stratified into fovea-on, fovea-split, and fovea-off groups. Days to surgery was defined as the time between the preoperative examination and surgery. The main outcome measure was the final postoperative visual acuity.

**Results:** 1,675 cases were studied. More than 80% of fovea-on/fovea-split and fovea-off cases had surgery within 1 and 3 days, respectively. The mean final postoperative visual acuity did not differ significantly between the fovea-on and fovea-split groups (Snellen equivalent [SE] 20/25 ± 20/49 and 20/32 ± 20/39, P = 1,000) and did not change significantly based on days to surgery in either group. The mean final postoperative visual acuity was lowest in the fovea-off group (Snellen equivalent = 20/56 ± 20/76, P < 0.001) and was significantly lower in cases where surgery was performed after two or more days when compared with cases performed within 1 day (Snellen equivalent 20/74 ± 20/89 vs. 20/46 ± 20/63, P < 0.001).

**Conclusion:** Fovea-on and fovea-split retinal detachments demonstrated comparable visual outcomes. Fovea-off RDs demonstrated worse visual outcomes, which declined further when surgery was delayed by two or more days.



# Dry AMD

## Historical Treatment:

- Amsler Grid
- AREDS

## New Treatment:

- Syfovre (pegcetacoplan)
- Izervay (avacincaptad peg)

Drug (Company)	Mechanism	NCT#	Estimated Study Completion	Recruitment Status	Last Update Period
<b>Phase I</b>					
DTA-301 (Daiichi Therapeutics)	Intravitreal injection with tyrosine kinase inhibitor	NCT03063079	December 2022	Active, not recruiting	August 2022
WY220094 (Boehringer-Ingelheim)	Bispecific human antigen-binding fragments of faricicab via the post-blebistatin system	NCT04054793	November 2025	Recruiting	November 2022
BE011 (Beigene Cell)	Gene therapy	NCT05099094	September 2023	Recruiting	August 2022
AV007 (Alkermes BioPharm)	betraferrin gel suspension	NCT04219989		Complete	May 2022
HO003 (Novartis)	Intravitreal injection	NCT04550603		Complete	September 2022
AA-3203 (Aerie)	RNA kinase inhibitor sustained release intravitreal implant	NCT03855884		Complete	June 2022
AKG272 (Alkermes Pharma)	Anti-VEGF antibody and anti-2 integrin/VEGF fusion protein	NCT04566020	April 2024	Not yet recruiting	July 2022
<b>Phase II</b>					
BO002 (Bovineer Biomedical)	Intravitreal injection of a bispecific fusion protein	NCT04007740	June 2024	Not yet recruiting	June 2022
WY220094 (Boehringer-Ingelheim)	Intravitreal injection of a BCL-6L inhibitor	NCT05025209	January 2023	Active, not recruiting	May 2022
AKT007 (Ocular Therapeutix)	Intravitreal self-assembling deoxyribose	NCT04614953		Complete	November 2022
40-532 (40 Molecular Therapeutics)	Dual transgene intravitreal gene therapy	NCT05025270	September 2026	Recruiting	October 2022
GO-02 (GenSight Vision)	Intravitreal injection with sorafenib	NCT05053073		Complete	January 2022
EXP-001 (ElexPharm Pharmaceuticals)	Intravitreal implant with a tyrosine kinase inhibitor	NCT05301948	December 2023	Recruiting	August 2022
4-507.2 (Aikawa Therapeutics)	Intravitreal tyrosine kinase inhibitor	NCT05301930	May 2023	Recruiting	September 2022
CLS-4 (Alkermes Biomedical)	Suprachoroidal injection of a tyrosine kinase inhibitor	NCT04262620		Complete	July 2022
PAN-0006 (PanOptical)	Topical tyrosine kinase inhibitor topical drop	NCT04747072		Complete	July 2019
WLS-0002 (Chromascreen Biotech)	Thermal nebulized drop	NCT05050400	February 2023	Not yet recruiting	May 2022
AKT009 (Ocular Therapeutix)	Dual LCKS inhibitor	NCT04932700		Complete	October 2021
IRM-007 (Illumio)	Anti-Fibrinolytic growth factor 2 inhibitor intravitreal injection	NCT04092293		Complete	August 2022
Indegeneon companies: formerly ARIA042, Adverum Biotechnologies)	Intravitreal gene therapy	NCT05106970	February 2024	Recruiting	September 2022
ICA-304 (Illumio)	Suprachoroidal gene therapy	NCT05106953	January 2024	Recruiting	October 2023
<b>Phase III</b>					
SP1-002 (Optical)	FC-fusion protein	NCT05127676	December 2024	Recruiting	September 2022
KSJ-301 (Medika Sciences)	Anti-Body Disruptor conjugate	NCT04854889	April 2023	Active, not recruiting	June 2022
ICA-304 (Illumio)	Subretinal gene therapy	NCT04840421	March 2020	Recruiting	May 2022
ICA-304 (Illumio)	Intravitreal gene therapy	NCT05057078	December 2024	Recruiting	June 2022
BA13004 (Bio-thera)	Becanabumab anti-VEGF intravitreal injection	NCT04249824	June 2025	Not yet recruiting	June 2022

# Wet AMD



# Pediatrics

- Nothing ever changes...jk...but seriously
- Myopia Prevention
  - Contact lens to reduce progression
  - Dilute atropine drops to decrease accommodation
- Pediatrician and PCP screening
  - Identify atypical red reflex, anisometropia, tropias



## Oculoplastics

Thyroid Eye Disease (TED)

- ~50% adults with autoimmune thyroid disease develop TED
- Smoking increases risk of TED 5x
- Ocular Findings: eyelid retraction, proptosis, dry eye, EOM muscle enlargement, RARE optic neuropathy

New Treatment:

- Teprotumumab: binds to IGF-1 blocking it's activation

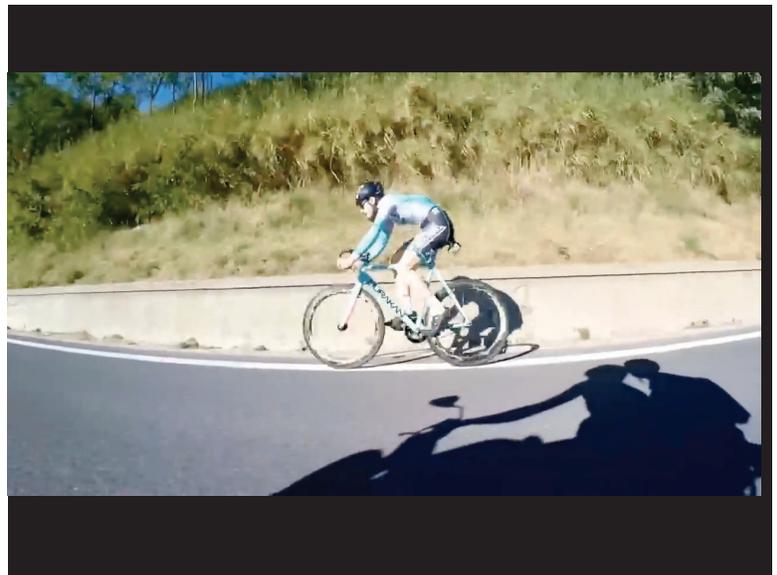
Before



After



## Closing Thoughts





Questions

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