On behalf of Vision Expo, we sincerely thank you for being with us this year.

Vision Expo Has Gone Green!

We have eliminated all paper session evaluation forms. Please be sure to complete your electronic session evaluations online when you login to request your CE Letter for each course you attended! Your feedback is important to us as our Conference Advisory Board considers content and speakers for future meetings to provide you with the best education possible.

VISION EXPO

1

Innovations in Glaucoma

Next Generation Technology, Medications, and Delivery

Justin Schweitzer, OD, FAAO
Vance Thompson Vision, Sioux Falls, South Dakota
Optometric Externship Director
Associate Director Residency Program

2

Financial Disclosure – Justin Schweitzer, OD, FAAO

- Aerie – C/L
- Alcon – C/L
- Allergan – C/L
- Bausch + Lomb – C/L
- Ocular Therapeutix - C
- EyePoint - C
- Dompe – C
- Zeiss – C/L
- Sun – C/L
- Equinox - I
- Reichert - C
- J&J – C/L
- Glaukos – C/L
- Horizon – C
- Quidel – C
- Sight Sciences – C/L
- LKC - C

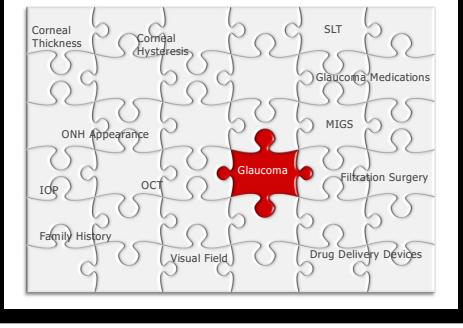
- Co-Chief Medical Editor: Modern Optometry

3

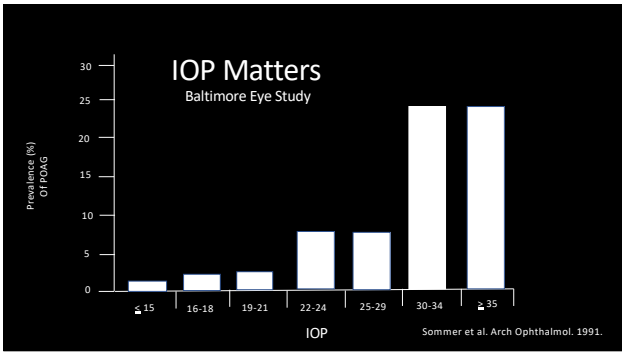
Today's Optometrists

"To be on the cutting edge of optometry, you need to be on the cutting edge of science and technology."

5



6



12

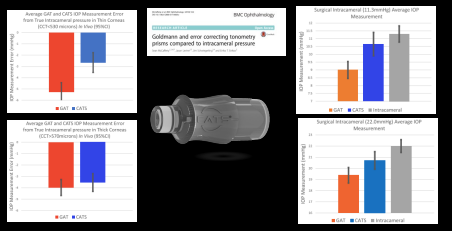
The Correcting Applanation Tonometer Surface (CATS)

British Journal of **Ophthalmology**

Modified Goldmann prism intraocular pressure measurement accuracy and correlation to corneal biomechanical metrics: multicentre randomised clinical trial

13

The Correcting Applanation Tonometer Surface (CATS)



14

IOP "corneal-compensated" (IOPcc)

213 Eyes of 125 glaucomatous patients followed for 2.4 years

GAT	ORA	RBT
↓	↓	↓
11.1% (.11)	24.5% (.24)	5.8%% (.05)

Susanna BN, Ogata, NG, Daga FB et al. Association between Rates of Visual Field Progression and Intraocular Pressure Measurements Obtained by Different Tonometer's. Ophthalmology. 2019 Jan;126(1): 49-54.

15

Corneal Hysteresis, IOP, CCT

16

Corneal Hysteresis

Corneal Hysteresis reflects the ability of the corneal tissue to dissipate energy [1]

- Function of viscoelastic damping[2]

Two predictive functions

1. Which glaucomatous eyes are most susceptible to visual field loss progression and risk of rate of progression?
2. Which eyes are susceptible to glaucoma?

1. Luce DA. *J Cataract Refract Surg.* 2005;31:156-162.
2. Dupps WJ Jr. *J Cataract Refract Surg.* 2007;33:1499-1501..

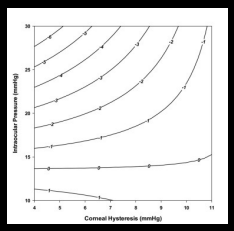
17

Average CH in Normal Subjects

	N	CH
Brazil	105	10.1 +/- 1.8
UK	272	10.2 +/- 1.2
China	125	10.9 +/- 1.5
Japan	204	10.2 +/- 1.3
Spain	88	10.8 +/- 1.5
USA	44	10.5 +/- 1.2

18

CH as a Predictor of Progression



Medeiros FA et al. *Ophthalmology.* 2013;120:1533-1540.

19

AMERICAN ACADEMY OF OPHTHALMOLOGY

Corneal Biomechanics and Visual Field Progression in Eyes with Seemingly Well-Controlled Intraocular Pressure

Bianca N. Susanna, MD,[1,2,3] Nina G. Ogata, MD,[1] Alessandro A. Jammal, MD,[1] Carolina N. Susanna, MD,[1,2,3] Samuel I. Berchuck, PhD,[1,4] Felipe A. Medeiros, MD, PhD[1]

460 eyes of 334 glaucoma patients
Follow-up – 4.3 years
Well controlled if IOP < 18 mm HG

179 eyes well controlled
42 (23.5%) of those eyes had VF progression

CH (8.6 vs 9.4)
CCT (515 vs 531)

68% higher risk of progression

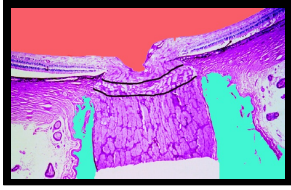
20

Relationship of Corneal Hysteresis and Anterior Lamina Cribrosa Displacement in Glaucoma

BRANDON J. WONG, SASAN MOGHIMI, LINDA M. ZANGWILL, MARK CHRISTOPHER, AKRAM BELGHITH, DEN BAO, CHRISTOPHER BOWD, MASSIMO A. FAZIO, CHRISTOPHER A. GIRKIN, AND ROBERT N. WEINREB

147 eyes of 96 glaucoma patients
Follow-up – 3.5 years

Choroidal thickness
Low Corneal hysteresis
=
posterior ALCS displacement



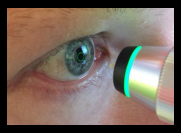
Each 1 mmHg lower CH
=
0.66 microns of posterior ALCS displacement

Wong BJ, Moghimi S, Zangwill LM, et al. Relationship Of Corneal Hysteresis and Anterior Lamina Cribrosa Displacement in Glaucoma. Am J Opthalmol. 2019 Nov 23.

21

Home IOP Monitoring

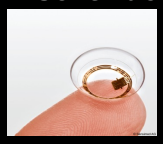
A device is intended as an adjunct for monitoring IOP of adult patients (self-use). The HOME tonometer is designed for use at home or on the go.

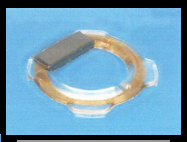


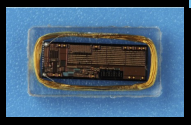
Measurement time	IOP (Right	Quality (Right
10/22/2020 15:56	20	EXCELLENT
10/23/2020 7:55	10	EXCELLENT
10/23/2020 9:58	13	EXCELLENT
10/23/2020 16:04	26	GOOD
10/24/2020 7:58	13	EXCELLENT
10/24/2020 9:58	13	EXCELLENT
10/24/2020 15:59	20	EXCELLENT
10/25/2020 8:03	15	EXCELLENT
10/25/2020 10:12	15	EXCELLENT
10/25/2020 16:15	19	EXCELLENT
10/26/2020 8:02	14	GOOD
10/26/2020 10:32	17	EXCELLENT
10/26/2020 16:04	31	GOOD
10/26/2020 16:09	29	GOOD
10/26/2020 16:09	29	EXCELLENT
10/27/2020 7:58	15	EXCELLENT
10/27/2020 10:08	20	POOR
10/27/2020 10:10	20	EXCELLENT
10/27/2020 15:51	26	EXCELLENT
10/28/2020 8:11	19	POOR
10/28/2020 8:11	16	EXCELLENT
10/28/2020 10:14	16	EXCELLENT
10/28/2020 16:04	24	EXCELLENT
10/29/2020 8:02	20	EXCELLENT
10/29/2020 10:35	16	REJECTED
10/29/2020 10:36	17	EXCELLENT

27

Continuous IOP Sensors



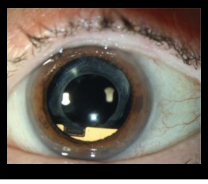


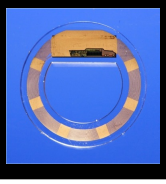


29

Implandata Eyemate

- Sulcus based IOP sensor
- 8 pressure-sensitive capacitors
- Diameter: 11.2 mm
- Thickness: 0.9 mm

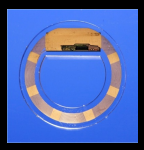


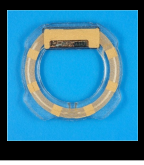


30

ARGOS-02 Trial: 1 year results

- 22 Patients
- Major Design Changes:
  - 0.9 to 0.5mm thickness with 0.1mm rounded tapering
  - 4 haptics to prevent cilliary sulcus rotation
- IOP Concordance:
  - D30:
    - Eyemate: 22.2 ± 9.2 mmHg
    - GAT: 19.5 ± 6.8 mmHg
  - D360:
    - Eyemate: 15.7 ± 3.8 mmHg
    - GAT: 14.1 ± 2.2 mmHg





American Journal of Ophthalmology DOI: (10.1016/j.ajo.2019.09.011)

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Sensors on the horizon…

LaunchPoint Technologies (Goleta, CA)

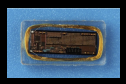
– Sensor attached to IOL or injected into vitreous

Intraocular Pressure Sensor: Launchpoint Technologies. Available at: http://www.launchpoint.com/portfolio/biomedical/intraocular-pressure-sensor. Accessed 10-23-2018

32

Sensors on the horizon…

- AcuMEMS (Menlo Park, CA)
  - iSense System: implantable sensor
- Glaukos (San Clemente, CA)
  - DOSE Medical IOP Sensor
- Implandata Ophthalmic Products GmbH
  - Suprachoroidal IOP sensor
- Injectsense Inc (Emeryville, CA)
  - Configurable on-demand sensor
- LaunchPoint Technologies (Goleta, CA)
  - Sensor attached to IOL or injected into vitreous
- Solx (Waltham, MA)
  - wireless intraocular sensor



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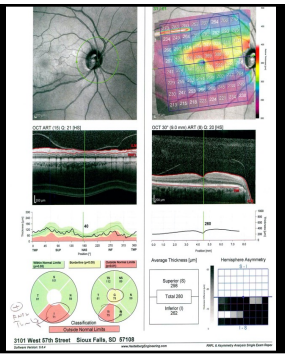
OCT

Pay attention to TSNIT curve.

Pay attention to the actual numbers in the segmentation plot

Pay attention to the numbers between eyes in the segmentation plot



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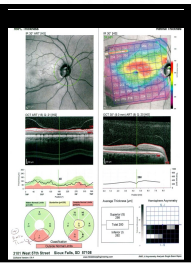
Am J Ophthalmol. 2013 Sep;156(3):567-577.e1. doi: 10.1016/j.ajo.2013.04.037. Epub 2013 Jun 28.

Diagnostic precision of retinal nerve fiber layer and macular thickness asymmetry parameters for identifying early primary open-angle glaucoma.

Sullivan-Mee M[1], Ruegg CC[2], Pensyl D[2], Halverson K[2], Qualls C[3].



Intereye (OD/OS) macular thickness asymmetry 5 microns

Intraeye (sup/inf of same eye) macular thickness 9 microns

Intereye (OD/OS) average RNFL thickness 9 microns

Total RNFL thickness 78 microns or less

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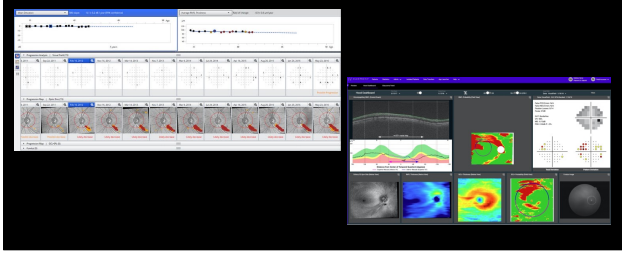
OCT Technology – Matching Structure and Function



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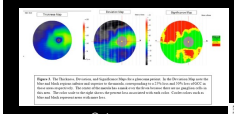
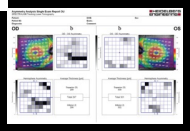
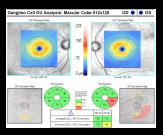
The Role of Ganglion Cell Imaging



Optovue

Spectralis - macula





Cirrus OCT

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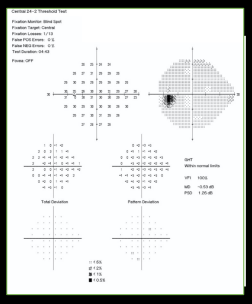

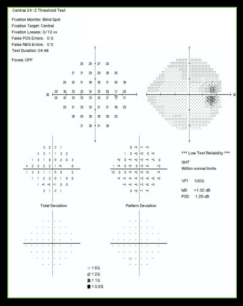

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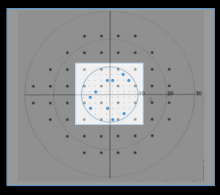
Resulting SITA Faster 24-2C Pattern on HFA3



Large Gray	24-2 pattern
Light Blue Dots	Ten additional 24-2C points
Small White	10-2 pattern

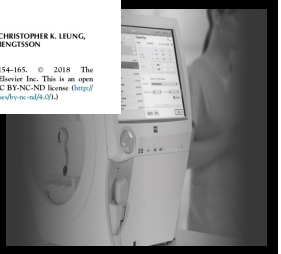
40

A New SITA Perimetric Threshold Testing Algorithm: Construction and a Multicenter Clinical Study

ANDERS HEIJL, VINCENT MICHAEL PATELLA, LUKE X. CHONG, AIKO IWASE, CHRISTOPHER K. LEUNG, ANJA TUULONEN, GARY C. LEE, THOMAS CALLAN, AND BOEL BENGTSSON

• PURPOSE: To describe a new time-saving threshold visual field–testing strategy—Swedish Interactive Thresholding Algorithm (SITA) Faster, which is intended to replace SITA Fast—and to report on a clinical evaluation of this new strategy.

Ophthalmol 2019;198:154–165. © 2018 The Author(s). Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).



30.4% shorter than SITA Fast
53.5% shorter than SITA Standard

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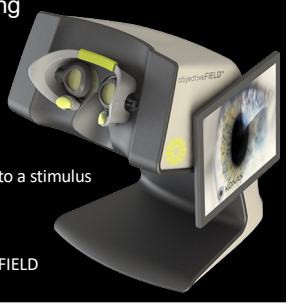
Objective Visual Field Testing



FDA 510(K) Cleared
Tests OU simultaneously in 7 minutes
Measures the response of the pupils to a stimulus

objectiveFIELD

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The Future of Visual Field Testing?

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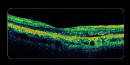
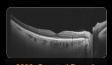
OCT Angiography: the Next Chapter?

- Images retinal microvasculature without dye injection
- Displays structure and function from a single imaging system



2002: Time Domain OCT



2006: Spectral Domain OCT

2014: OCTA

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Trend Analysis

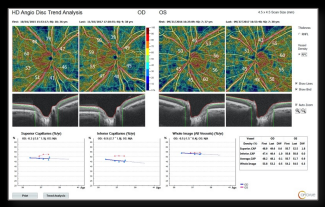

Image courtesy of Eric D. Nudleman, MD and Michael H. Goldbaum, MD of Shiley Eye Institute, University of California at San Diego, La Jolla, CA

45

Evaluation of an AI system for the automated detection of glaucoma from stereoscopic optic disc photographs: the European Optic Disc Assessment Study

- Objectives - To evaluate the performance of a deep learning based Artificial Intelligence (AI) software for detection of glaucoma from stereoscopic optic disc photographs, and to compare this performance to the performance of a large cohort of ophthalmologists and optometrists.
- Results
  - Pegasus was able to detect glaucomatous optic neuropathy with an accuracy of 83.4% (95% CI: 77.5–89.2)
  - This is comparable to an average ophthalmologist / optometrist accuracy of 80.5% / 80% respectively (95% CI: 67.2–93.8) / (95% CI: 67–88) on the same images.
  - There was no statistically significant difference between the performance of the deep learning system and ophthalmologists or optometrists.

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Genetics of Glaucoma

Key Points

- Ultimately, it allows for a more personalized patient management treatment algorithm
- Understanding the genetic basis of various forms of POAG glaucoma provides an opportunity for targeting specific genes or biological pathways for disease.
- By genetic testing it may be possible in the future to provide personalized therapeutic plans for a given patient based on knowledge of their specific gene mutations and the molecular pathways they impact
- Patients with gene variants in mitochondrial genes may benefit from antioxidant therapies, whereas patients with mutations in lipid metabolism genes may benefit from cholesterol lowering medications. JAMA Ophthalmol. 2019;137(7):756-765. doi:10.1001/jamaophthalmol.2019.0900

Avellino's test will have Monogenic & Polygenic POAG forms

Early Onset monogenic forms:
- Juvenile open-angle glaucoma
- Congenital glaucoma
- Anterior segment developmental syndrome

Adult Onset polygenic forms:
- Primary open-angle glaucoma(POAG)
- Angle-closure glaucoma(ACG)
- Low tension glaucoma(LTG)
- Exfoliation glaucoma

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Treatment

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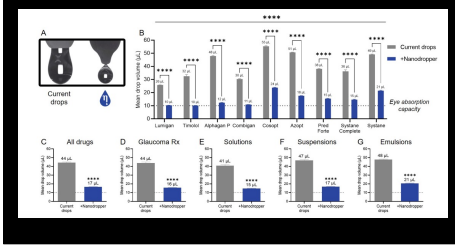
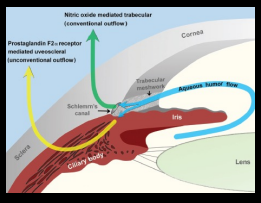
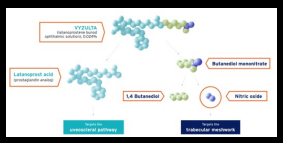
Delivering Treatment



49

latanoprostene bunod 0.024% (Vyzulta)





50

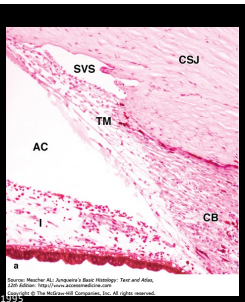
Nitric Oxide

Endogenous in the human body

Causes alterations in the cytoskeletal network

Reduced NO in TM, Schlemm's canal, and ciliary muscle

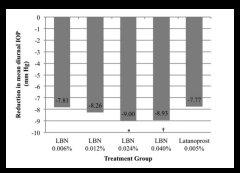
Nathanson JA et al. Alterations of ocular nitric oxide synthase in human glaucoma. Invest Ophthalmol Vis Sci. 1995



51

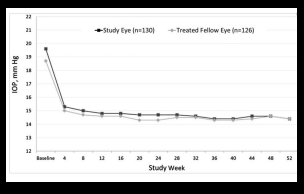
VOYAGER Study

latanoprostene bunod 0.024% (Vyzulta)



JUPITER Study

latanoprostene bunod 0.024% (Vyzulta)



52

JAMA Ophthalmol. 2016 Mar;134(3):294-303. doi: 10.1001/jamaophthalmol.2015.5601.

Association of Dietary Nitrate Intake With Primary Open-Angle Glaucoma: A Prospective Analysis From the Nurses' Health Study and Health Professionals Follow-up Study

Jae H Kang [1], Walter C Willett [2], Bernard A Rosner [3], Emmanuel Buys [4], Janey L Wiggs [5], Louis R Pasquale [6]

- 63,893 women from Nurses' Health Study
- 41,094 men from Health Professionals Follow-Up Study

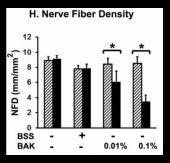
Findings:

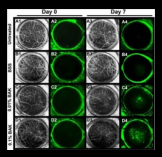
- Compared with the lowest quintile of dietary nitrate intake (appx 80mg/day), the highest quintile (appx 240mg/day) was associated with:
  - 21% lower risk of all POAG
  - 44% lower risk of POAG with early paracentral visual field loss

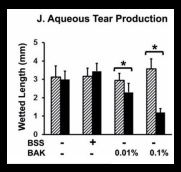
53

Neurotoxicity of BAK

- Exposure to BAK (0.01% or 0.1%) QD x 7 days:
  - Decrease NFD (p=0.02 & 0.001)
  - Decrease aqueous production (phenol red)





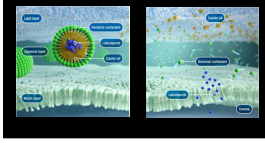


Invest Ophthalmol Vis Sci. 2012 Apr; 53(4): 1792–1802

54

BAK-Free Latanoprost

- Following instillation, micelles mix with the tear film
- As the micelles migrate toward the ocular surface, they break apart, releasing latanoprost

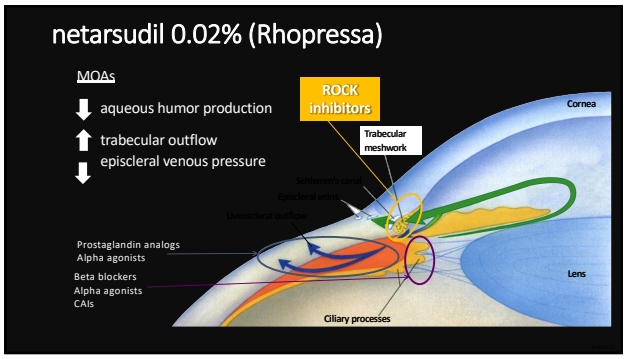


Preservative-Free

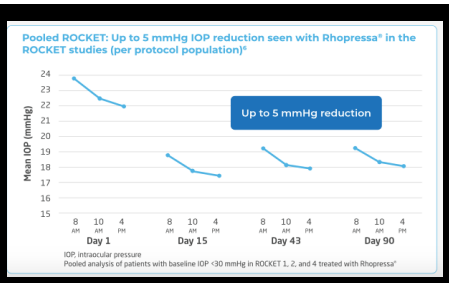
SINGLE	**LAT** (Latanoprost 0.005%)**	7.5mL
	DOR (Dorzolamide 2%)	10mL
COMBINATION	**BRIM-DOR®** (Brimonidine 0.15% and Dorzolamide 2%)	10mL
	TIM-LAT® (Timolol 0.5% and Latanoprost 0.005%)**	5mL
	TIM-DOR-LAT® (Timolol 0.5%, Dorzolamide 2%, and Latanoprost 0.005%)**	5mL
	TIM-BRIM-DOR® (Timolol 0.5%, Brimonidine 0.15%, and Dorzolamide 2%)	10mL (2 x 5mL bottles per shipment)
	TIM-BRIM-DOR-LAT® (Timolol 0.5%, Brimonidine 0.15%, Dorzolamide 2%, and Latanoprost 0.005%)**	5mL
TRIPLE/QUAD KIT	**TIM-BRIM-DOR®** (Timolol 0.5%, Brimonidine 0.15%, and Dorzolamide 2%)	5mL
	TIM-BRIM-DOR-LAT® (Timolol 0.5%, Brimonidine 0.15%, Dorzolamide 2%, and Latanoprost 0.005%)**	5mL

55

netarsudil 0.02% (Rhopressa)



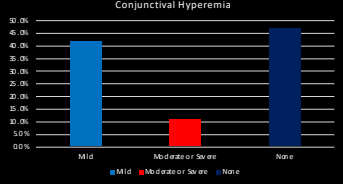
56



netarsudil 0.02% (Rhopressa)

57

netarsudil 0.02% (Rhopressa)



~ 15-20% Hyperemia at baseline

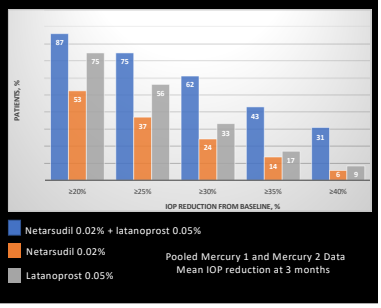
6% dropout rate for hyperemia

Serle et al. Am J Ophthalmol. 2018; 186;116-127

58

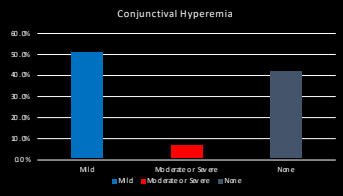
netarsudil 0.02% + latanoprost 0.005% (Rocklatan)

- RHO protein kinase (destabilizes actin in TM)
- Rock inhibitor (lowers EVP)
- Latanoprost (uveoscleral outflow)
- Net Inhibition



59

netarsudil 0.02% + latanoprost 0.005% (Rocklatan)



~ 15-20% Hyperemia at baseline

15% Corneal Verticillata

10.6% Conjunctival Heme

60

Omidenepag Isopropyl (OMDI)

Selective, non-prostaglandin, prostanoid EP2 receptor agonist
Mechanism of Action: Increase outflow via both conventional and uveoscleral

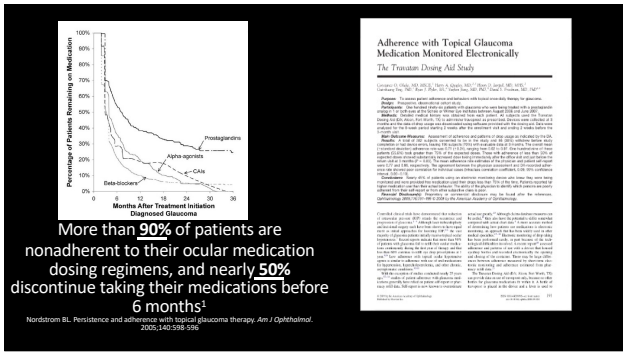
Phase 3 AYAME Study
- OMDI 0.002% vs latanoprost 0.005%
  - qd dosing x 4 weeks
  - Baseline IOP ~ 24 mm Hg

OMDI = 25.1% reduction (17.81 mm Hg)
Conjunctival hyperemia = 24.5%

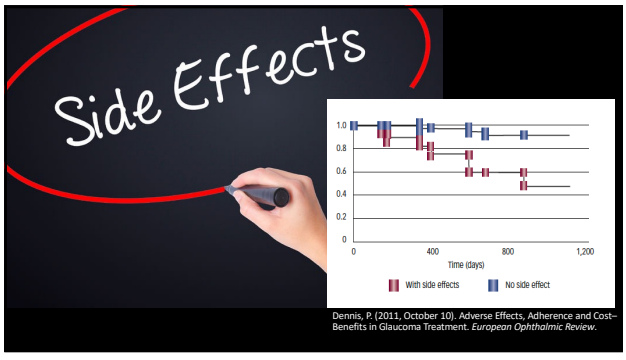
61


Innovations in Glaucoma Drug Delivery
What the Future Holds

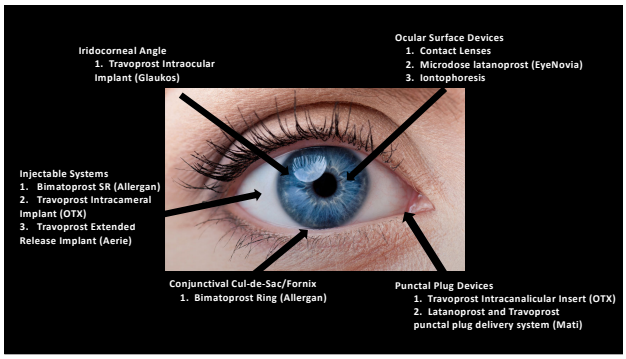
62


Percentage of Patients Remaining on Medication
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Prostaglandins
Alpha-agonists
CAIs
Beta-blockers
0
6
12
18
24
30
36
Months After Treatment Initiation
Diagnosed Glaucoma
More than 90% of patients are nonadherent to their ocular medication dosing regimens, and nearly 50% discontinue taking their medications before 6 months1
Nordstrom BL. Persistence and adherence with topical glaucoma therapy. Am J Ophthalmol. 2005;140:598-596
Adherence with Topical Glaucoma Medication Monitored Electronically
The Travatan Dosing Aid Study

64


Side Effects
1.0
0.8
0.6
0.4
0.2
0
0
400
800
1,200
Time (days)
With side effects
No side effect
Dennis, P. (2011, October 10). Adverse Effects, Adherence and Cost–Benefits in Glaucoma Treatment. European Ophthalmic Review.

65



66

Patients Attitudes Towards Drug Delivery

Triple Combination Eye Drop – 85%

Microdose Eye Spray – 54%

Drug-eluting Contact Lens – 31%

Drug-eluting Periocular Ring Insert – 43%

Injectable Subconjunctival Drug Insert- 32%

Injectable Anterior Chamber Implant – 30%

attitude is everything

Wang BB., Lin MM., Nguyen, T., et al. Patient attitudes towards novel glaucoma drug delivery approaches. Digit J Ophthalmol. 2018; 24(3): 16-23

67

Microdose latanoprost
(EyeNovia)

Delivers microdoses of latanoprost with Optejet delivery

Advantages: 75% less drug and preservative
88% of the time got to target

Achieved 29% IOP lowering from baseline in Phase 2 study

Pasquale, LR, Shan L, Weinreb RN, et al. Latanoprost with high precision, Piezo-print microdose delivery for IOP lowering: clinical results of the PG21 study of 0.4 micrograms daily microdose.

68

Drug-Eluting Contact Lens

Attractive option secondary to large residence time in the eye and upward of 50% bioavailability in comparison with eye drop formulations.

Li, CC, Chauhan, A. Modeling ophthalmic drug delivery by soaked contact lenses. Ind Eng Chem Res 2006; 45: 3718–3734.

Peng, C-C, Kim, J, Chauhan, A. Extended delivery of hydrophilic drugs from silicone-hydrogel contact lenses containing Vitamin E diffusion barriers. Biomaterials 2010: 31: 4032–4047.

69

Drug-Eluting Contact Lens

- Diopter Corporation
  - Uses an approved contact lens with approved drugs
  - Vitamin E Nano-barriers to extend drug release
- Phase I
  - Subject wore contact lens for 2 day dosing period
  - IOP reduction was observed over 9 days after the lens was removed
- Phase Ib and Phase 2 are planned for 2nd and 3rd quarter of 2021

70

Drug-Eluting Contact Lens

- MediPrint Ophthalmics
  - LLT-BMT1 – drug eluting contact lens - bimatoprost
- Phase I – SIGHT-1
  - 5 Subjects wore the lens for 7 days continuously
  - Demonstrated 100% tolerability and no adverse events
  - IOP efficacy was noted
- SIGHT-2 – Pase 2b dose-ranging clinical study is underway

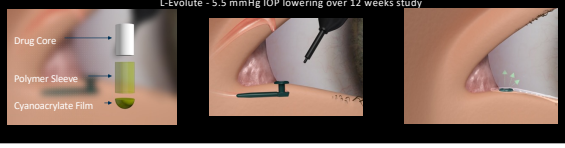
71

Punctal Plug Delivery System
(Mati Therapeutics)

Latanoprost and Travoprost designs

U.S. Phase II Multi-center Trials (Lower Puncta)
Glau 12 (n=92) – 96% retention rate
Glau 13 (n=87) – 92% retention rate

Phase II Clinical Study
L-Evolute - 5.5 mmHg IOP lowering over 12 weeks study



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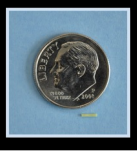
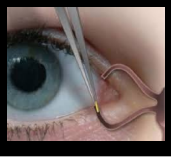
Travoprost Intracanalicular Insert
(Ocular Therapeutix)

Bioresorbable sustained-release intracanalicular insert

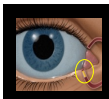
Designed for continuous steady release of travoprost to the ocular surface for up to 90 days
Preservative free
Allows visualization



Low Ocular Adverse Events:
Dacryocanaliculitis – 8.3%
Lacrimal structure disorder – 6.6%



73



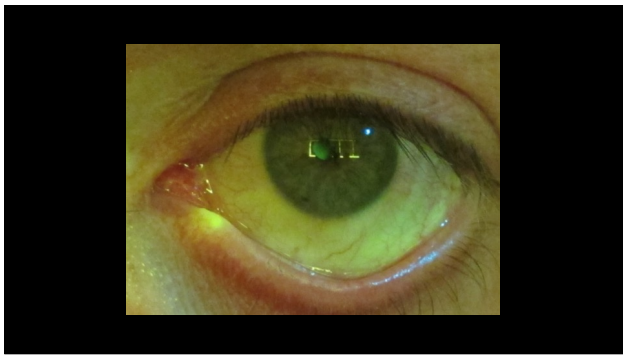
Travoprost Intracanalicular Insert
(Ocular Therapeutix)

Phase III randomized, double-blind, placebo-controlled clinical trial

	Reduction in IOP					
	2 Week		6 Week		12 Week	
Diurnal Time Points	mm Hg OTX-TP	Vehicle	mmHg OTX-TP	Vehicle	mmHg OTX-TP	Vehicle
8:00 AM	-5.72	-3.88	-4.81	-4.01	-3.91	-3.52
10:00 AM	-4.92	-3.16	-4.03	-3.23	-3.34	-2.63
4:00 PM	-5.22	-3.18	-4.16	-3.14	-3.27	-2.60

n=334 OTX-TP n=211 Vehicle

74



75

Bimatoprost SR (Allergan)

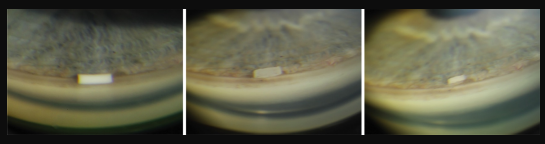
(10-microgram bimatoprost sustained-release implant)

- Biodegradable bimatoprost sustained-release implant
- FDA-approved and indicated to reduce IOP in patients with open angle glaucoma or OHT
- Single intracameral administration
- Phase I/II/III Studies

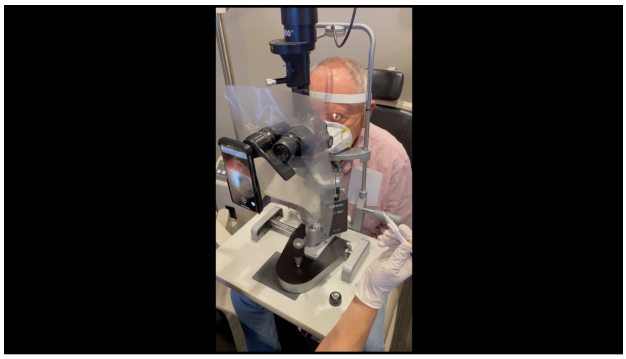
76

Bimatoprost SR (Allergan)

(10-microgram bimatoprost sustained-release implant)



77



78

24 Month Phase I/II Clinical Trial

75 subjects

- bimatoprost pellet (6, 10, 15, or 20 micrograms)
- topical bimatoprost 0.03%

Craven ER, Walters T, Christie WC, Day DG, et al. 24-Month Phase I/II Clinical Trial of Bimatoprost Sustained-Release Implant (Bimatoprost SR) in Glaucoma Patients. Drugs. 2020 Feb;80(2): 167-179.

79

24 Month Phase I/II Clinical Trial

bimatoprost pellet (6, 10, 15, or 20 micrograms)	topical bimatoprost 0.03%
24 months – IOP reduction 7.5, 7.3, 7.3, 8.9 mm Hg	24 months – IOP reduction of 8.2 mm Hg

No Rescue or Retreatment
68% - 6 mos.
40% - 12 mos.
28% - 24 mos.

Craven ER, Walters T, Christie WC, Day DG, et al. 24-Month Phase I/II Clinical Trial of Bimatoprost Sustained-Release Implant (Bimatoprost SR) in Glaucoma Patients. Drugs. 2020 Feb;80(2): 167-179.

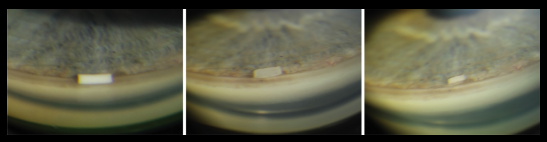
80

Phase III (ARTEMIS)

27% -conjunctival hyperemia
10% - post administration 2 days

5.4% - endothelial cell loss over 20 months

5% - iritis



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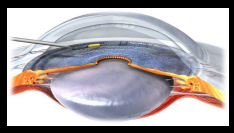
Travoprost Intracameral Implant

(Ocular Therapeutix)

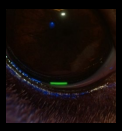
Bioresorbable sustained-release implant injected into the AC

Goal: Steady release of travoprost with target duration from 4 to 6 months



Preclinical Models (beagle dogs)
Steady state release through 4 months

IOP lowering of 25-30% through 4 months



82

Travoprost Intracameral Implant

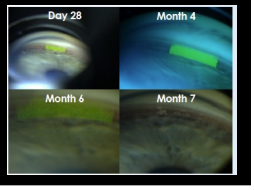
(Ocular Therapeutix)

Phase 1, prospective, multi-center, open label

Cohort 1 n=5 (15 micrograms) → Day 28 -9.1 mm Hg (n=5); Mo. 4 -7.6 mm Hg (n=4); Mo. 6 –7.5 mm Hg (n=3); *Mo. 21 - -9.3 (n=1)

Cohort 2 n=4 (26 micrograms) → Day 28 -6.0 mm Hg (n=4); Mo. 4 -6.8 mm Hg (n=4); Mo. 6 –6.1 mm Hg (n=3); *Mo. 9 - -5.9 (n=2)

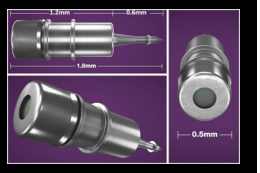
Cohort 3 n=4 (15 micrograms Fast Degrading) → Day 28 -11.5 mm Hg (n=3); Mo. 4 -13.8 mm Hg (n=2); *Mo. 6 -12.5 (n=1)



83

Travoprost intraocular implant
(Glaukos)

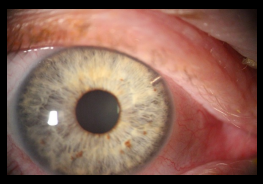
Resides in AC angle, anchored behind TM



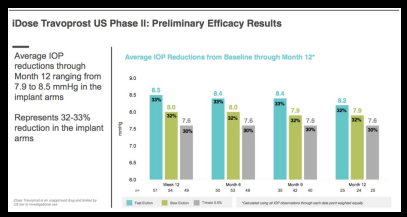
- Length: 1.8 mm
- Diameter: 0.5 mm
- Titanium
- Non-ferrous

84

Travoprost intraocular implant
(Glaukos)



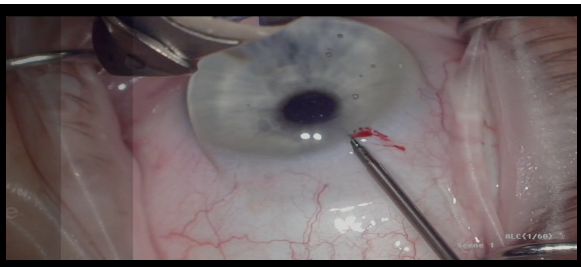
85



24- Month Update

Average IOP reductions from baseline = 7.9 mm Hg and 7.4 mm Hg in the fast and slow release arms.
Average IOP reductions from baseline = 29% and 28% in the fast and slow release arms.
Favorable safety profile with no ECC loss, no corneal adverse events, no adverse events of conjunctival hyperemia

86

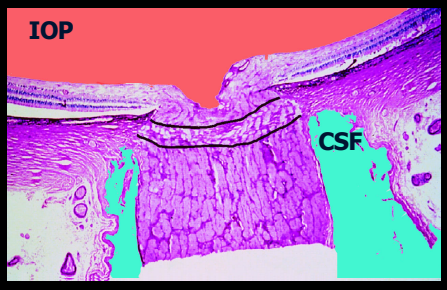


36 Month Update

1. 70% and 68% of subjects in fast and slow-release were well-controlled on fewer or same medications as baseline.
2. Average IOP reductions were 8.3 mmHg and 8.5mmHg in the fast and slow-release arms.

87

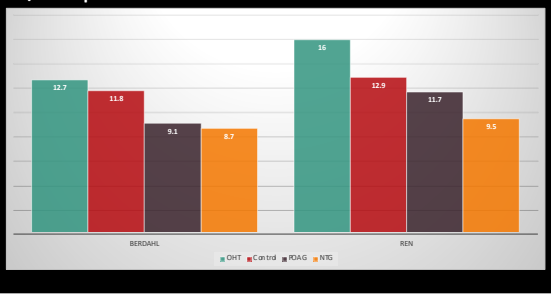
CSF/ICP Pressure



Jonas JB, Berenshtein E, Holbach L.Anatomic relationship between lamina cribrosa, intraocular space, and cerebrospinal fluid space. Invest Ophthalmol Vis Sci. 2003 Dec;44(12):5189-95.

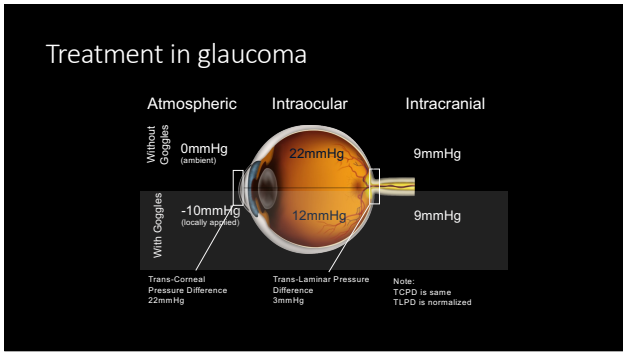
88

CSF/ICP pressure

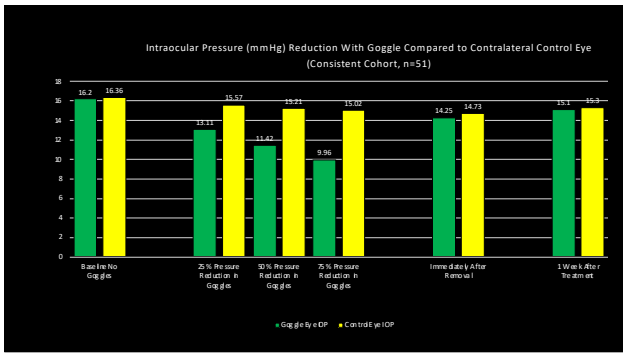


89

90


Treatment in glaucoma
Atmospheric
Intraocular
Intracranial
Without Goggles
0mmHg
(ambient)
22mmHg
9mmHg
With Goggles
-10mmHg
(locally applied)
12mmHg
9mmHg
Trans-Corneal Pressure Difference 22mmHg
Trans-Laminar Pressure Difference 3mmHg
Note:
TCPD is same
TLPD is normalized

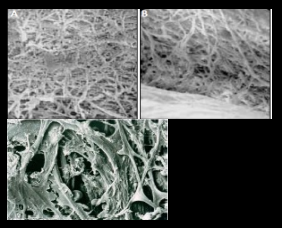
91


Intraocular Pressure (mmHg) Reduction With Goggle Compared to Contralateral Control Eye
(Consistent Cohort, n=51)
16.2
16.36
13.11
15.57
11.42
15.21
9.96
15.02
14.25
14.73
15.1
15.3
Baseline No Goggles
25% Pressure Reduction in Goggles
50% Pressure Reduction in Goggles
75% Pressure Reduction in Goggles
Immediately After Removal
1 Week After Treatment
Goggle Eye IOP
Control Eye IOP

92

Selective Laser Trabeculoplasty

Selectively targets and laser burns pigmented TM cells



100

Selective Laser Trabeculoplasty Versus Medical Therapy as Initial Treatment of Glaucoma: A Prospective, Randomized Trial

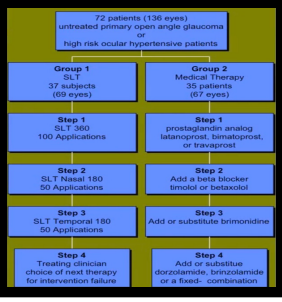
L. Jay Katz, MD, William C. Steinmann, MD,† Azad Kabir, MD,‡ Jeanne Molineaux, COA,* Sheryl S. Wizov, COA,* and George Marcellino, PhD§ the SLT/Med Study Group*

J Glaucoma • Volume 21, Number 7, September 2012

- SLT Med Study (2012)
  - Dr. Katz @ Wills Eye in Philadelphia
    - J Glaucoma 2012;21:460-468
  - SLT (100 applications over 360 degrees of TM) vs. prostaglandin analog
  - Primary outcome -> IOP
  - Secondary outcome -> # of treatment steps

101

SLT Med Study Treatment Arms



102

SLT vs. Prostaglandins

- SLT Med Study (2012)

Results;

1. IOP reduction:
   - SLT – 25.7% IOP reduction
     - IOP reduced from 24.5 to 18.2 (6.3 mmHg reduction)
   - Prostaglandin – 28.3% IOP reduction
     - IOP reduced from 24.7 to 17.7 (7.0 mmHg reduction)
2. # of treatment steps:
   - SLT group - 11% of eyes required additional SLT
   - Prostaglandin group -> 27% of eyes required additional medication

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Lancet. 2019 Apr 13;393(10180):1505-1516. doi: 10.1016/S0140-6736(18)32213-X. Epub 2019 Mar 9.

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

Gazzard G[1], Konstantakopoulou E[2], Garway-Heath D[2], Garg A[2], Vickerstaff V[3], Hunter R[4], Ambler G[5], Bunce C[6], Wormald R[7], Nathwani N[8], Barton K[2], Rubin G[9], Buszewicz M[4]; LiGHT Trial Study Group.

Primary Outcome - Quality of Life at 3 years
Secondary Outome – Cost, cost-effectiveness, clinical effectiveness, and safety

Conclusions:
- No significant difference in QOL
- 97% probability of SLT as 1st treatment being more cost-effective
- SLT at target IOP 93% of visits vs 91.3% at target for meds
- 78.2% of SLT Drop Free @ 3 Years

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Steroid After Laser Trabeculoplasty (SALT)

Steroid	NSAID
• IOP Pre-Op: 23.3 mm Hg	• IOP Pre-Op: 23.3 mm Hg
• 12 week IOP check	• 12 week IOP check
• IOP lowering of **5.2±2.7** mmHg	• IOP lowering of **6.2±3.1** mmHg

Saline Tears IOP lowering of **3±4.3** mmHg

- Steady state IOP ~ 6 weeks (new baseline)

Groth et al. Steroids After Laser Trabeculoplasty (SALT) Trial: Impact of Short-term Anti-Inflammatory Treatment on SLT Efficacy. Ophthalmology June 5 2019

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What
About
MIGS

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Procedures that have an ab-interno approach, are minimally traumatic, with at least modest efficacy, extremely high safety and rapid recovery .
Conservative
Aggressive
MIGS
Saheb H, Ahmed, IIK. Micro-invasive glaucoma surgery: current perspectives and future directions. Curr Opin Ophthalmol. 2012;23(2): 96-104.

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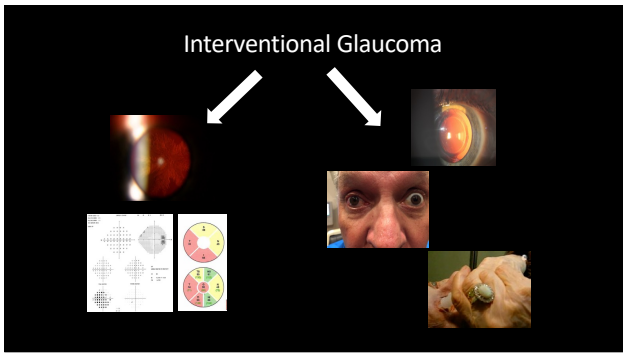
Interventional Glaucoma

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Trabecular Microbypass Stent
(iStent Inject W)

Schlemm Canal Microstent
(Hydrus)

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US Multicenter Pivotal Trial:
Trabecular Microbypass Stent x 3 (iStent infinite)

Three-stent, standalone procedure

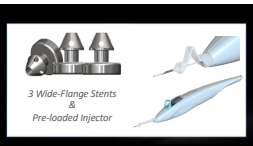
- Three wide-flange stents preloaded in injector system, to facilitate placement across ~6 clock hrs. of Schlemm's canal

Trial enrolled patients with open angle glaucoma with uncontrolled IOP:

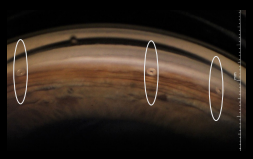
- Unresponsive to maximum tolerated medical therapy OR
- Uncontrolled by medical therapy and have failed ≥ 1 conventional incisional intraocular glaucoma or cilioablative procedure

Enrollment completed Oct 2019

- US IDE open-label, prospective, single-arm pivotal study
- 72 subjects across 15 investigational sites
- 12-month follow-up



3 Wide-Flange Stents
&
Pre-loaded Injector



Not approved by the FDA

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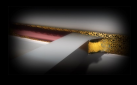
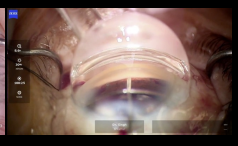
Excisional Goniotomy
(Kahook Dual Blade)



Goniotomy
(iAccess)



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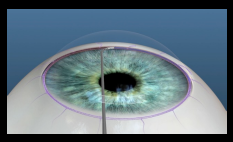
Ab-interno Trabeculotomy + Canaloplasty
(OMNI)



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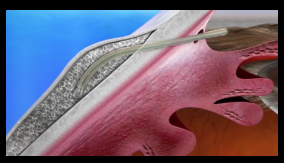

Subconjunctival Stent
(Xen)

Xen 45 Gel Stent
US Pivotal Clinical Trial

	Baseline	12 month
Medicated IOP	25.1 (3.7)	15.9 (5.2)
Glaucoma Meds	3.5 (1.0)	1.7 (1.5)

Hypotony 16 (24.6%)
Bleb Needling 21 (32.3%)

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Technology is nothing.

What's important is that you have a faith in people, that they're basically good and smart, and if you give them tools, they'll do wonderful things with them.

justin.schweitzer@vancethompsonvision.com

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