

Glaucoma Treatment Strategies

**Dry Eye Clinic Director
Residency Coordinator**

Empire Eye and Laser Center
Bakersfield, CA

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Financial Disclosures

- Aerie Pharmaceuticals
- Allergan
- Dompé
- Eyevance Pharmaceuticals
- Horizon
- Kala Pharmaceuticals
- Johnson and Johnson Vision Care, Inc
- Novartis
- NovaBay Pharmaceuticals
- Ocular Therapeutix
- Science Based Health
- Sight Sciences
- Sun Pharma
- Zeiss
- Tissue-Tech



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Introduction

- Partner at a referral center (anterior segment)
- 2 OMDs, 3 FTE ODs (including a OD resident), 1 NP
- Focused on ocular surface disease and glaucoma



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Objectives

- Learn about the new glaucoma medications available
- Be familiarized with the different MIGS procedures for glaucoma treatment strategies.
- Be able to use this knowledge to administer a customized treatment plan for different cases.

What is Glaucoma?

- Progressive loss of RNFL resulting in a loss in the peripheral field of vision.
- High IOP is **NOT** part of the definition of glaucoma, but is a risk factor.
- Risk factors: Race, Age, (+) FmHx, High IOP, Thin corneal thickness, large vertical C/D ratio, myopia?, diabetes?, blood pressure?
- Mechanical theory vs Vascular theory?

So what? (aka epidemiology)

- WHO: Second leading cause of blindness worldwide
- 4M cases of OAG in US, with a significant number of patients going blind every year¹
- Significant cost: predicted > \$1.5 billion annually¹

Review Treatment Options

- Factors to Consider: Efficacy, cost, contraindications, side effects, likelihood of compliance
- Drops
- Lasers
- Implantable
- MIGS

New(-ish) Drops

- Rho Kinase Inhibitors: Netarsudil (Rhopressa 0.02%)

- MOA:

- ➔ 1. Increase trabecular meshwork outflow
- ➔ 2. Lower episcleral venous pressure
- ➔ 3. Decrease aqueous production

- Efficacy: 20% IOP reduction
- Side effects: Conjunctival hyperemia
- Dosing: QHS (to help with Fuchs' dystrophy)
- Treatment for Fuch's?

CONCLUSION

ROCK inhibitor therapy shows promise in Fuchs endothelial dystrophy, other causes of corneal edema, and tissue engineering therapy. Further research is needed to compare long-term outcomes of ROCK inhibitor therapy in corneal endothelial disease to conventional endothelial keratoplasty, including visual acuity and CEC density. This would allow for appropriate patient counseling prior to initiating ROCK inhibitors. Other corneal applications of ROCK inhibitor therapy continue to be unveiled, with recent data suggesting its potential to prolong allograft survival after corneal transplantation by downregulating inflammatory mediators and inhibiting neovascularization [56]. ROCK inhibitors have significant potential in the field of cornea and will undoubtedly play a key role in how clinicians care for patients in the future.

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doi: 11

New(-ish) Drops

- Combo drops - Latanoprostene bunod (Vyuzulta 0.024%)

- Latanoprost + Nitric Oxide (NO)

- MOA

- ➔ 1. Increase uveal scleral outflow (PGA)
- ➔ 2. Increase trabecular meshwork outflow (NO - similar to rho kinase inhibitors)

- Efficacy: Compared to latanoprost, additional 1.2 mmHg lowering effect
- Side effects: Conjunctival Hyperemia
- Dosing: QHS

New(-ish) Drops

- Combo drops - Latanoprost 0.005%+ Netarsudil 0.02% (Rocklatan)

- MOA

- ➔ 1. Increase uveal scleral outflow (PGA)
- ➔ 2. Increase trabecular meshwork outflow
- ➔ 3. Lower episcleral venous pressure
- ➔ 4. Decrease aqueous production

Efficacy: Compared to latanoprost, additional 1.2 mmHg lowering effect

- Side effects: Conjunctival Hyperemia x 2, corneal verticillata
- Dosing: QHS

Preservative options

- Tafluprost 0.0015% (Zioptan)

- Dorzolamide 2%/Timolol 0.5%

- Timolol 0.5% (Timoptic Oculos)

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Meds Cost

- PA fatigue? Or ignore them altogether?
- Insurance dictating med coverage?
- “Can't I just prescribe the cheapest and hope for the best?”

Lasers

- ALT
- SLT

ALT

- Argon Laser Trabeculoplasty
- No longer performed due to inability to repeat
- MOA - Unknown, different theories (Mechanical, biologic, and repopulation)

SLT

- Selective Laser Trabeculoplasty
- First line in Europe (LiGHT study)
 - Delay treatment in naive patients x 3 years
- Repeatable
- MOA - Unknown, different theories (Mechanical, biologic, and repopulation)

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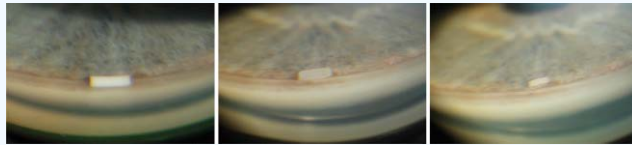
Selective laser trabeculoplasty versus eye drops for first-line treatment of ocular hypertension and glaucoma (LiGHT): a multicentre randomised controlled trial

Gus Gazzard, FRCOphth · Evgenia Konstantakopoulou, PhD · Prof David Garway-Heath, MD · Anurag Garg, FRCOphth · Victoria Vickerstaff, MSc · Rachael Hunter, MSc · et al. Show all authors · Show footnotes

Open Access · Published: March 09, 2019 · DOI: [https://doi.org/10.1016/S0140-6736\(18\)32213-X](https://doi.org/10.1016/S0140-6736(18)32213-X)

Implantable medication

- Durysta™ from Allergan
- 10 mcg biodegradable bimatoprost SR implant
- Last 4-6 months*
- Consistent IOP lowering effects without the side effects of topical meds



2 Weeks

9 Months

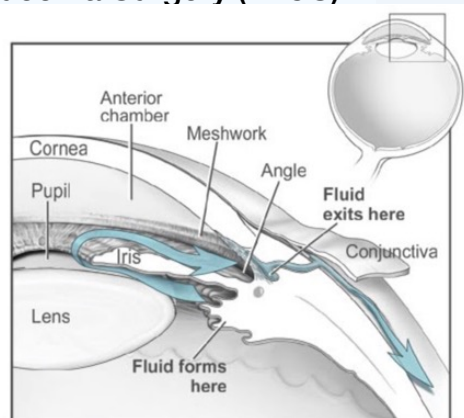
12 Months



Video courtesy of Mitch
Ibach OD, FAAO

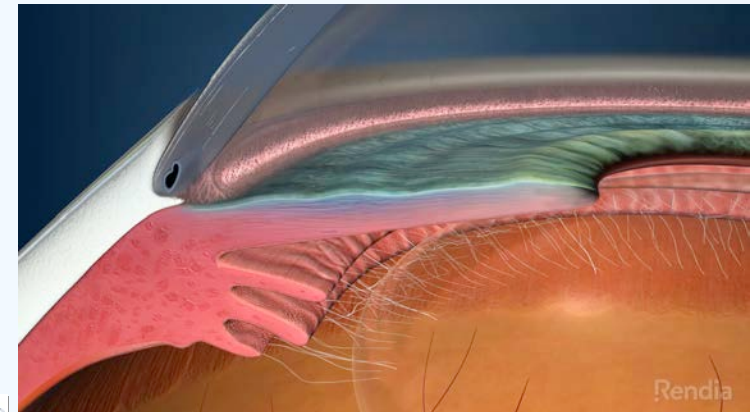
Minimally Invasive Glaucoma Surgery (MIGS)

- Angle anatomy review



Credit: National Eye Institute, National Institutes of Health

Minimally Invasive Glaucoma Surgery (MIGS)



MIGS

- Require little to no scleral dissection
- May be done with or without cataract extraction
- May be done with or without a stent

Trabectome vs Kahook Dual Blade vs Trabeculotomy

- Trabectome - costly device to remove part of the trabecular meshwork
- KDB - single use, cheaper blade and also removes the trabecular meshwork
- Trabeculotomy (done by the OMNI device) tears up the trabecular meshwork

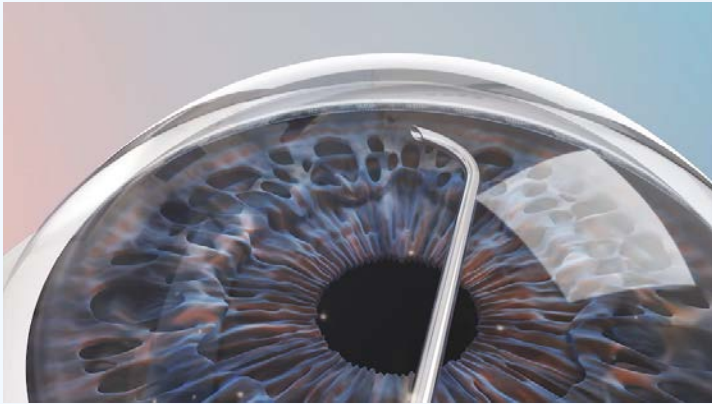
- Long term effects of damaging TM? TM aqueous pump¹?
- Netarsudil? Nitric Oxide?



Kahook Dual Blade goniotomy



Trabeculotomy

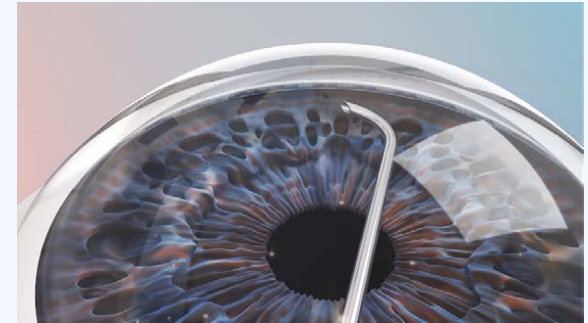


Video courtesy of Sight Science

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Canaloplasty

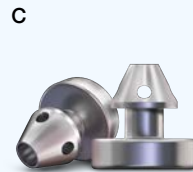
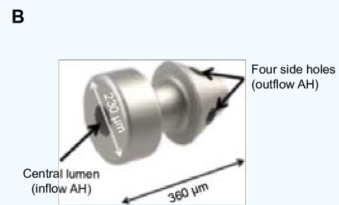
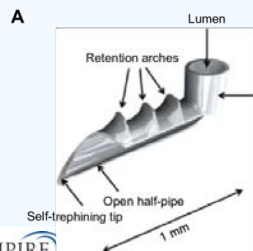
- Injecting viscoelastic into Schlemm's canal to open distal collector channels
- "Unclogging the pipes"



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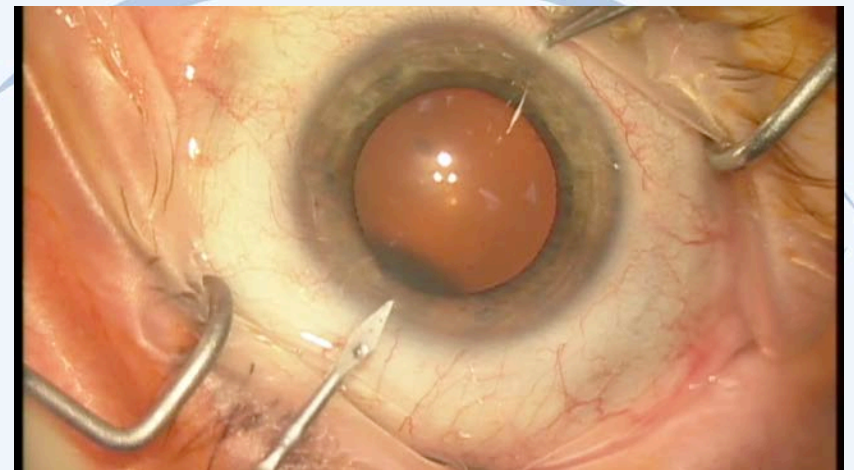
iStent by Glaukos

- A. iStent Original - L shaped stent
- B. iStent Inject - "punctal plug with holes" to allow drainage
- C. iStent Inject W - Wider flange



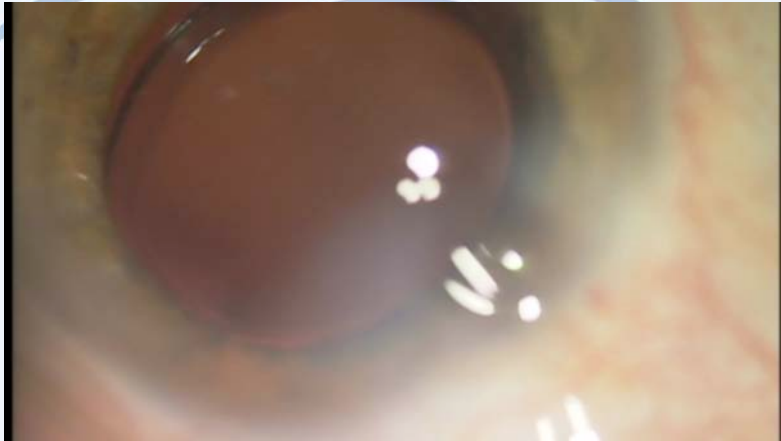
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Cataract surgery



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iStent Inject implantation



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Aqueous Angiography Video

Aqueous Angiography Before and After Stenting

Alex Huang, MD, PhD

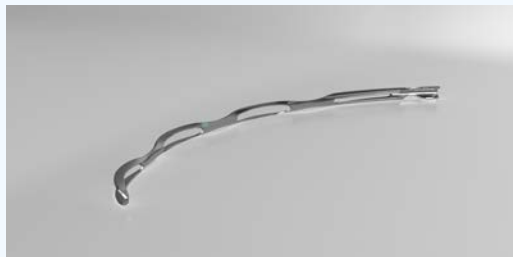
- Immediate and more expansive flow post iStent inject implantation
- Arcs of flow that can span 5-6 clock hours
- May re-establish flow in previously dormant outflow channels



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Hydrus by Ivantis

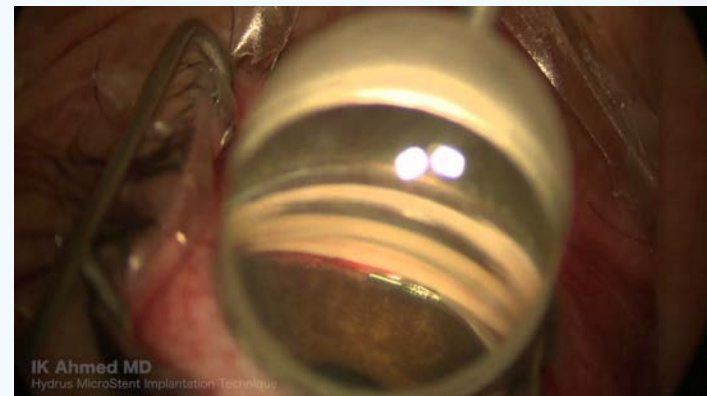
- Indicated for mild to mod OAG
- Done at time of cataract surgery
- Inserted through TM and parallel to Schlemm's canal



Retrieved from: <https://crstoday.com/articles/delivering-a-new-confidence-with-the-hydrus-microstent/delivering-a-new-confidence-with-the-hydrus-microstent-2/>

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Hydrus implantation video



IK Ahmed MD
Hydrus MicroStent Implantation Technique

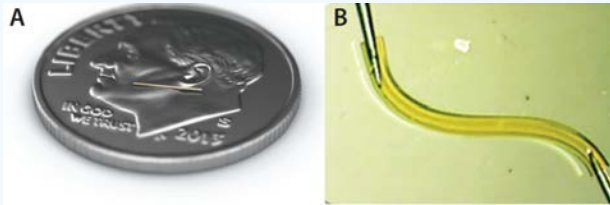


Video courtesy of IQBAL IKE K. AHMED, MD, retrieved from https://www.youtube.com/watch?v=qeL5ny_nHY

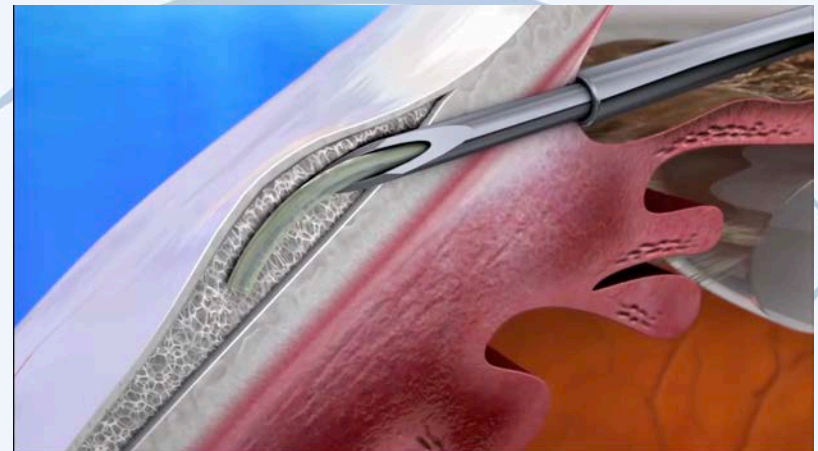
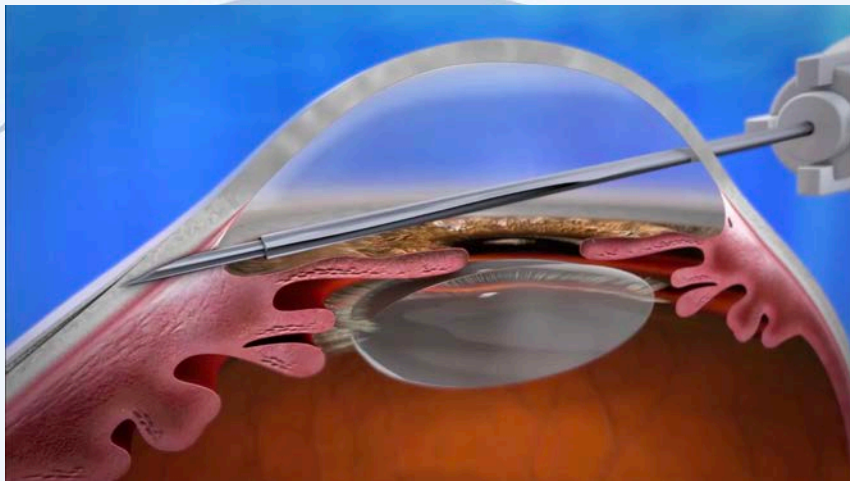
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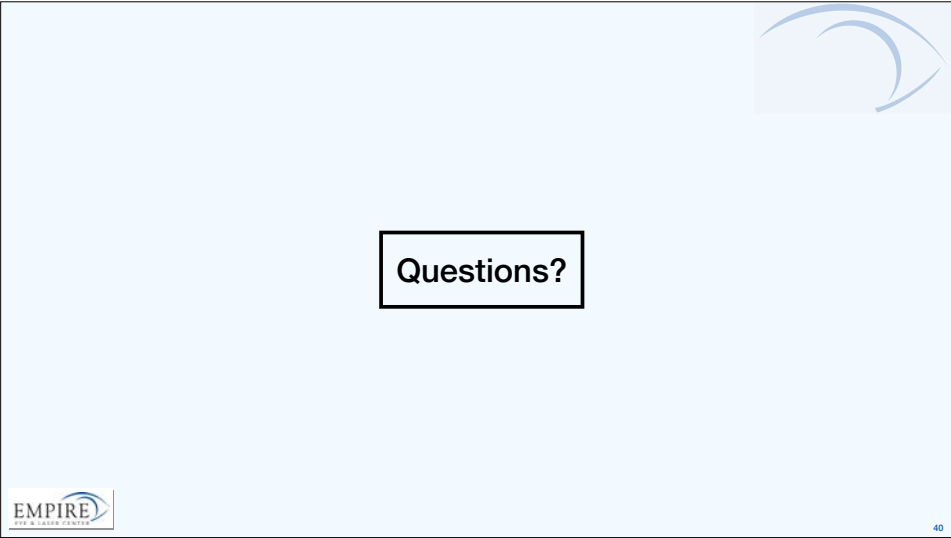
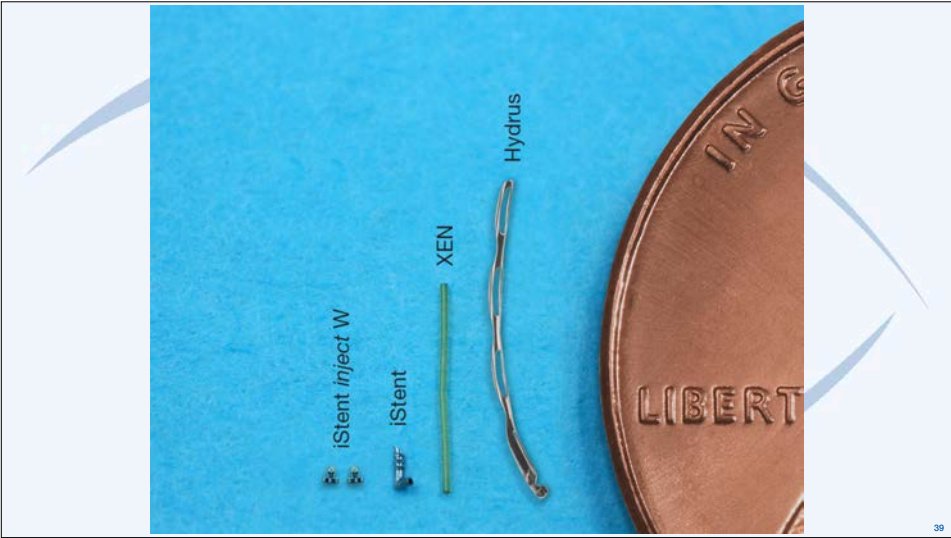
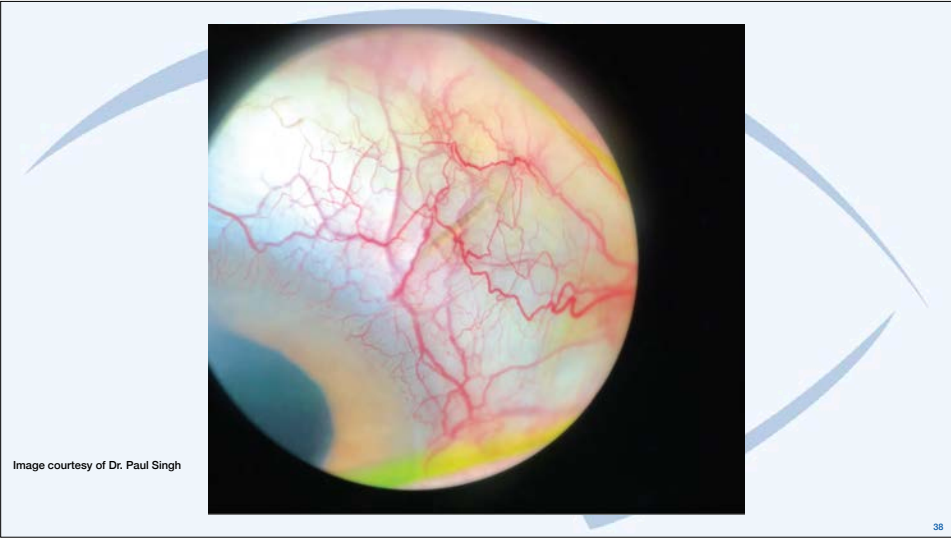
Xen Gel Stent by Allergan

- Small tube
- Creates another drainage system to the subconjunctival space



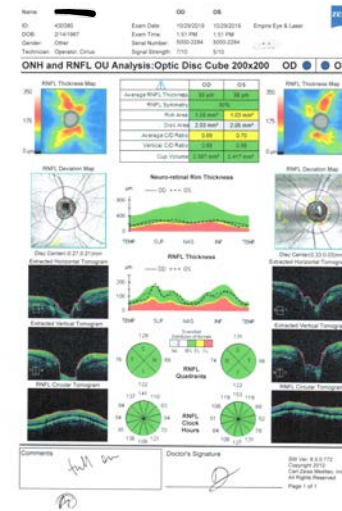
Xen Gel Stent by Allergan





Case #1

- 48 yo CF
- H/o OHT OU since 2008
- Pach: 575/569
- H/o chronic blepharitis OU
- Prior use of bimatoprost 0.01%, insurance denial, switched to latanoprost 0.005%
- In 2017 develops KCS. OTC tears not enough. Insurance won't cover rx meds
- Treated MGD which prolonged her ability to use latanoprost
- IOPs in the mid teens with meds



Case #1

- 2020 - Covid happens
- 10/2020 - Pt ran out of meds x 1 month. IOP spikes to 30/29
- What would you do now?

Case #1

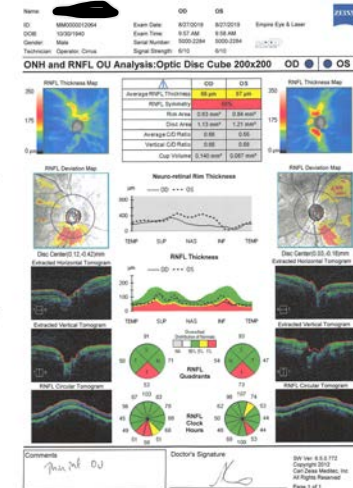
- Started her on Tafluprost 0.0015% QHS due to ocular surface issues
- Rec SLT but pt hesitant due to high deductible insurance plan
- H/o chronic hordeola
- Finally decides to have SLT in 05/2021
- IOPs now in the mid teens without meds, pt happy

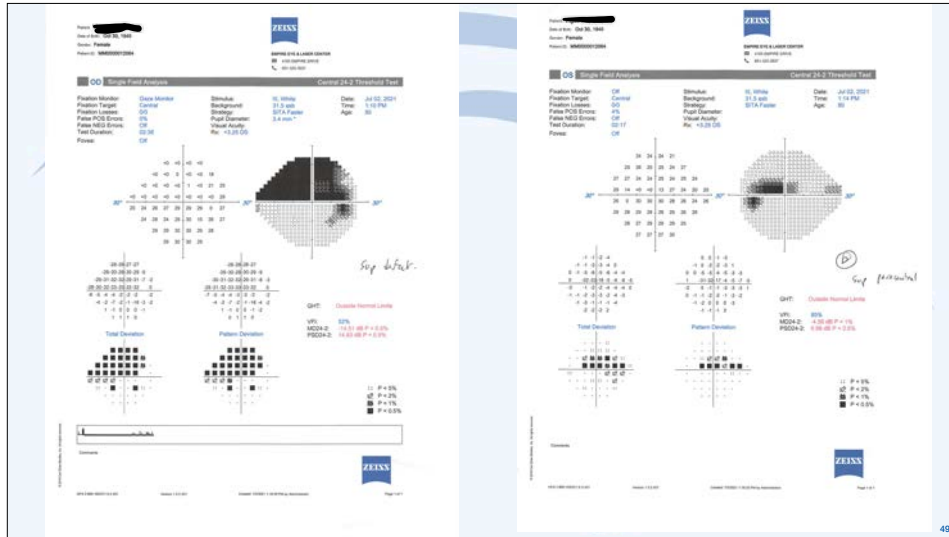
Case #2

- 78 yo CM referred for glaucoma and cataract eval
- Dx “many years ago” by Dr. Caprioli at JSEI, h/o latanoprost and timolol gtts use but stopped using meds x 10 years
- H/o stroke 2017
- VA cc 20/25 PHNI 20/30-2 PH 20/25
- IOP 29/30 via applanation

Case #2

- Slit lamp examination
- L/L: 3+ MGD OU
- L: 3+ NSC and brunescant lens OU
- C/D: 0.7 thin inferior rim 0.6 inferior notch
- Everything else was unremarkable





Case #2

- Dx:

 1. POAG OU - mild to mod stage
 2. Combined cataracts OU - Visually significant

- Plan:

 1. iStent Inject during cataract extraction to help lower IOP
 2. Cataract extraction

Case #2

- 1 month post CE OU, no meds
- VA sc at near J1+ OU
- Post op refraction: -1.75-0.50x104 20/15-2, -1.75-0.50x083 20/15-2
- IOP 17/18 via applanation. Pt is happy to be off meds

- Saw him again 06/2021
- IOP 21/17 via applanation
- Due to age vs. R/B of vision loss. Ok to monitor for now

vdang@empireeyeandlaser.com



Thank You!