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 Education Planning Committee considers content and speakers for future meetings to provide you with the best education possible.

vision expo

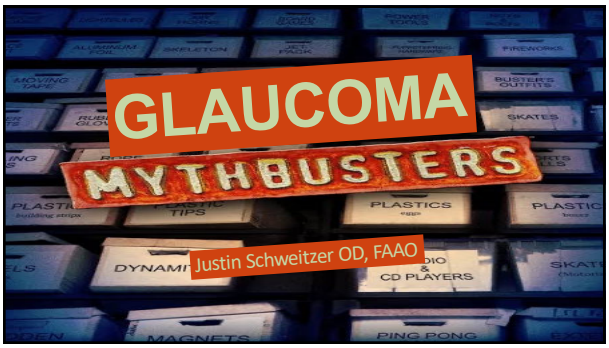
1

Financial Disclosure – Justin Schweitzer, OD, FAAO

- Alcon – C/L
- Aldeyra - C
- Allergan – C/L
- Bausch + Lomb – C/L
- Bruder - C
- Sight Sciences – C/L
- Dompe – C/L
- Zeiss – C/L
- Visus - C
- Science Based Health – C
- Tarsus – C/L
- Santen - C
- Sun – C/L
- Reichert - C
- Glaukos – C/L
- MediPrint – C
- LKC – C/L
- Avellino – C
- Iveric bio – C
- Ocuphire – C
- Viatris – C
- Thea – C
- Heru – C
- Eyenovia - C

All relevant relationships have been mitigated

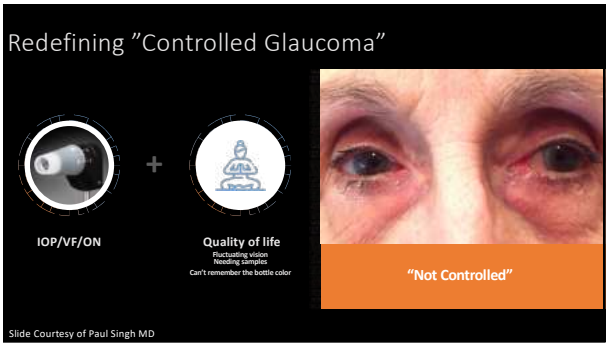
2



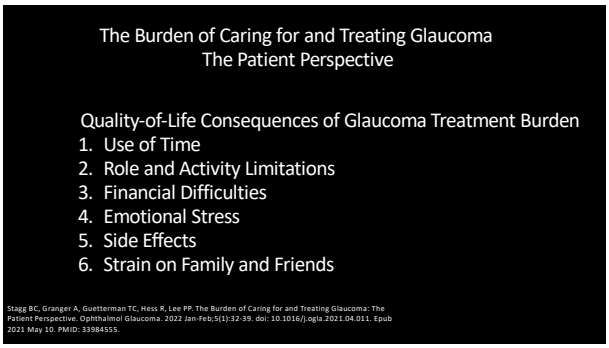
3


Myth 1 ?
"Controlled Glaucoma" Is A Stable Visual Field And Stable OCT?

4


Redefining "Controlled Glaucoma"
+
IOP/VF/ON
Quality of life
Fluctuating vision
Needing samples
Can't remember the bottle color
"Not Controlled"
Slide Courtesy of Paul Singh MD

5


The Burden of Caring for and Treating Glaucoma
The Patient Perspective
Quality-of-Life Consequences of Glaucoma Treatment Burden
1. Use of Time
2. Role and Activity Limitations
3. Financial Difficulties
4. Emotional Stress
5. Side Effects
6. Strain on Family and Friends
Stagg BC, Granger A, Guetterman TC, Hess R, Lee PP. The Burden of Caring for and Treating Glaucoma: The Patient Perspective. Ophthalmol Glaucoma. 2022 Jan-Feb;5(1):32-39. doi: 10.1016/j.ogla.2021.04.011. Epub 2021 May 10. PMID: 33984555.

6

Impact of Multiple Glaucoma Medications on Dry Eye Disease

Number of Drops	Incidence of DED among 61 glaucoma patients[1]	Incidence of DED among 19,665 glaucoma patients[2]
1	11%	51%
2	39%	55%
3+	40%	60%

OSDI®-Ocular surface disease index®
1. Fechtner RD et al. Cornea. 2010;29:618-621. 2. Erb C et al. Graefes Arch Clin Exp Ophthalmol. 2008;246:1593-1601. 3. Leung EW et al. J Glaucoma. 2008;17:350-355.

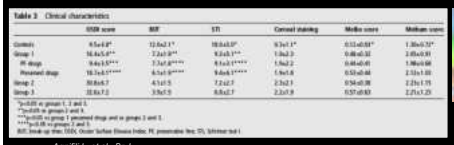
Slide Courtesy of Paul Singh MD

7

Effects on Meibomian Glands

Effect on lids/meibomian glands

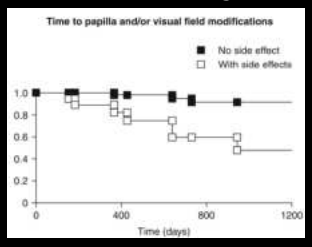
- Study on glaucoma patients 18mo stable treatment with different medications.
- Reduced number of meibomian glands
- Reduced numbers of acinae and increased dysfunction in patients
- Patients on multiple medications with preservatives = increased dysfunction and reduced number of acinae



Agnifili L., et al. Br J Ophthalmol 2013.

8

Side Effects Lead to Progression



• Denis, Philippe, et al. Medical outcomes of glaucoma therapy from a nationwide representative survey

9

Solutions?

Preservative-Free Formulations
SLT
Glaucoma Drug Delivery
Minimally Invasive Glaucoma Surgery

10

Preservative-Free Formulations

N=349, Significant improvement in both signs and symptoms of OSD with switch to PF meds

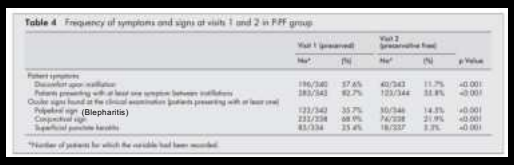


Table 4 Frequency of symptoms and signs at visits 1 and 2 in PFF group

	Visit 1 (preserved)		Visit 2 (preservative free)		
	No.*	(%)	No.*	(%)	p Value
Patient symptoms					
Discomfort upon instillation	196/340	57.6%	40/343	11.7%	<0.001
Patients presenting with at least one symptom between instillations	283/343	82.7%	123/344	35.8%	<0.001
Ocular signs found at the clinical examination (patients presenting with at least one)					
Palpebral sign (Blepharitis)	123/343	35.7%	50/346	14.5%	<0.001
Conjunctival sign	231/334	68.9%	74/338	21.9%	<0.001
Superficial punctate keratitis	83/334	25.4%	18/337	5.3%	<0.001

*Number of patients for which the variable had been recorded.

Pisella, P. J., P. Pouliquen, and C. Baudouin. Prevalence of ocular symptoms and signs with preserved and preservative free glaucoma medication

11

11

Preservative-Free Solutions

PF-Latanoprost

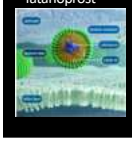
	Phase 3 (US) Trial (n=325)		Phase 3 (Europe) Trial (n=353)	
	PF-Latanoprost	Xalatan	PF-Latanoprost	Xalatan
Mean baseline IOP ± SD(mmHg)	18.8 ± 2.9	19.2 ± 3.1	24.1 ± 1.8	24.0 ± 1.7
Mean IOP reduction from baseline (mmHg) (range)	2.7 (2.2 - 3.0)	3.4 (2.9 - 3.8)	8.6 (8.3 - 8.8)	8.9 (8.8 - 9.0)

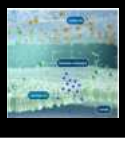
12

12

BAK-Free Latanoprost

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

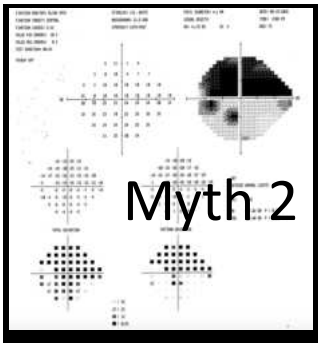




Preservative-Free

13

14



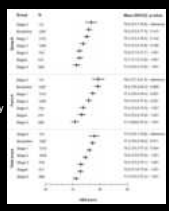
Myth 2 ?

Surgical Intervention Should Be Delayed For As Long As Possible?

15

Visual Field Damage and QOL[1,2]

"At worse levels of VF damage, glaucoma patients demonstrate shorter, more fragmented bouts of physical activity throughout the day and lower activity levels during typical waking hours, reflecting low physiologic functioning[1]"



1. Jian-Yu E, Jennifer A. Schrack, Aleksandra Mihailovic, Amal A. Wanigatunga, Sheila K. West, David S. Friedman, Laura N. Gitlin, Tianjing Li, Pradeep Y. Ramulu. Patterns of Daily Physical Activity across the Spectrum of Visual Field Damage in Glaucoma Patients. Ophthalmology. Volume 128, Issue 1, 2021,Pages 70-77,ISSN 0161-6420,https://doi.org/10.1016/j.ophtha.2020.06.053.

2. Rulli, E., Quaranta, L., Riva, I. *et al.* Visual field loss and vision-related quality of life in the Italian Primary Open Angle Glaucoma Study. *Sci Rep* **8**, 619 (2018). https://doi.org/10.1038/s41598-017-19113-z

16

Interventional Glaucoma Mindset

17

Safety Profile of MIGS

	iStent	iStent Inject	Hydrus	KDB	Trabectome	GATT	TRAB360	VISCO360	OMNI System	ABiC
IOP spike	1.9–22.2	1.06–16.8	1.9–6.45	1.0–18.2	2.06–28.9	0–16.7	1.2	0.9–1.1	3.7	0–22.2
Hyphaema	1.85–11.4	0–5	1.92–6.45	0–34.9	4.72–95	0.97–58	50.6	1–13.1	3.7	1.9–20
Corneal oedema	2.1–8.97	0–10	0–3.23	1.0–15.5	0	0	8.2	0	4.9	0
Blob needling	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Device obstruction	0–13.2	0–6.2	0–6.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SCH	1.9–2.27	0	0	0	1.47	0	0	1	0	0

1. Vinod K, Gedde SJ. Safety profile of minimally invasive glaucoma surgery. Curr Opin Ophthalmol. 2021 Mar 1;32(2):160-168. doi: 10.1097/ICU.0000000000000731. PMID: 33315726.

2. Rowson, A.C.; Hogarty, D.T.; Maher, D.; Liu, L. Minimally Invasive Glaucoma Surgery: Safety of Individual Devices. *J. Clin. Med.* **2022**, *11*, 6833. https://doi.org/10.3390/jcm11226833

18

Schlemm's Canal/TM Procedures

	Stents	SC Dilation	TM Cutting
Fibrosis Risk	(-)	(+)/(-)	(+)(+)
Hyphema	(-)	(+)/(-)	(+)(+)
PAS Risk	(-)	(-)	(+)
IOP Lowering	(+)	(+)	(+)(+)
Data	(+)(+)(+)	(+)/(-)	(+)(+)

19

Trabecular Microbypass Stent (iStent Inject W)

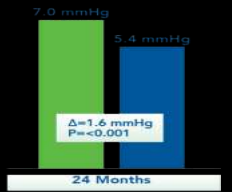
Schlemm Canal Microstent (Hydrus)

20

Trabecular MicroBypass X 2 PIVOTAL TRIAL

PRIMARY ENDPOINT:
≥ 20% Reduction in Unmedicated DIOP

SECONDARY ENDPOINT:
Mean Unmedicated DIOP Reduction



iStent inject + Phaco (N=380) Phaco alone (N=118)

Samuelson TW, Sarkisian SR Jr, Lubeck DM, Stiles MC, Duh YJ, Kerns KA, Giamporcaro JE, Hornbeak DM, Katz LJ, iStent inject Study Group. Prospective, Randomized, Controlled Pivotal Trial of an Ab Interno Implanted Trabecular Micro-Bypass in Primary Open-Angle Glaucoma and Cataract: Two-Year Results. Ophthalmology. 2019 Jun;126(6):811-821. doi: 10.1016/j.ophtha.2019.03.006. Epub 2019 Mar 14. PMID: 30880158.

21

HORIZON Trial – 5 Year

	Stent + Cataract (n=369)	Cataract Only (n=187)
Change in diurnal IOP (mean)	-8.3 mm HG (+/-3.8)	-6.5 mm HG (+/-4.0)
60 months medication free	66%	46%
60 months mean IOP (mm Hg)	16.6 (+/-3.2)	17.6 (+/-3.6)
1 preoperative med 2 to 4 preoperative med	52.6% 47.4%	54% 46%

Ahmed IIK, De Francesco T, Rhee D, McCabe C, Flowers B, Gazzard G, Samuelson TW, Singh K; HORIZON Investigators. Long-term outcomes from the HORIZON randomized trial for a Schlemm's canal microstent in combination cataract and glaucoma surgery. Ophthalmology. 2022 Feb 23:S0161-6420(22)00060-9.

22

Trabecular MicroBypass X 2 PIVOTAL TRIAL[1]

Conclusions: The overall safety profile of the treatment group was favorable and similar to that in the control group throughout the 2-year follow-up.

HORIZON Trial – 5 Year[2]

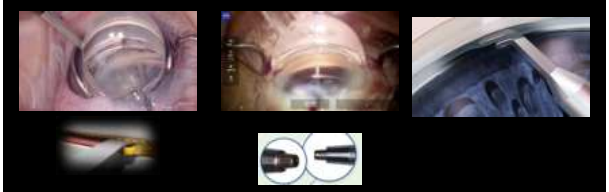
Conclusions: The addition of a Schlemm's canal microstent in conjunction with CS was safe, resulted in lowered IOP and medication use, and reduced the need for postoperative incisional glaucoma filtration surgery compared with CS after 5 years. Long-term presence of the implant did not affect the corneal endothelium adversely.

1. Samuelson TW, Sarkisian SR Jr, Lubeck DM, Stiles MC, Duh YJ, Ruiz-Ramos GA, Giamporcaro JE, Hornbeak DM, Katz LJ; iStent inject Study Group. Prospective, Randomized, Controlled Pivotal Trial of an Ab Interno Implanted Trabecular Micro-Bypass in Primary Open-Angle Glaucoma and Cataract: Two-Year Results. Ophthalmology. 2019 Jun;126(6):811-821. doi: 10.1016/j.ophtha.2019.03.046. Epub 2019 Mar 14. PMID: 30880108

2. Ahmed IIK, De Francesco T, Rhee D, McCabe C, Flowers B, Gazzard G, Samuelson TW, Singh K; HORIZON Investigators. Long-term outcomes from the HORIZON randomized trial for a Schlemm's canal microstent in combination cataract and glaucoma surgery. Ophthalmology. 2022 Feb 23:S0161-6420(22)00060-9.

23

Excisional Goniotomy (Kahook Dual Blade) | **Goniotomy (iAccess)** | **Goniotomy (SION)**



24

Ab-interno Trabeculotomy + Canaloplasty
(OMNI)



25

A Peek into The Future…

Elios
- Excimer Laser Technology
- 10 Microchannels in the TM
- Combo with CEX

Vialase
- Femtosecond laser
- Micron-accurate gonio imaging
- Non-invasive
- Customized drainage channels


Camera


Femtosecond Laser

26

A Peek into The Future…

MINIject
- 5-mm-long uveoscleral device
- 2-year outcomes of 25 patients have shown a 40% reduction of IOP.

Minimally invasive micro-sclerostomy (MIMS)
- Stent-less
- 90-micron diameter cylinder of scleral tissue
- Ab interno approach

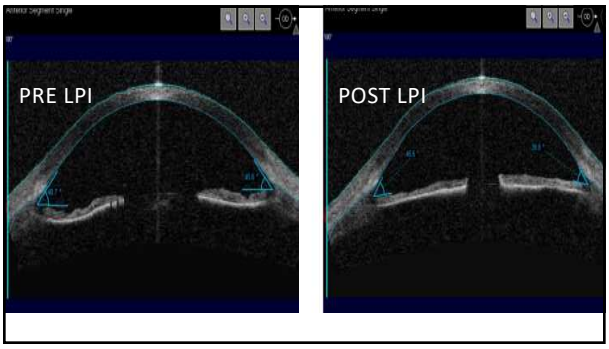
27


MYTH
BUSTED

28


Myth 3 ?
Anterior Segment OCT Can Replace Gonioscopy When Analyzing The Angle?

29


PRE LPI
POST LPI

31

Laser peripheral iridotomy for the prevention of angle closure: a single-centre, randomised controlled trial

889 subjects (Treated eye=LPI Untreated eye = control) – followed for 6 years

Criteria for Primary Angle Closure Suspect
1. No PAS present in any quadrant
2. No visible TM 6 clock hours or greater

Criteria considered as not preventative
1. IOP > or equal to 24 (measured twice)
2. PAS covering 1 or greater clock hours
3. Acute Angle Closure

→ 4.19/1,000 – LPI arm
7.97/1000 – control arm
47% reduction

32

Laser peripheral iridotomy for the prevention of angle closure: a single-centre, randomised controlled trial

Interpretation: Incidence of angle-closure disease was very low among individuals classified as primary angle closure suspects identified through community-based screening. Laser peripheral iridotomy had a modest, albeit significant, prophylactic effect. In view of the low incidence rate of outcomes that have no immediate threat to vision, the benefit of prophylactic laser peripheral iridotomy is limited; therefore, widespread prophylactic laser peripheral iridotomy for primary angle-closure suspects is not recommended.

33

Diagnostic accuracy of AS-OCT vs gonioscopy for detecting angle closure: a systematic review and meta-analysis

Thomas Desmond[1,2] · Vincent Tran[2] · Monish Maharaj[3,4] · Nicole Carnt[1,2,5,6] · Andrew White[1,2,5]

Received: 12 January 2021 / Revised: 13 May 2021 / Accepted: 3 June 2021 / Published online: 5 July 2021
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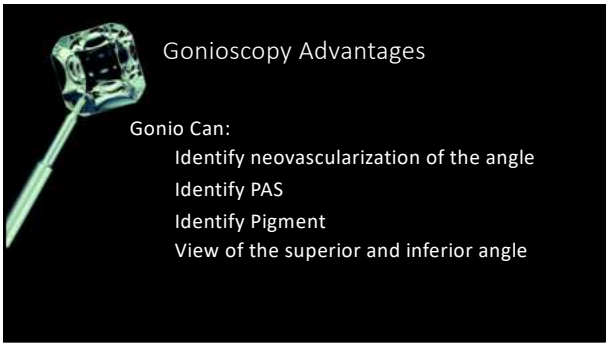
- It is currently unclear how AS-OCT fits into clinical practice for detecting angle closure.
- AS-OCT is sensitive for detecting angle closure.
- AS-OCT may be a good screening tool for angle closure.
- AS-OCT has a high rate of false positives when measured against gonioscopy.
- AS-OCT in not yet able to replace gonioscopy.

Desmond T, Tran V, Maharaj M, Carnt N, White A. Diagnostic accuracy of AS-OCT vs gonioscopy for detecting angle closure: a systematic review and meta-analysis. Graefes Arch Clin Exp Ophthalmol. 2022 Jan;260(1):1-23. doi: 10.1007/s00417-021-05271-4. Epub 2021 Jul 5. Erratum in: Graefes Arch Clin Exp Ophthalmol. 2021 Sep 28;: PMID: 34223989; PMCID: PMC8255327

34


Gonioscopy Advantages
Gonio Can:
Identify neovascularization of the angle
Identify PAS
Identify Pigment
View of the superior and inferior angle

35


MYTH
BUSTED

36


Alternative Visual Field Perimeters Are Ready to Overtake Standard Automated Perimetry?
Myth 4?

37

PROS	CONS
1. **Improved patient comfort**.	1. ***Not Well Studied in Comparision***
2. **Increased accessibility.**	1. ***Questionable underestimation in advanced disease.***
3. **Real-time data and analytics.**	
4. **Customized testing**.	
5. **Patient engagement**.	

38

Virtual Reality–Based and Conventional Visual Field Examination Comparison in Healthy and Glaucoma Patients

Jan Stapelfeldt[1,*], Şerife Seda Kucur[1,2], Nina Huber[1], René Höhn[3], and Raphael Sznitman[1]

"VR System slightly underestimated VF defects in glaucoma patients"

Assessment of Remote Training, At-Home Testing, and Test-Retest Variability of a Novel Test for Clustered Virtual Reality Perimetry

Stapelfeldt J, Kucur SS, Huber N, Höhn R, Sznitman R. Virtual Reality-Based and Conventional Visual Field Examination Comparison in Healthy and Glaucoma Patients. Transl Vis Sci Technol. 2021 Oct 4;10(12):10. doi: 10.1167/tvst.10.12.10. PMID: 34614166; PMCID: PMC8496417.

Chia ZK, Kong AW, Turner ML, Salfee M, Damato BE, Backus BT, Blaha JJ, Schuman JS, Deiner MS, Ou Y. Assessment of Remote Training, At-Home Testing, and Test-Retest Variability of a Novel Test for Clustered Virtual Reality Perimetry. Ophthalmol Glaucoma. 2023 Aug 22:S2589-4196(23)00160-6. doi: 10.1016/j.ogla.2023.08.006.

39

Validation of a Wearable Virtual Reality Perimeter for Glaucoma Staging, The NOVA Trial: Novel Virtual Reality Field Assessment

Statistically noninferior to HFA when staging glaucoma using Medicare definitions

Limitations: Monitoring advanced glaucoma

Bradley C, Ahmed IIK, Samuelson TW, Chaglasian M, Barnebey H, Radcliffe N, Bacharach J. Validation of a Wearable Virtual Reality Perimeter for Glaucoma Staging, The NOVA Trial: Novel Virtual Reality Field Assessment. Transl Vis Sci Technol. 2024 Mar 1;13(3):10. doi: 10.1167/tvst.13.3.10. PMID: 38488433; PMCID: PMC10946691.

40

Subjective/Binocular Visual Field Testing

39% faster than SAP in clinical testing and functions in ambient light.[1]

Equivalent to SAP with repeatability.[1]

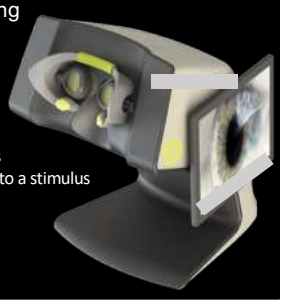
Random binocular testing

1. Comparison between New Perimetry Device (IMOvifa®) and Humphrey Field Analyzer" M Eslani, T Nishida, S Moghimi, JM Arias, C Vasile, V Mohammadzadeh, RN Weinreb; Invest. Ophthalmol. Vis. Sci. 2022;63(7):1272 – A0412.

41

Objective Visual Field Testing

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



42

Advantages of objective perimetry

- Nothing to learn for the patient
- One *bilateral* test
- Less susceptible to refractive error and media opacity
- Easy to take - patients report they prefer OFA

- Learning effect - results can improve with experience
- Two monocular tests
- Susceptible to refractive error and media opacity
- More susceptible to anxiety, frustration, fatigue - "I just guess"

43

Advantages of objective perimetry

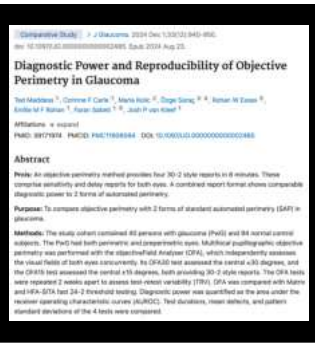
- No patient response required
- Patients just need to look straight ahead and not fall asleep
- Dark room *not* required
- *Predictable* Exam time
  - ~7 minutes, for *both eyes* (30-2 & 24-2 together!) OR
  - ~90 seconds, for *both* eyes
- If analysis improves can refresh reports

- Patients must click a button
- Reliant upon the patient's ability, dexterity, cooperation
- Dark room required
- *Variable* exam time (24-2)
  - 3 to >7 mins *per eye (longer for some patients)*
- No, SAP discards raw data

44

Objective Perimetry

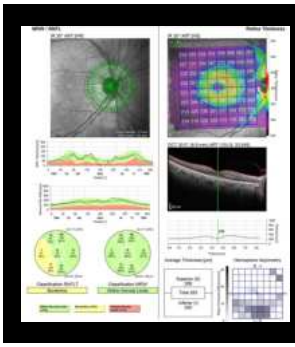
1.
Ali,E.N.;Maddess,T.;James,A.C.;Voicu,C.;Lueck,C.J.Pupillaryresponsetosparsemultifocalstimuliinmultiplesclerosis patients. *Mult. Scler.* **2014**, *20*, 854–861. [CrossRef]
2.
Maddess,T.;Ho,Y.L.;Wong,S.S.;Kolic,M.;Goh,X.L.;Carle,C.F.;James,A.C.Multifocalpupillographicperimetrywithwhite and colored stimuli. *J. Glaucoma* **2011**, *20*, 336–343. [CrossRef] [PubMed]

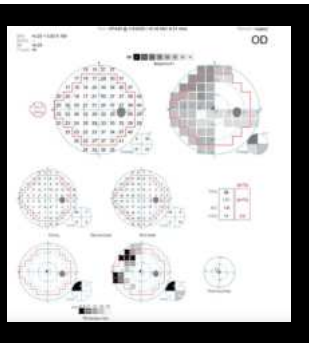


Diagnostic Power and Reproducibility of Objective Perimetry in Glaucoma

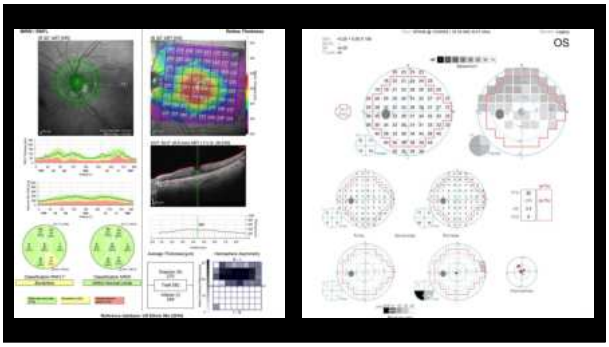
Abstract

45





46



47

48

49

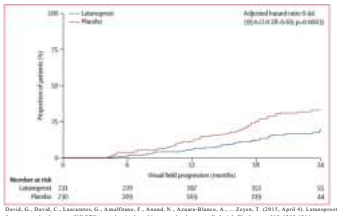
50

Why are PGAs first line?

- Most efficacious
- Once daily dosing
- Minimal systemic SE's
- Uveoscleral outflow slows @night

Primary Open-Angle Glaucoma PPP 2020. American Academy Of Ophthalmology, 2020, p.97

25-33% ↓



David, G., David, C., Lancaster, G., Amalfitano, F., Anand, N., Azuara-Blanco, A., ... Zeyen, T. (2015, April 4). Latanoprost for open-angle glaucoma (UKGTS): a randomised, multicentre, placebo-controlled trial. *The Lancet, 385*, 1295-1304

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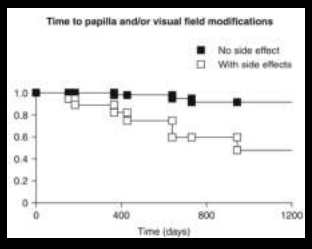
Treatment Challenges



• Denis, Philippe, et al. Medical outcomes of glaucoma therapy from a nationwide representative survey

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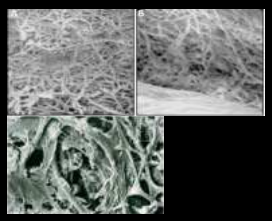
Selective Laser Trabeculoplasty



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LiGHT trial: 6-year results of primary selective laser trabeculoplasty versus eye drops for the treatment of glaucoma and ocular hypertension

Gus Gazzard, Evgenia Konstantakopoulou, David Garway-Heath, Mariam Adeleke, Victoria Vickerstaff, Gareth Ambler, Rachael Hunter, Catey Bunce, Neil Nathwani, Keith Barton, on behalf of the LiGHT Trial Study Group

Primary Outcome - Quality of Life at 6 years
Secondary Outome – clinical effectiveness and safety

Conclusions:
- No significant difference in QOL
- 26.8% VS 19.6% progressed drops vs SLT
- Trab required in 32 eyes in drops arm compared to 13 eyes in the SLT arm
- 69.8% of SLT Drop Free @ 6 Years

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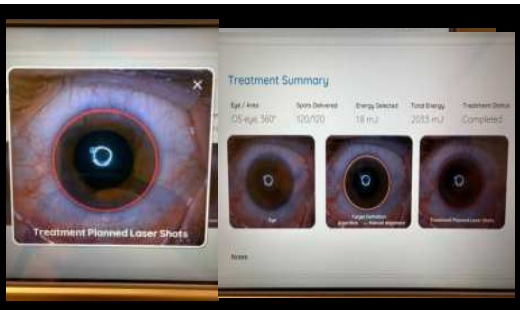

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Patients Attitudes Towards Drug Delivery

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

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Bimatoprost SR

(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

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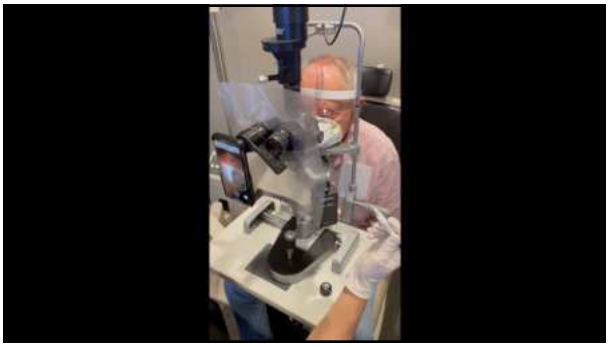

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Travoprost intraocular implant

Resides in AC angle, anchored behind TM

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

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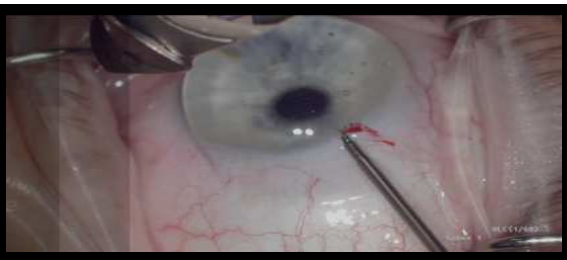

36 Month Update

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.

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Thank You!!

Justin.Schweitzer@vancethompsonvision.com

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