Surgical Mythbusters: Answers to Your Common and Not So Common Questions

COPE#93620-PO

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Disclosures - Walter O. Whitley, OD, MBA, FAAO has received consulting fees, honorarium or research funding from:

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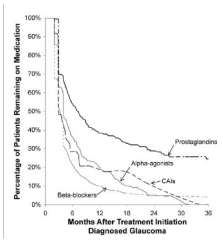
Mythbuster #1

First Line Therapy Is Always A Drop?

3




Adherence with Topical Glaucoma Medication Monitored Electronically
The Travatan Dosing Aid Study

More than **90%** of patients are nonadherent to their ocular medication dosing regimens, and nearly **50%** discontinue taking their medications before 6 months[1]

4

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

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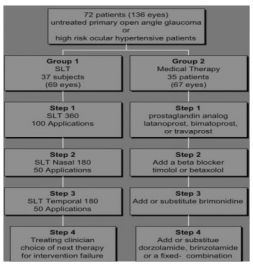
SLT Med Study Treatment Arms



6

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

7

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

8

Low-Energy SLT Repeated Annually: Rationale for the COAST Trial

Tony Realini, MD, MPH, Gus Gazzard, MD, Mark Latina, MD, Michael Kass, MD

Newly diagnosed POAG treated with:
1. ALT 360 x 1
2. Standard SLT 360 as needed
3. Low-energy SLT 360 repeated annually

10-year Results Medication Free Rates	10-year Results Median Times to Treatment
1. ALT – 22.6%	1. ALT – 2.8 years
2. Standard SLT -25.0%	2. Standard SLT -3.2 years
3. Low-energy SLT – 58.3%	3. Low-energy SLT – 6.2 years

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Automated Direct SLT

Automated Direct Selective Laser Trabeculoplasty: First Prospective Clinical Trial

Mordechai Goldenfeld[1], Michael Belkin[2], Masha Dobkin-Bekman[3], Zachary Sacks[3], Sharon Blum Meirovitch[1], Noa Geffen[4,5], Ari Leshno[1,4], and Alon Skaat[1,4]

Purpose: Direct selective laser trabeculoplasty (DSLT) is a rapid, noncontact automated procedure performed directly through the limbus without gonioscopy. In this first nonrandomized clinical trial we assessed its safety and ability to reduce intraocular pressure (IOP).

Methods: Fifteen patients (15 eyes: 10 with open-angle glaucoma [OAG], 4 with ocular hypertension, and 1 with pseudoexfoliation glaucoma), naive or after medication washout, with an IOP ≥22 mm Hg, underwent DSLT by irradiation with 100 or 120 sequential noncontact 532-nm, Q-switched laser shots (0.8–1.4 mJ) automatically applied during 1.5 or 2.3 seconds on the limbus, guided by image analysis and eye tracking. Results were assessed at 1 and 3 hours, 1 day, 1 week, and 1, 3, and 6 months.

Results: The mean ± standard deviation baseline IOP (mm Hg) in all eyes was 26.7 ± 2.3. At 1, 3, and 6 months, this value was significantly reduced to 21.7 ± 4.2 (by 18.1%), to 20.8 ± 2.5 (by 21.4%), and to 21.5 ± 4.1 (by 18.8%), respectively. In six patients treated with 1.4 mJ/shot, the mean IOP at 6 months decreased from 26.7 ± 3.2 to 19.3 ± 2.0 (27.1%, $P = 0.03$). There was a significant reduction in hypotensive medications (from 1.6 ± 1.0 to 0.4 ± 0.7, $P = 0.03$). No serious adverse events occurred.

Conclusions: Automated DSLT appears to be an effective and safe noncontact, rapid modality for reducing IOP in patients with OAG. Higher energy usage led to better results.

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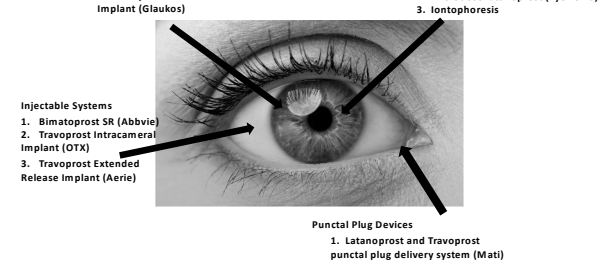

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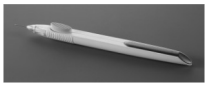
Bimatoprost SR (Abbvie)

(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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Bimatoprost SR (Abbvie)

(10-microgram bimatoprost sustained-release implant)

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24 Month Phase I/II Clinical Trial

bimatoprost pellet
(6, 10, 15, or 20 micrograms)

↓

24 months – IOP reduction
7.5, 7.3, 7.3, 8.9 mm Hg

topical bimatoprost 0.03%

↓

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.

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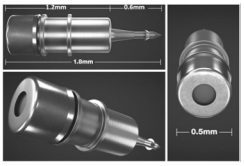
Travoprost intraocular implant

(Glaukos)

Resides in AC angle,
anchored behind TM



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

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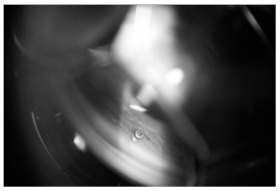
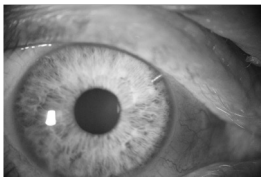
Travoprost intraocular implant

(Glaukos)





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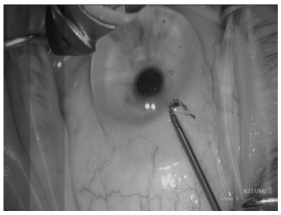

36 Month Update

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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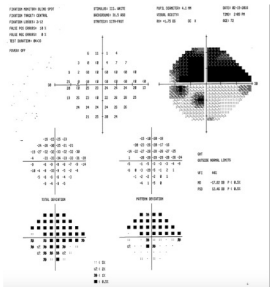

Mythbuster #2
Surgical
Intervention
Should
Be
Delayed
Or
Serve
As A
Last Resort?

?

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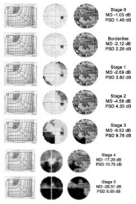
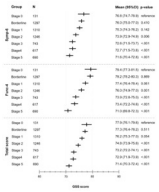
Visual Field Damage and QOL[1,2]

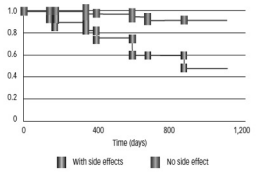


"At worse levels of VF damage, glaucoma patients demonstrate shorter, more fragmented bouts of physical activity throughout the day and lower activity levels during typical waking hours, reflecting low physiologic functioning:"



1. Jiaxi 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.2020.06.013.
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

19



Dennis, P. (2011, October 10). Adverse Effects, Adherence and Cost–Benefits in Glaucoma Treatment. *European Ophthalmic Review*.

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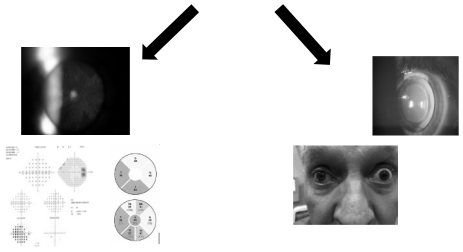
Interventional Glaucoma



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Safety Profile of MIGS

	iStent	iStent Inject	Hydrus	KDB	Trabectome	GATT	TRAB360	VISCO360	OMNI System	ABiC
IOP spike	1.8–22.2	1.06–18.6	1.9–6.45	1.0–18.2	2.06–28.9	0–18.7	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	0.97–38	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	6.2	0	4.9	0
Bleb 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	1.8–2.27	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

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Schlemm's Canal/TM Procedures

Surgical Glaucoma Best Practices: Optimizations

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

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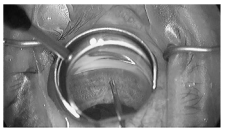
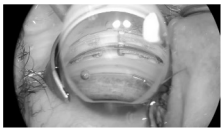
Trabecular Microbypass Stent (iStent Inject W)



Schlemm Canal Microstent (Hydrus)



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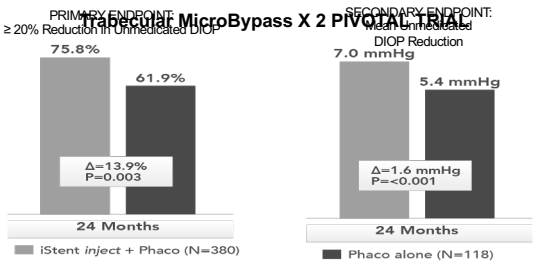
Trabecular MicroBypass X 2 PIVOTAL TRIAL



Samuelson TW, Sarkisian SR Jr, Lubeck DM, Stiles MC, Duh YJ, Romo EA, 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: 30880108.

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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)00160-9.

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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, Romo EA, 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: 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)00160-9.

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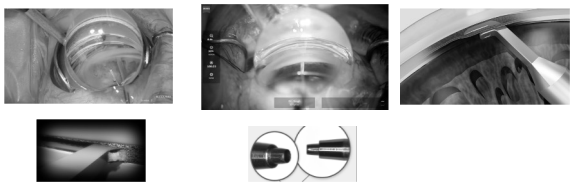
Excisional Goniotomy (Kahook Dual Blade) | **Goniotomy (iAccess)** | **Goniotomy (SION)**



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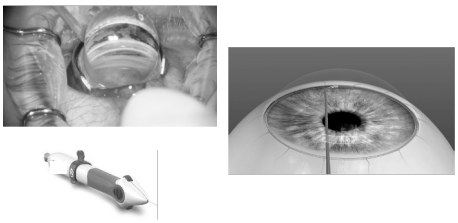
Ab-interno Trabeculotomy + Canaloplasty (OMNI)



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Mythbuster #3
Toric IOLs Don't Always Work

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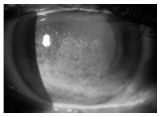
Cataract Patients - Corneal Staining

N = 136 patients (272 eyes)

- 60% Never experience DES symptoms
- Positive Corneal Staining: 209 eyes (76.8%)
- Central Corneal Staining: 136 eyes (50%)



Trattler WB, Majmudar PA, Donnenfeld ED, McDonald MB, Stonecipher KG, Goldberg DF. The Prospective Health Assessment of Cataract Patients' Ocular Surface (PHACO) study: the effect of dry eye. Clin Ophthalmol. 2017 Aug 7;11:1423-1430.

31

The Near ~~Triad~~ Quadrad:

Accommodation, convergence, miosis and **excyclotorsion**

Refs:

- Read SA, Buehren T, Collins MJ. Influence of accommodation on the anterior and posterior cornea. J Cataract Refract Surg. 2007 Nov;33(11):1877-85.
- Buehren T, Collins MJ, Loughridge J, et al. Corneal topography and accommodation. Cornea 2003; 22:311–316
- Allen MJ, Carter JH. The torsion component of the near reflex; a photographic study of the non-moving eye in unilateral convergence. Am J Optom Arch Am Acad Optom 1967; 44:343–349
- Bannon RE. Near point binocular problems astigmatism and cyclophoria. Ophthalmic Opt 1971; 11:158–168

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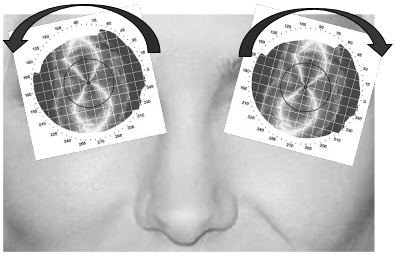
Excyclotorsion Can Occur With Accommodation



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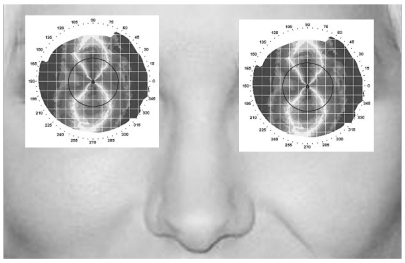
Better



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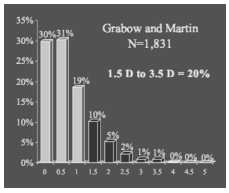
Incidence of Pre-op Astigmatism in Cataract Patients

- 70% of patients have ≥ 0.5 D of pre-op astigmatism



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Astigmatism About 1.0 D or Less…

(about 80% of pts)

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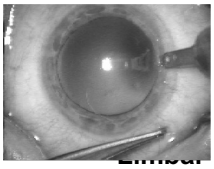

Limbal

Steven J. Dell, M.D.
Austin, Texas

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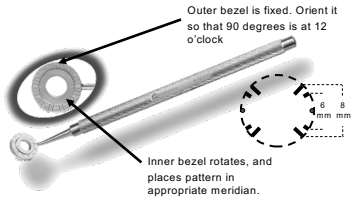
Dell LRI Marker

Rhein Medical



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Toric IOL Conventional Teaching

- Torics now available in monofocal, MF, EDOF, and accommodating
- For every 1° the toric IOL is off the target axis, 3.3% of the desired astigmatic effect is lost
- 10 degrees off loses 1/3rd of the effect
- From a practical standpoint, this is not really true clinically

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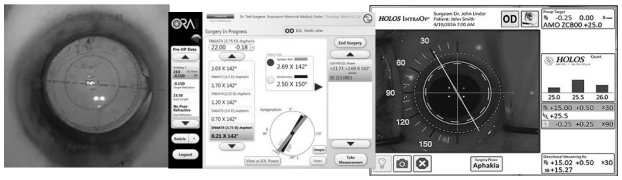
Place Correctly

- Intra-op aberrometry: ORA



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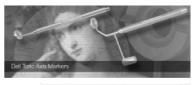
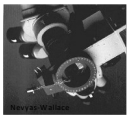
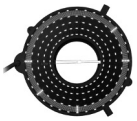
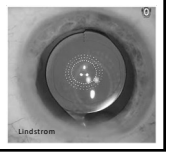
Place Correctly

- Manual marking systems









41

Place Correctly

- Image guidance systems: Callisto, Verion, Leica IOL Compass

42

ZEISS Callisto

43

ZEISS Callisto System

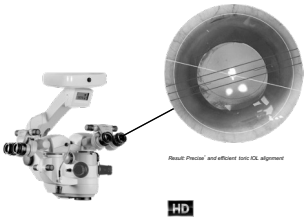
ZEISS IOLMaster family

ZEISS CALLISTO

ZEISS OPMI Lumera Scope

44

Visualization
Skip changing your visual field of reference and stay focused



Result: Precise and efficient toric IOL alignment

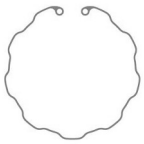
HD

HD video recording
Including assisting overlay function

45

Rotation Prevention

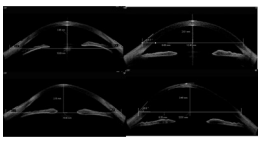
- Rhexis smaller than optic, 360 overlap
- Henderson CTR in all higher risk
  - AL over 24 or large ant seg
  - Vertically oriented
  - One failure (27mm eye at 90 degrees)
- Always remove OVD from behind IOL
- Leave eye soft
- No eye rubbing x 2wks
- Occasionally, in higher risk, consider leaving a bit of cortex where haptic will engage bag



46

Rotation Risk in Longer Eyes

- Larger bag: less robust friction fit
- Larger ACD: rhexis size errors, incomplete OVD removal
- Low power IOLs: thinner
- Weak zonules more common, trampolining of L.I.D.
- Tend to have more astig in 1st place



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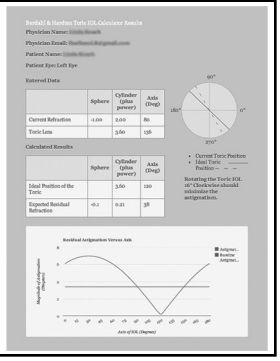
Astigmatismfix.com

- Where?
  - OR
  - Minor room
  - SL
- When?
  - Wait a few weeks
- What?
  - Just reposition?
  - CTR?
  - ROC?
  - Suture haptic to CTR



48

Scope of the Problem?

49

Rotation Rate

Ophthalmology. 2016 Feb;123(2):275-86. doi: 10.1016/j.ophtha.2015.10.002. Epub 2015 Nov 18.
Toric Intraocular Lenses in the Correction of Astigmatism During Cataract Surgery: A Systematic Review and Meta-analysis.
Kessel L[1], Andresen J[2], Tendal B[3], Erngaard D[4], Flesner P[5], Hjortdal J[6].

- 1.1% (6/554) required repositioning

J Cataract Refract Surg. 2014 Oct;40(10):1654-60. doi: 10.1016/j.jcrs.2014.01.044. Epub 2014 Aug 20.
Long-term clinical outcomes of toric intraocular lens implantation in cataract cases with preexisting astigmatism.
Miyake T[1], Kamiya K[2], Amano R[2], Iida Y[2], Tsunehiro S[2], Shimizu K[2].

- 1.6% (6/378) rotated over 20 degrees (Acrysof Toric)
  - All 6, AL > 25mm, vertical IOL

50

Conclusions

- Biometry advances have made sphere power calcs very good
- Focus has shifted to minimizing astigmatic errors
- Toric usage is increasing in our practice, flat nationally
- One rotation is too many
- Risk factors are identifiable
- Special precautions should be used in higher risk eyes

51

Mythbuster #4
Epiphora is only caused by DED/MGD

52

- Chronic vs Acute
- Dry eye related?
- But what about MGD?

53

Potential Contributing Risk Factors and Causes

- **NLD obstruction**
- **KCS/MGD**
- **Small anatomy of NLD/Puncta/Punctal Stenosis**
- **Lid laxity/Floppy lids**
- **Conjunctivochalasis**
- **Ectropion/Entropion**
- **Trichiasis**
- **TED**
- **Trauma**

54

Nasolacrimal Duct Obstruction

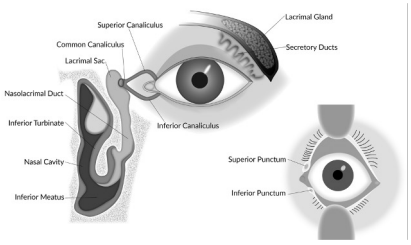
Perform Irrigation & Dilation

- Indicated when NLD obstruction suspected
- In-office procedure
- CPT code 68801 vs 68840
- Steroid/antibiotic taper x 3 weeks
- Repeat procedure if needed
- When to refer for stent

55

Stent

56



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Use of mini-monoka stents for punctal/canalicular stenosis

R N Hussain, H Kanani, T McMullan
Correspondence to Dr R N Hussain, Department of Ophthalmology, Leicester Royal Infirmary, Infirmary Square, Leicester LE1 5WW, UK;

Abstract

- **Background** Proximal lacrimal system stenosis may cause debilitating epiphora and recurrent ocular infections. Mini-monoka stents are primarily used in the management of canalicular lacerations. Evidence regarding their use to treat punctal/canalicular stenosis is sparse. Compared with dacryocystorhinostomy, a punctocanaliculoplasty with mini-monoka stenting is quicker, less invasive with reduced postoperative complications/recovery time.
- **Aims** : To assess the effectiveness of mini-monoka punctocanaliculoplasty for treatment of punctal/canalicular stenosis.
- **Methods:** A retrospective case note analysis was performed on 77 consecutive patients (123 eyes).
- **Results** 73% of eyes had punctal stenosis, 72% had canalicular stenosis; 46% had a combination of the above. 20% had some degree of lid laxity and 29% had nasolacrimal duct stenosis. 101 eyes (82%) had significant improvement in symptoms and were discharged without further intervention. Excluding the patients with structural comorbidity the success rate improved to 88%.
- **Conclusions** Mini-monoka punctocanaliculoplasty is an effective, safe, simple and relatively non-invasive treatment strategy for the management of epiphora secondary to punctal and/or canalicular stenosis.

http://dx.doi.org/10.1136/bjophthalmol-2011-300670

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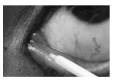
Punctal Stenosis

59

PUNCTAL PLUGS

- Still a mainstay in dry eye treatment
- When should you not use them?
- Future innovation!
- KCS Meds?



60

3-Snip Punctoplasty

- The rectangular 3-snip procedure consists of 2 vertical incisions through the posterior wall of the punctum and vertical canaliculus (one medial and one lateral)
- Followed by a horizontal incision connecting the ends of the vertical incisions, resulting in a rectangular excision of tissue.
- In-office procedure
- https://www.youtube.com/watch?v=vlna58Ff2jE

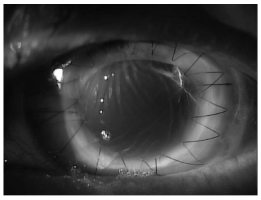
61

Mythbuster #5

Full Corneal transplant is your only Option

62

Corneal Transplant



63

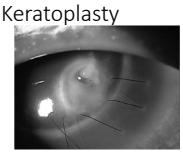
What to expect with a PK

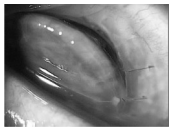
- Day 1
  - Moderate to severe stromal/corneal edema
  - AC 1-2+ cell and pigment
  - Poor vision and pain
- Week 1
  - Moderate corneal edema may still be present
  - Vision is improved but still moderately decreased
  - AC some inflammation present (tr-1+ cell)
- Month 1
  - Most corneal edema should be resolved at this time
  - Refraction/Pachymetry/Atlas to monitor
  - AC is quiet
- Month 6
  - Stabilization
  - Select suture removal to decrease induced astigmatism

64

Complications of Penetrating Keratoplasty

- Long-term complications
  - Glaucoma
  - Microbial keratitis
  - Suture-related problems
  - Wound dehiscence
  - Immunologic graft rejection
  - Late endothelial failure
  - Graft failure
- Refractive error, astigmatism





65

Long-term maintenance

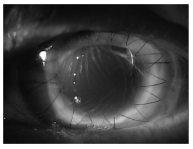
- Long term topical steroid to decrease rejection rate
- Some patients may require oral antivirals if corneal transplant is related to scaring from prior HSV
- Repeat PK may be needed after approximately 20 years

66

Alternatives to PKP

67

- Corneal crosslinking
- CAIRS
- DALK
- K Pro



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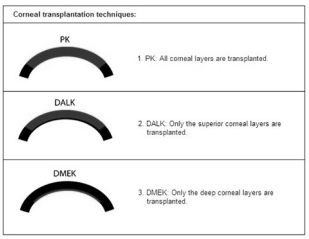
DALK: deep anterior lamellar keratoplasty



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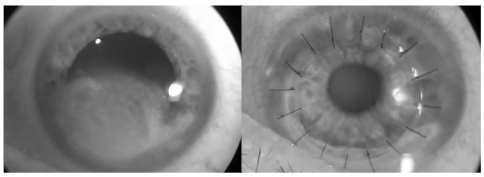


Pre/Post Example of DALK

70

Watch Out for Keratoconus!

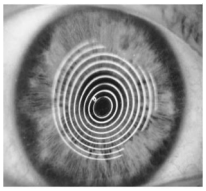
8 Potential Signs & Symptoms

Typically onset occurs in teenage years or early twenties

- **Look out for warning signs in medical history**
  - History of eye rubbing
  - Family & genetic predispositions
- **Look out for visual complaints**
  - Blurred vision
  - Distortion of images
- **Look out for refractive anomalies**
  - Distortion of mires on keratometry
  - Error messages on autorefractors
  - Unsatisfactory attempts at vision correction & progressive loss of UCVA & BCVA
  - Increasing astigmatism

71

Irregular Placido (egg-shaped) Topography



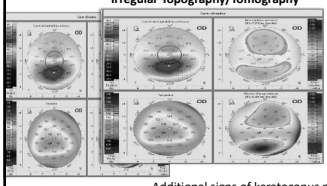
Early signs of keratoconus may include

- *Skewed radial axis of astigmatism*
- *Asymmetric or truncated bow-tie*

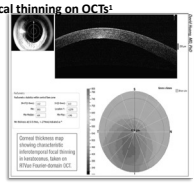
[1] Y.S. Rabinowitz. Keratoconus. Survey of Ophthalmology Vol 42. Num 4. Jan-Feb 1998.

72

Irregular Topography/Tomography



Focal thinning on OCTs[1]



Additional signs of keratoconus may include

- Astigmatism variance between eyes
- Stromal and epithelial thickness changes
- Posterior elevation changes
- Wavefront aberrations
- Topographic changes
  - Inferior steepening
  - Irregularity indices

[1]https://www.reviewofophthalmology.com/article/making-the-most-of-anterior-segment-oct

73

CAIRS

- Mid-peripheral intrastromal transplantation of donor cornea stromal segments
- Stand alone for non progressive cases
- Combined with CXL for progressive cases
- Reversible
- No sutures
- The volume of tissue transferred varies between 1 mm^3 and 6 mm^3 only.
- No severing of corneal nerves

74

CAIRS- Pros

- CAIRS uses corneal tissue as the implant, rather than the INTACS medical-grade plastic.
- As a result, we can safely place it more anterior in the cornea to produce more effect.
- It integrates better with the host cornea for much less glare and a better cosmetic appearance.
- it doesn't carry the risk of extrusion which would sometimes impact INTACS.

75

CAIRS- Cons

- The main cons are that it is donor tissue!
- There is a small risk of rejection (but it's a very small amount of cornea
- The reported rate of rejection in the literature is so low that we're only aware of 1 case)
- It's a little more technically challenging to perform the surgery than with INTACS.

76

What to expect: CAIRS

- Day 1
  - Moderate stromal/corneal edema
  - AC 1+ cell
  - Poor vision
- Week 1
  - MILD corneal edema may still be present
  - Vision is improved but still moderately decreased

Month 1

- Most corneal edema should be resolved at this time
- Refraction/Pachymetry/Atlas to monitor
- Topical steroids x 6 weeks

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Long-term maintenance

- CXL
- CLs
- Other visual rehabilitation

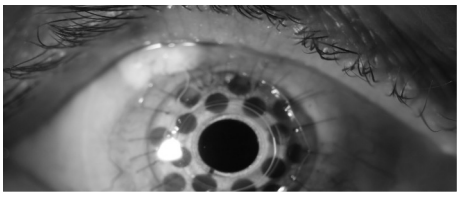
78

Corneal Crosslinking

- UV light and photosensitizer to strengthen chemical bonds in the cornea
  - Oxidative deamination reaction with ends chains of collagen
- FDA Approved in the US 2016
  - Epi-off
- Indicated to help slow progression of:
  - Keratoconus
  - PMD
  - Terrien Marginal Degeneration
  - Post-refractive surgery ectasia

79

KPro



80

Novel Graft Failure Tx Options

- Keratoprosthesis – "KPro"
- Restores vision by marrying mechanical central lens optic with a peripheral donor cornea
- KPro has three components which are assembled into a single unit
- A PMMA front plate with an optical stem extends through a 3 mm hole in a donor cornea and overlaps it centrally
- Titanium back plate snaps onto the optical stem and abuts the posterior side of the cornea
- K-Pro sutured into place much like a PKP
- Central optic provides for vision even if the cornea becomes cloudy or opaque.

81

Mythbuster #6

Laser Cataract Surgery has Better Outcomes

82

Femtosecond Laser Cataract Surgery

- Clear corneal incision and paracentesis
  - Abandoned by most, inferior to diamond incisions
- Astigmatic keratotomy
  - Abandoned by most, inferior to diamond incisions
  - Solely used as billing justification
- Lens fragmentation
  - Useful in very dense lenses, but only with good pupil dilation
  - Abandoned by most, femto usage is WAY down nationally
- Capsulotomy
  - The best usage of the laser
  - Helpful for surgeons who have difficulty making a capsulotomy

83

Cost?

84

JCARS

Platform	Mean Suction-On Time*	Range
Catalys	3 min 49 s	3 m 27 s, 4 m 31 s
Lensx	1 min 35 s	1 m 25 s, 1 m 42 s
Victus	3 min 42 s	3 m 24 s, 4 m 11 s

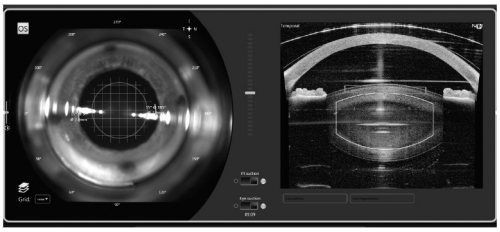
*Based on 10 consecutive femtosecond phacoemulsification procedures.

85

Z8 – wet dock

86

One Interface



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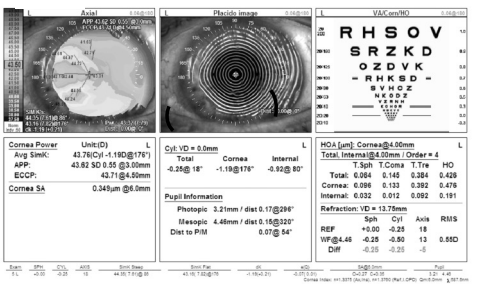
65 yo TMF with Correctly Positioned Femto Arcuates

- TMF removed due to debilitating visual distortions
- Monofocal 3 piece IOL placed in bag open capsule
- Pt claims vision is still poor, presents for a 3rd opinion.
- -0.25 - 0.50 x 049 20/20-1
- UCVA 20/25
- LVC? When?

88



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Mythbuster #7
There are No Effective Treatments for Floaters

90

So What Do You Tell Your Patients?

91

Nutrition

- n=61
- Decrease in visual discomfort
  - Active P<0.001
  - Placebo P=0.416
- Decrease in vitreous opacity
  - Active P<0.001
  - Placebo P=0.081

Ankamah E, Green-Gomez M, Roche W, Ng E, Welge-Lüßen U, Kaercher T, Nolan JM. Dietary Intervention With a Targeted Micronutrient Formulation Reduces the Visual Discomfort Associated With Vitreous Degeneration. Transl Vis Sci Technol. 2021 Oct 4;10(12):19.

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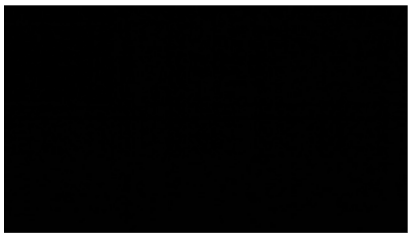
1 Step Limited Vitrectomy

Video Courtesy of Paul Singh, MD



93

Laser Vitreolysis

- Goh WN, Mustapha M, Zakaria SZS, Bastion MC. The effectiveness of laser vitreolysis for vitreous floaters in posterior vitreous detachment. Indian J Ophthalmol. 2022 Aug;70(8):3026-3032.
- Lin T, Li T, Zhang X, Hui Y, Moutari S, Pazo EE, Dai G, Shen L. The Efficacy and Safety of YAG Laser Vitreolysis for Symptomatic Vitreous Floaters of Complete PVD or Non-PVD. Ophthalmol Ther. 2022 Feb;11(1):201-214.
- C.P. Shah, J.S. Heier. YAG laser vitreolysis vs sham YAG vitreolysis for symptomatic vitreous floaters: a randomized clinical trial. JAMA Ophthalmol, 135 (2017), pp. 918-923.
- D. Su, C.P. Shah, J. Hsu. Laser vitreolysis for symptomatic floaters is not yet ready for widespread adoption. Surv Ophthalmol, 65 (2020), pp. 589-591.

94

PPV for Vitreous Opacities

Video Courtesy of John Kitchens, MD

95

Vitrectomy

- Dysager DD, Koren SF, Grauslund J, Wied J, Subhi Y. Efficacy and Safety of Pars Plana Vitrectomy for Primary Symptomatic Floaters: A Systematic Review with Meta-Analyses. Ophthalmol Ther. 2022 Dec;11(6):2225-2242.
- Morris RE. Vitreous Opacity Vitrectomy (VOV): Safest Possible Removal of "Floaters". Clin Ophthalmol. 2022 Jun 1;16:1653-1663.
- Mason JO, Neimkin MG, Mason JO, et al. Safety, efficacy, and quality of life following sutureless vitrectomy for symptomatic vitreous floaters. Retina. 2014;34:1055-1061.

96

The Future of Floaters

- Picosecond / femtosecond lasers with 3D imaging
- Pharmacologic vitreolysis
- Nanoparticles w/low energy laser

Stephenson, M. Treating Floaters: The Pros, The Cons, the Techniques. https://www.reviewofophthalmology.com/article/treating-floaters-the-pros-cons-and-techniques, May 2024.

97

Mythbuster #8

Drops are Most Effective for Intraocular Surgery

98

Cataract Considerations
Issues with Cataract Post Op Drops

- Confusion
- Cost
- Convenience
- Compliance

99

TriMoxi or DexMoxi Intravitreal Injection

An injection of an antibiotic & steroid combination in the eye at the time of surgery.

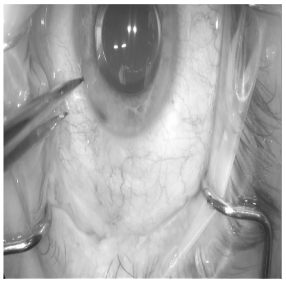
1. Triamcinolone or dexamethasone
2. Moxifloxacin

100

Pars plana injection into the vitreous cavity.

Medicine is injected after the IOL placement.

Patients are still under anesthesia so it is mostly painless



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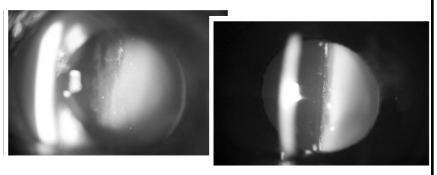
What Will the Doctor See???

View of the injected medication 2 hours after injection



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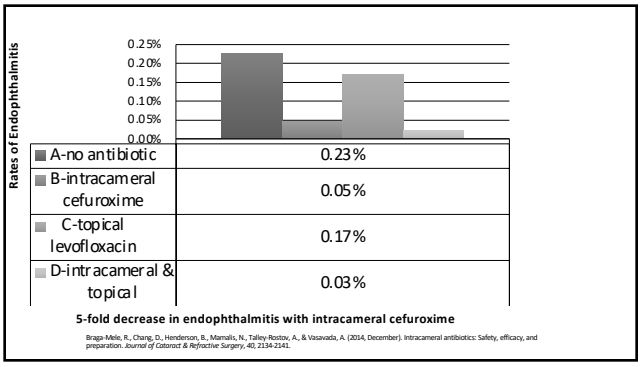

Braga-Mele, R., Chang, D., Henderson, B., Mamalis, N., Talley-Rostov, A., & Vasavada, A. (2014, December). Intracameral antibiotics: Safety, efficacy, and preparation. *Journal of Cataract & Refractive Surgery, 40,* 2134-2141.

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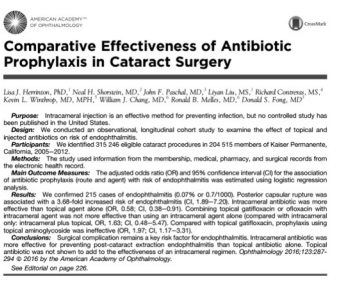

AMERICAN ACADEMY OF OPHTHALMOLOGY

Comparative Effectiveness of Antibiotic Prophylaxis in Cataract Surgery

Lisa J. Herrinton, PhD,[1] Neal H. Shorstein, MD,[2] John F. Paschal, MD,[3] Lyan Liu, MS,[1] Richard Contreras, MS,[4] Kevin L. Winthrop, MD, MPH,[5] William J. Chang, MD,[3] Ronald B. Melles, MD,[6] Donald S. Fong, MD[3]

Purpose: Intracameral injection is an effective method for preventing infection, but no controlled study has been published in the United States.
Design: We conducted an observational, longitudinal cohort study to examine the effect of topical and injected antibiotics on risk of endophthalmitis.
Participants: We identified 315 246 eligible cataract procedures in 204 515 members of Kaiser Permanente, California, 2005–2012.
Methods: The study used information from the membership, medical, pharmacy, and surgical records from the electronic health record.
Main Outcome Measures: The adjusted odds ratio (OR) and 95% confidence interval (CI) for the association of antibiotic prophylaxis (route and agent) with risk of endophthalmitis was estimated using logistic regression analysis.
Results: We confirmed 215 cases of endophthalmitis (0.07% or 0.7/1000). Posterior capsular rupture was associated with a 3.68-fold increased risk of endophthalmitis (CI, 1.80–7.20). Intracameral antibiotic was more effective than topical agent alone (OR, 0.58; CI, 0.38–0.91). Combining topical gatifloxacin or ofloxacin with intracameral agent was not more effective than using an intracameral agent alone (compared with intracameral only: intracameral plus topical, OR, 1.63; CI, 0.48–5.47). Compared with topical gatifloxacin, prophylaxis using topical aminoglycoside was ineffective (OR, 1.97; CI, 1.17–3.31).
Conclusions: Surgical complication remains a key risk factor for endophthalmitis. Intracameral antibiotic was more effective for preventing post-cataract extraction endophthalmitis than topical antibiotic alone. Topical antibiotic was not shown to add to the effectiveness of an intracameral regimen. *Ophthalmology 2016;123:287-294 © 2016 by the American Academy of Ophthalmology.*

See Editorial on page 226.

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Concerns with Injections

1. Cystoid Macular Edema
   1. This study measured macular thickness in both arms at both 1 week and 1 month post-op
   2. No statistically significant difference in macular thickness

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CLINICAL TRIAL REPORT

Transzonular vitreous injection vs a single drop compounded topical pharmaceutical regimen after cataract surgery

Fisher, B. L., & Potvin, R. (2016). Transzonular Vitreous Injection vs. a Single Drop Compounded Topical Pharmaceutical Regimen After Cataract Surgery. *Clinical Ophthalmology, 10,* 1297-1303.

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Concerns with Injections

- Cystoid Macular Edema
- Steroid response/ IOP spikes
  - Compared at Baseline, 1 day PO, 1 week PO, and 1 month PO
  - No statistically significant difference in IOP, no significant drift over time.

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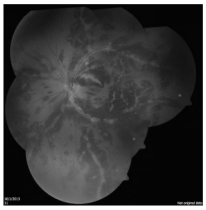
Concerns with Injections

1. Cystoid Macular Edema
2. Steroid response/ IOP spikes
3. HORV



Fisher, B. L., & Potvin, R. (2016). Transzonular Vitreous Injection vs. a Single Drop Compounded Topical Pharmaceutical Regimen After Cataract Surgery. *Clinical Ophthalmology, 10,* 1297-1303.

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Concerns with Injections

1. Overall experience

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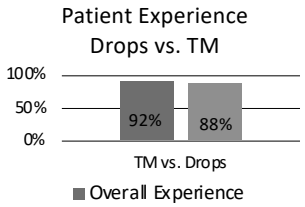
CLINICAL TRIAL REPORT

Transzonular vitreous injection vs a single drop compounded topical pharmaceutical regimen after cataract surgery



Fisher, B. L., & Potvin, R. (2016). Transzonular Vitreous Injection vs. a Single Drop Compounded Topical Pharmaceutical Regimen After Cataract Surgery. *Clinical Ophthalmology, 10,* 1297-1303.

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FDA Approved

- Intracameral
  - Dexamethasone intraocular suspension 9%
- Intracanalicular
  - Dexamethasone 0.4 mg insert

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What does the literature say?

- Kuriakose RK, Cho S, Nassiri S, Hwang FS. Comparative Outcomes of Standard Perioperative Eye Drops, Intravitreal Triamcinolone Acetonide-Moxifloxacin, and Intracameral Dexamethasone-Moxifloxacin-Ketorolac in Cataract Surgery. J Ophthalmol. 2022 Jul 19;2022:4857696.
- Hovanesian, John A. MD; Donnenfeld, Eric D. MD. Intracameral dexamethasone 9% vs prednisolone acetate 1% in controlling postoperative pain and inflammation in patients undergoing cataract surgery. Journal of Cataract & Refractive Surgery 48(8):p 906-911, August 2022.
- Anderson J, Young S, Cockerham G, Chomsky A, Parr NJ. Evidence Brief: Intracameral Moxifloxacin for Prevention of Endophthalmitis After Cataract Surgery. Washington, DC: Evidence Synthesis Program, Health Services Research and Development Service, Office of Research and Development, Department of Veterans Affairs. VA ESP Project #09-199; 2022.

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Mythbuster #9

I Have to See Patients for all Postoperative Visits

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A Doctor Should Do What *Only* a Doctor Can Do

- Ophthalmologists
- Optometrists
- Physician Assistants
- Nurse Practitioners
- Technicians: COA, COT, COMT

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Why Telehealth for Post Op Care?

Patient care and outcomes come first	Demonstrate efficacy and safety
Social distance considerations	Clinically efficient

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Protocols for Telehealth Post Op

Who qualifies for Telehealth Post-Op?

- Stand-alone cataract surgery only (including ATIOLs)
- No MIGs, K procedures, combined, etc.

Visits

- POD #1 – Virtual
- POW #1 – In-office
- POM #1 – In-office

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Protocols for Telehealth Post-Op

Peri-operative Medications
- Cyclopentolate + Phenylephrine – 2 drops 30 min apart prior to leaving home
- Diamox 500mg Sequel post surgery
- Brimonidine / dorzolamide BID x one week
- Omni #1 (prednisolone/gatifloxacin/bromfenac) TID x two weeks, then
- Omni #2 TID (prednisolone/bromfenac) x three weeks

Malpractice Carrier Considerations
- Recommend telehealth calls must be made by a provider
- Did not see changes in standard of care
- Covered by informed consent

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Considerations

- Surgeon can schedule one day in-office if potential complication noticed during surgery
- Low threshold to be seen same day in office

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Telehealth Template

Depending on surgical volume, one to two OD providers perform telehealth post-ops

Telehealth scheduled appointments every 10-15 min to allow for documentation, missed calls, etc.

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Study #1
5/4/20 - 7/6/20

Early Opportunities (AKA Issues)
n=196 pts
- Can't get in touch with patient
- Cancelled surgery
- Drop issues
- Language barrier
- Patient comfort with TH
- Surgery outside of VSC
- Patients who needed to come in: IOP - 5 pts

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Study #2
Pre/Post COVID Reopening

- Standard in-office protocol used
- Study Arm #1 –25 pts pre-covid drop protocol
  - 3 Post IOP > 30mm Hg (30, 32, 33)
- Study Arm #2 - 25 pts post-reopening drop protocol
  - 1 Post IOP > 30mm Hg (32 on same day)

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Patient Satisfaction Scores

N=36

- How satisfied were you with the convenience of the 1-day postoperative telehealth visit?
  - 94% Patient Satisfaction
- How would you describe your overall satisfaction of your 1-day postoperative telehealth appointment?
  - 94% Patient Satisfaction
- How satisfied were you with the understanding of your post-operative drops following your telehealth post-operative appointment?
  - 93% Patient Satisfaction

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Patient Satisfaction Scores

N=36

- The telehealth system was simple and easy to use.
  - 93% Agreement
- If I had to have cataract surgery again, I would prefer to have my 1-day post-operative appointment as a teleheath appointment.
  - 83% Agreement

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1

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Cataract / Refractive Surgery Complications

Operative Complications
- Surgeon makes the call

Post-operative Complications
- Co-managing doctor makes the call

Successful co-management is the result of continuous communication!!

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Co-management 101

- Put Patients First!!
- Always the patient's choice
- Must be clinically appropriate
- Treat the referral source as a colleague
- Utilize a team approach

****2016 AAO Comprehensive Guidelines for the Co-management of Ophthalmic Postoperative care*

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Surgical Mythbusters

1. First line therapy is always a drop - Busted
2. Surgery is last resort - Busted
3. Toric IOLs Don't Always Work - Busted
4. Epiphora is caused only by DED/MGD - Busted
5. Full K transplant is your only option - Busted
6. Laser cataract surgery has better outcomes - Busted
7. There are no effective treatment options for floaters - Busted
8. Drops are most effective for intraocular surgery - Busted
9. I Have to See Patients for all Postoperative Visits - Busted

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Thank You!!

- wwhitley@cvphealth.com

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