



What Would You Do? – Case Studies in Refractive Surgery

Kyle Sandberg, OD, FAAO



Disclosures

- **Kyle Sandberg, OD, FAAO**
 - Allergan
 - World College of Refractive Surgery and Visual Sciences

Vision Correction For Individuals With Spinal Cord Injuries

Monday May 23, 2022 | Category: Cataracts

The benefits of refractive surgery for certain groups of people, particularly those with physical disabilities, are obvious. Individuals who are unable to use their arms or hands to handle their glasses or contact lenses who struggle to put contact lenses on their eyes or to keep their glasses from sliding down their nose are well suited to benefit from refractive surgery, like [Cataract Eye Surgery](#).





Case 1

- ▶ 27 y.o. HM
 - ▶ CC: MMA fighter no longer lets me wear contacts lenses wants Laser ONLY
 - ▶ OD: -4.00DS
 - ▶ OS: -4.25DS

Case 1

Oculus Optikgeräte GmbH
Münchholzhäuser Str. 29

35582 Wetzlar

Tel: (0641) 20 05-0
Fax: (0641) 20 05-255

www.oculus.de



R

OCULUS - PENTACAM Holladay Report

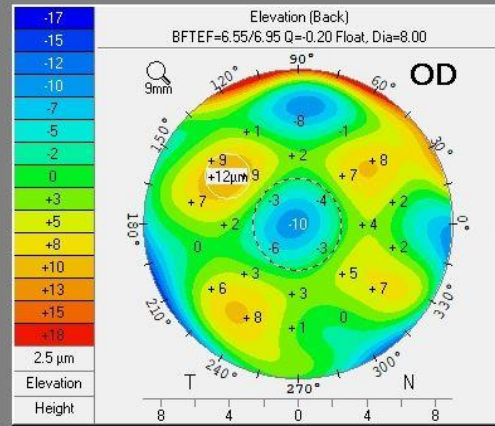
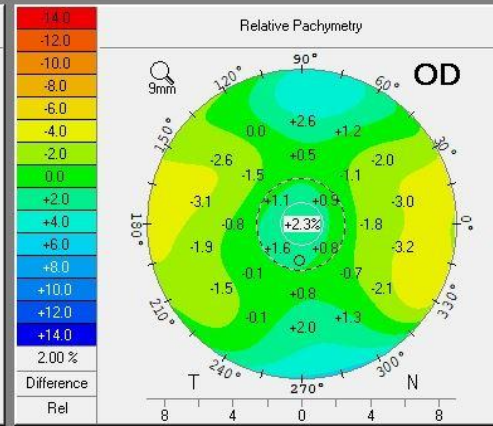
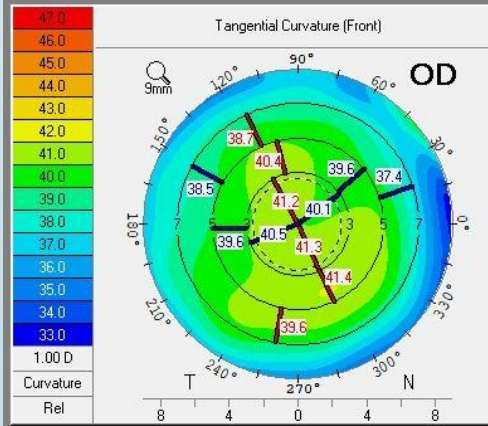
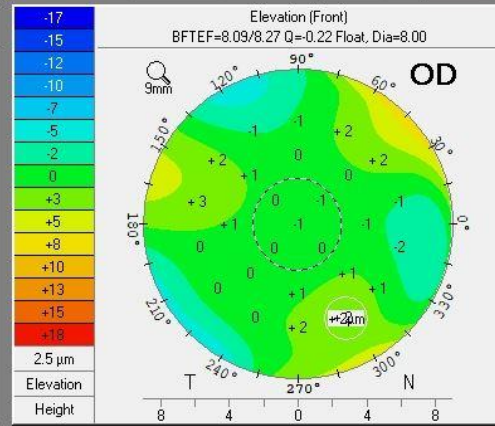
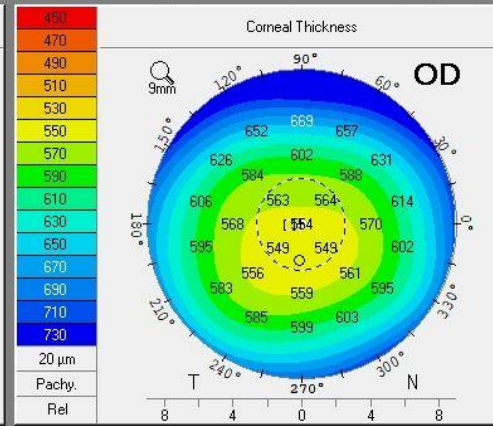
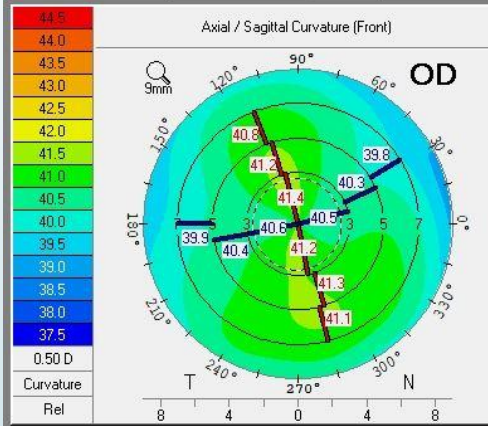
1.2209

Last Name: S
First Name: M
ID:
Date of Birth: 06/23/1994 Eye: Right
Exam Date: 07/01/2022 Time: 13:09:16

Equiv K-Readings 65 (4.5mm Zone)

EKR65 Flat K1:	40.85 D (14 °)	Q (6.0mm):	-0.16
EKR65 Steep K2:	41.36 D (104 °)	Total SA: Z(4+6+8.0)	+0.159 μ
EKR65 Mean:	41.10 D	Radii Ratio (B/F):	85.6 %
Astig EKR65:	0.51 D	RMS HOA WE (6mm)	0.330 μm

Pupil Dia:	+ 2.62 mm	x:	0.03 mm T	y:	0.01 mm I	(rel.VN)
HWTW:	() 13.2 mm	x:	0.37 mm T	y:	0.02 mm I	(rel.VN)
Pachy Min:	○ 547 μm	x:	0.07 mm T	y:	1.05 mm I	(rel.VN)
Est. Pre-Ref. Km	39.3 D	Refr.Chang	+1.6 D			
ACD (Ext.):	4.27 mm	Chord μ:	0.03 m	QS:	Light Src.!	



Case 1

Oculus Optikgeräte GmbH
Münchholzhäuser Str. 29

35582 Wetzlar

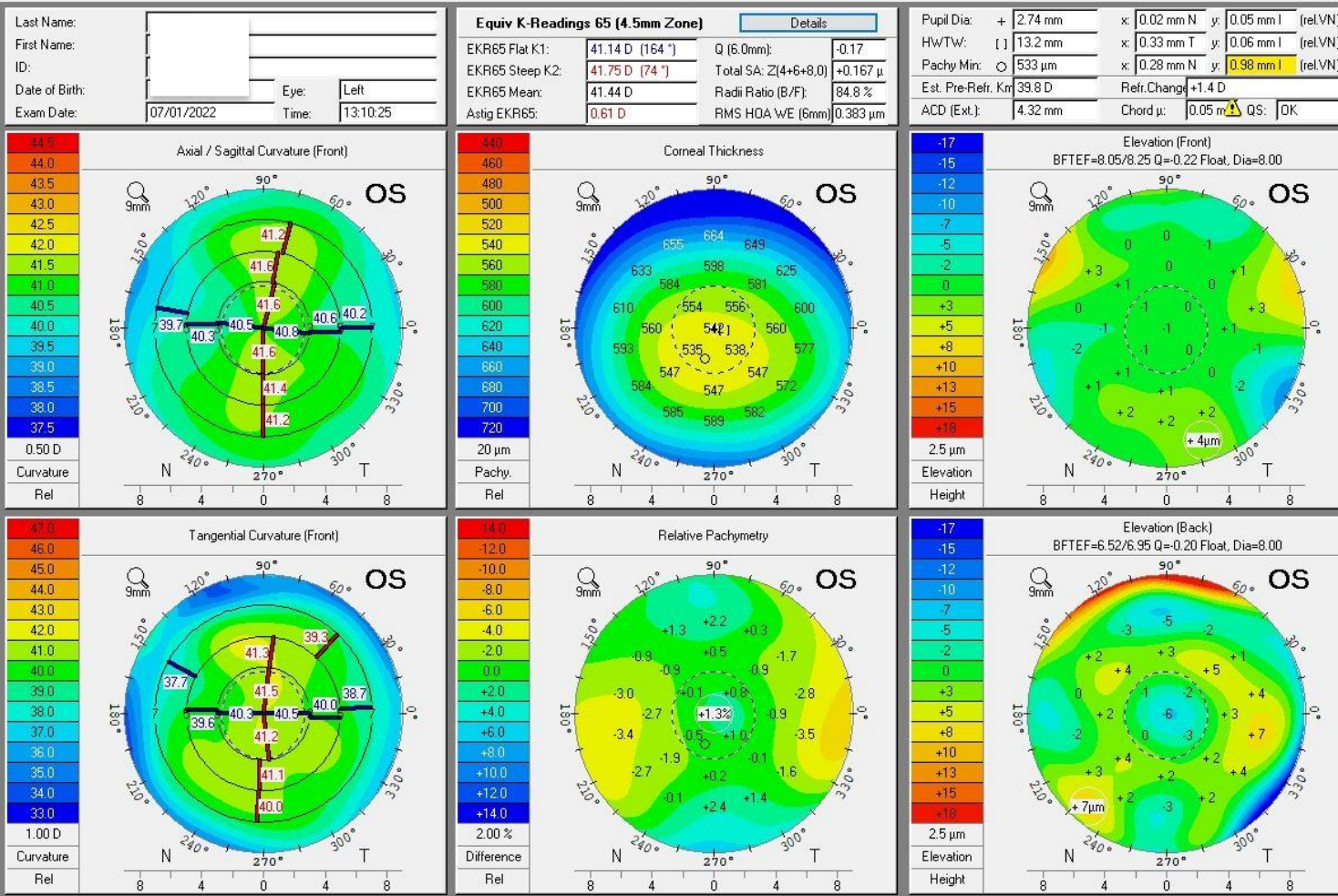
Tel: (0641) 20 05-0
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www.oculus.de



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1.22/09





When poll is active, respond at pollev.com/sandberg

Text **SANDBERG** to **22333** once to join

What procedure would you recommend for this athlete?

LASIK

PRK

SMILE

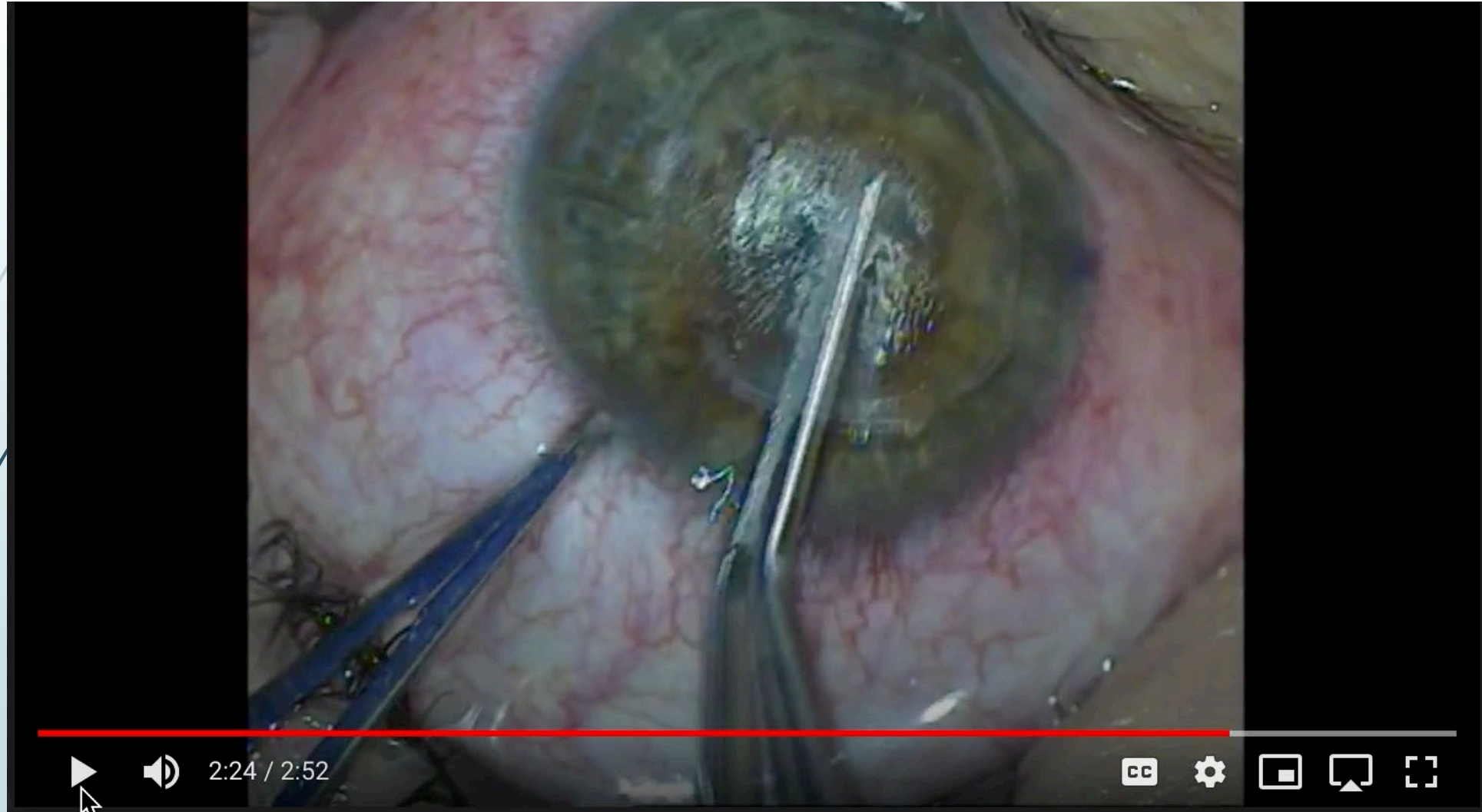
NO Surgery



SMILE

- ▶ 1 week post op
 - ▶ DVAsc
 - ▶ OD: 20/20⁻¹
 - ▶ OS: 20/20
- ▶ Pt is very satisfied with VA
 - ▶ He still lost his next fight

What can we do with the lenticule?



Courtesy: Kathryn Hatch,

Femtosecond Intrastromal Lenticule Implantation (FILI) for Management of Moderate to High Hyperopia: 5-Year Outcomes

Sheetal Brar, MS, Sri Ganesh, MS, DNB, FRCS, Skanda Samak Sriganesh, AS, and Hemali Bhavsar, MS

Published Online: June 01, 2022 · <https://doi.org/10.3928/1081597X-20220503-01>

PDF

View Full Text

Abstract

Abstract

PURPOSE: To report the long-term clinical experience following femtosecond intrastromal lenticule implantation (FILI) for the management of moderate to high hyperopia.

METHODS: Eligible patients who underwent FILI for moderate to high hyperopia from July 2013 to October 2020 were included. A donor small incision lenticule extraction lenticule, matched for refractive error, was implanted into the recipient's corneal pocket created using a femtosecond laser at 160 μm depth. Visual and refractive outcomes and long-term complications were evaluated at the end of a mean follow-up of 68 ± 17.28 months (5.6 years).

RESULTS: Forty-two eyes of 25 patients (mean age: 27.29 ± 5.52 years) were analyzed. The mean spherical equivalent reduced significantly from $+5.50 \pm 1.96$ to $+0.66 \pm 1.17$ diopters (D) at last follow-up visit. Thirty eyes (71%) were within ± 1.00 D of spherical equivalent correction. Cumulative uncorrected distance visual acuity of 20/40 or better was achieved in 34 eyes (81%). Efficacy and safety indices were 0.86 ± 0.19 and 1.17 ± 0.39 , respectively. There was a significant increase in mean keratometry (Kmean) anterior, central corneal thickness, Q-value, and corneal higher order aberrations and a decrease in Kmean posterior 2 weeks postoperatively, without any significant change in these parameters thereafter ($P > .05$). Four eyes of 3 patients underwent enhancement and another 4 eyes underwent explantation of the lenticule followed by exchange (2 eyes) and hyperopic laser in situ keratomileusis (2 eyes). No eye lost more than one line of CDVA.

CONCLUSIONS: At 5 years of follow-up, FILI for moderate to high hyperopia showed good safety, efficacy, and reversibility. Modification of nomograms and surgical planning may be employed for further refinement of the outcomes.

[*J Refract Surg.* 2022;38(6):348–354.]

- 42 eyes
 - avg preop +5.50
 - avg post op +0.66
- 81% achieved 20/40 or better
- No eyes lost more than 1 line of CDVA

PrEsbyopic
Allogenic
Refractive
Lenticule

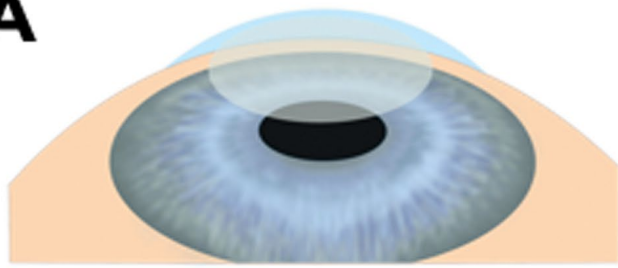


Allogenic Lenticules

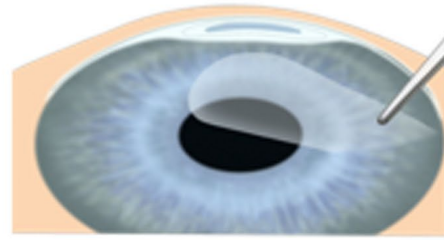
Allotex Inc. - TransForm Corneal Allograft (TCA)

- ▶ Cuts up to 100 lenticules from donor cornea
- ▶ Phase 2 multicenter trial in Europe
 - ▶ 101 emmetropic eyes.
 - ▶ TCA placed monocularly in non-dominant eye
 - ▶ No loss of uncorrected binocular visual acuity in distance vision.
 - ▶ 2 lines of improvement at intermediate vision
 - ▶ 5 lines of visual acuity improvement at near vision

A



Lenticule Creation



Lenticule Extraction

B

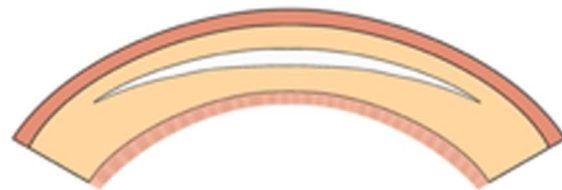


Myopic Lenticule

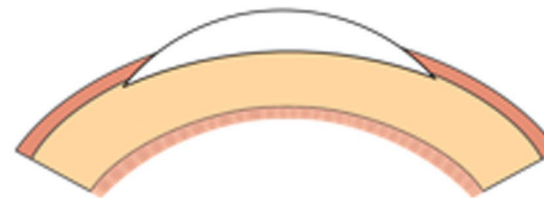


Hyperopic Lenticule

C



Stromal keratophakia




Epikeratophakia

[nature](#) > [scientific reports](#) > [articles](#) > [article](#)

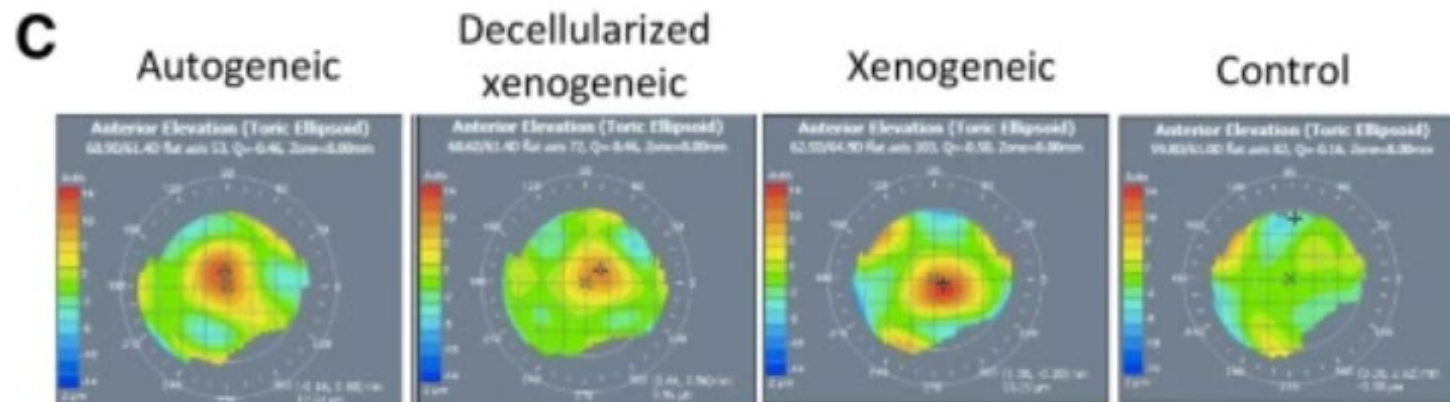
Article | [Open Access](#) | [Published: 30 January 2018](#)

Biological corneal inlay for presbyopia derived from small incision lenticule extraction (SMILE)

[Yu-Chi Liu](#), [Ericia Pei Wen Teo](#), [Heng Pei Ang](#), [Xin Yi Seah](#), [Nyein Chan Lwin](#), [Gary Hin Fai Yam](#) & [Jodhbir S. Mehta](#) 

[Scientific Reports](#) **8**, Article number: 1831 (2018) | [Cite this article](#)

2114 Accesses | **32** Citations | [Metrics](#)





Case 2

- ▶ 33 y.o. WF – Yoga Studio owner
 - ▶ CC: hates CL. Had a serious infection 2 years ago OS
 - ▶ OD: -5.75 -0.25 x 141 → 20/20
 - ▶ OS: -5.25 -0.25 x 031 → 20/25
 - ▶ SLE:
 - ▶ Unremarkable OD
 - ▶ Scar OS @12:00 (paracentral)

Case 2

Name: Scope, Jaimee

ID: CZMI742996118

DOB: 6/2/1989

Gender: Unknown

Technician: Operator, Cirrus

Exam Date: 1/12/2022

Exam Time: 11:26 AM

Serial Number: 500-34010

Signal Strength: N/A

CZMI

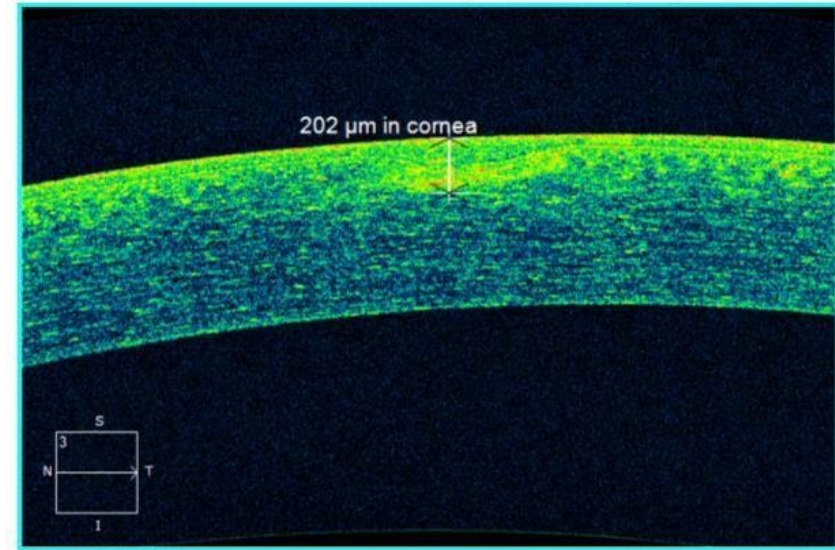
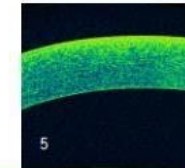
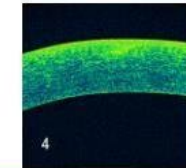
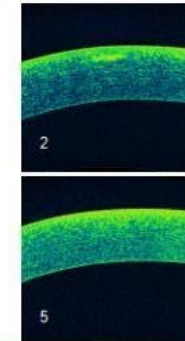
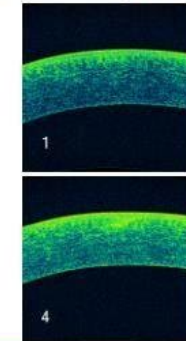
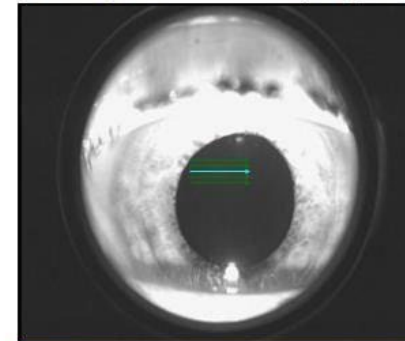


L

High Definition Images: Anterior Segment 5 Line Raster

OD OS

Scan Angle: 0° Spacing: 0.25 mm Length: 3 mm



Comments

Doctor's Signature

Analysis Edited: 1/12/2022 11:27 AM

SW Ver: 11.5.1.47041
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Page 1 of 1

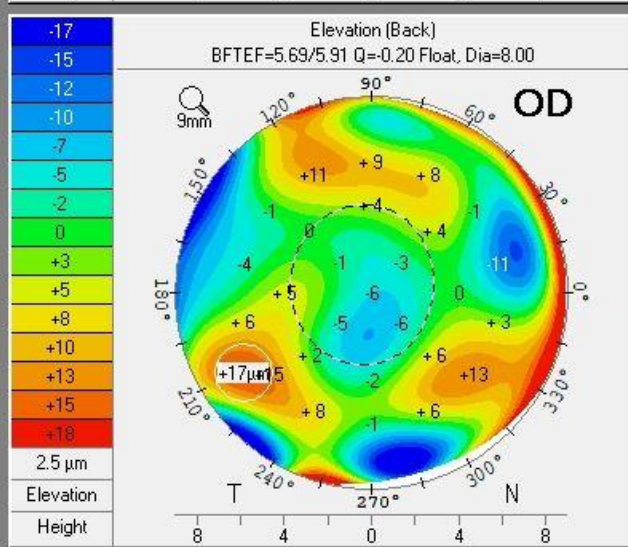
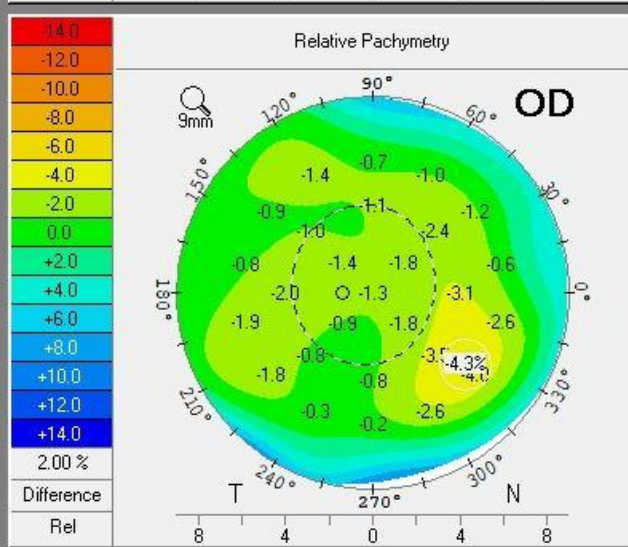
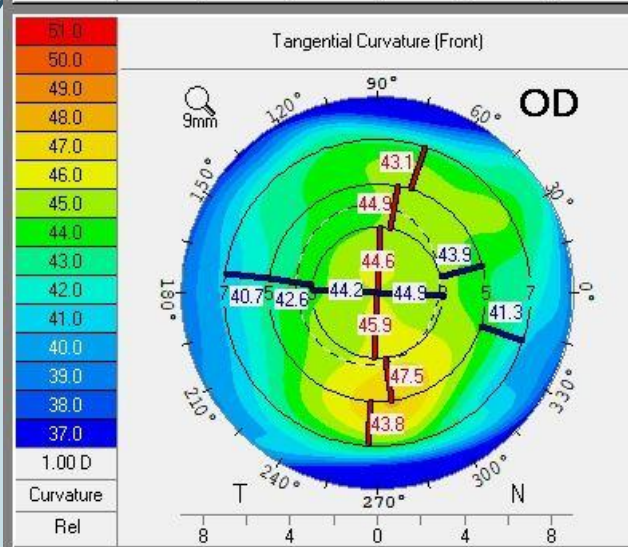
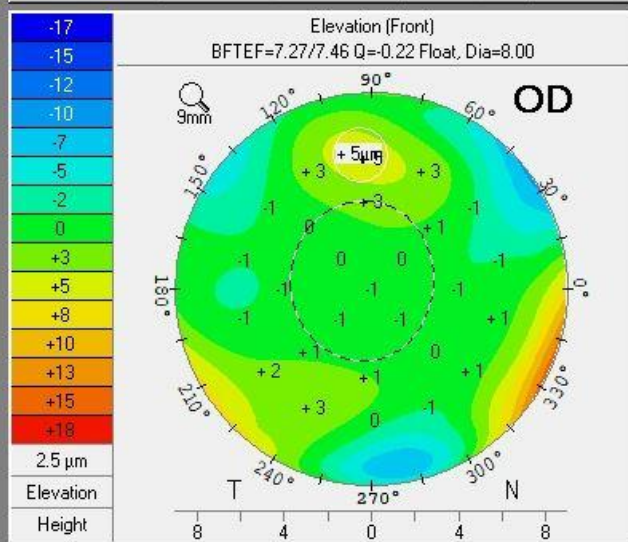
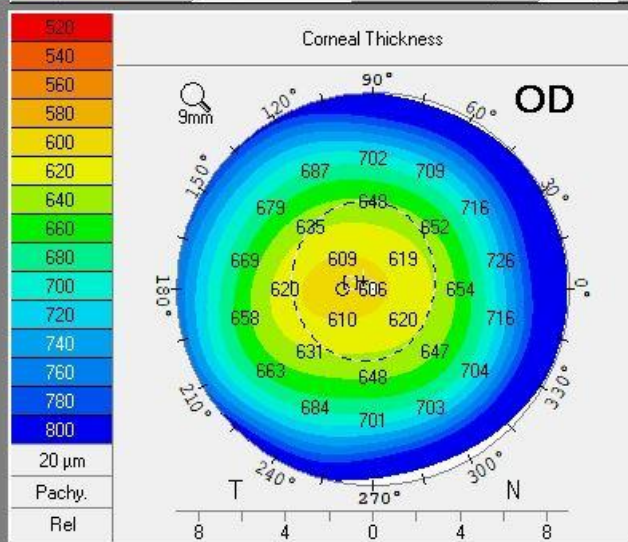
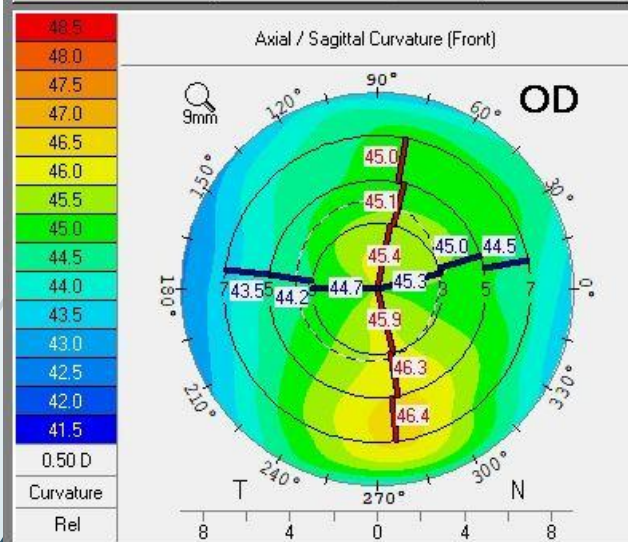
OCULUS - PENTACAM Holladay Report

1.22/09

Last Name: _____
 First Name: _____
 ID: _____
 Date of Birth: _____ Eye: Right
 Exam Date: 01/12/2022 Time: 10:45:53

Equiv K-Readings 65 (4.5mm Zone)		Details	
EKR65 Flat K1:	44.78 D (3°)	Q (6.0mm):	-0.14
EKR65 Steep K2:	45.22 D (93°)	Total SA: Z(4+6+8.0)	+0.247 μ
EKR65 Mean:	45.00 D	Radii Ratio (B/F):	81.0 %
Astig EKR65:	0.44 D	RMS HOA WE (6mm)	0.453 μm

Pupil Dia:	+ 3.46 mm	x: 0.21 mm T	y: 0.18 mm S	(rel.VN)
HWTW:	[] 11.9 mm	x: 0.52 mm T	y: 0.13 mm S	(rel.VN)
Pachy Min:	○ 602 μm	x: 0.68 mm T	y: 0.00 mm S	(rel.VN)
Est. Pre-Ref. Kr	46.0 D	Refr.Chang: -0.7 D		
ACD [Ext.]:	3.95 mm	Chord μ:	0.28 m	QS: OK



OCULUS - PENTACAM Holladay Report

1.22r09

Last Name:

First Name:

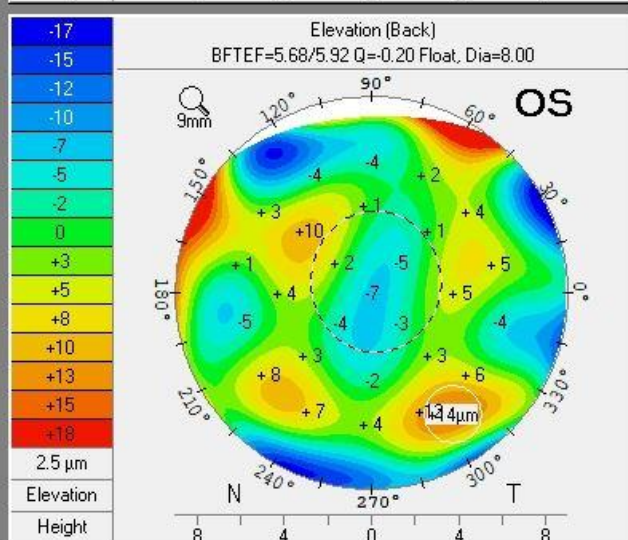
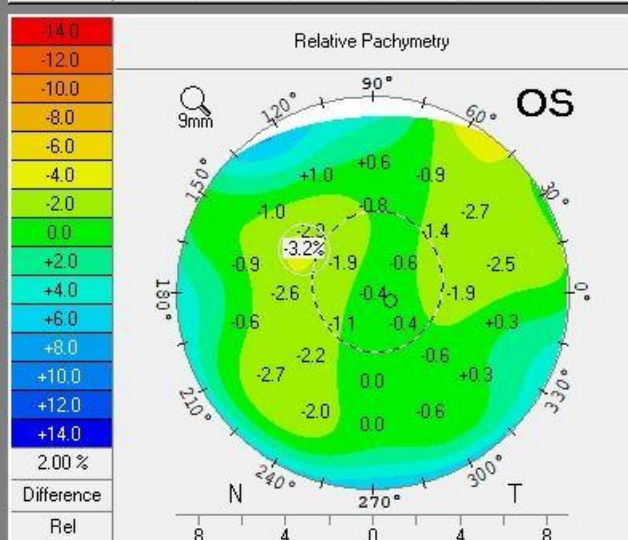
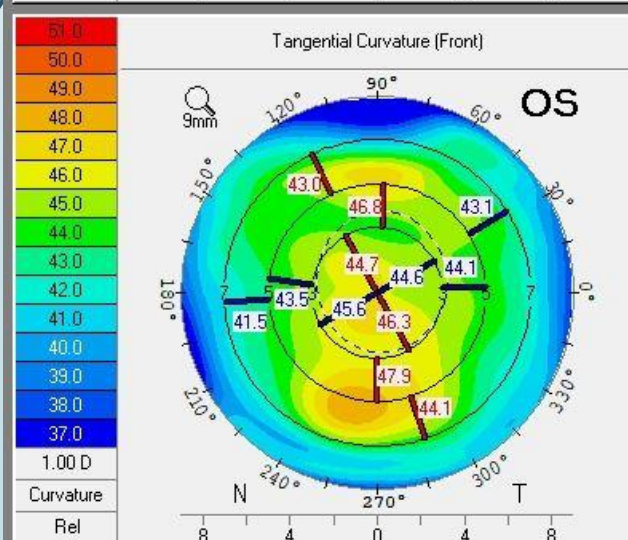
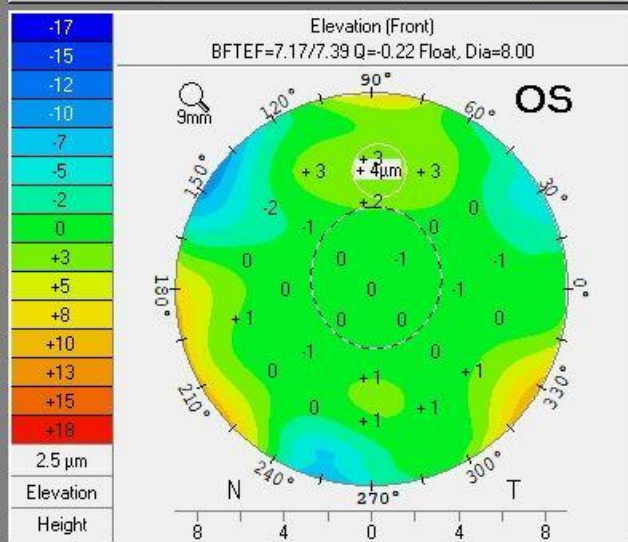
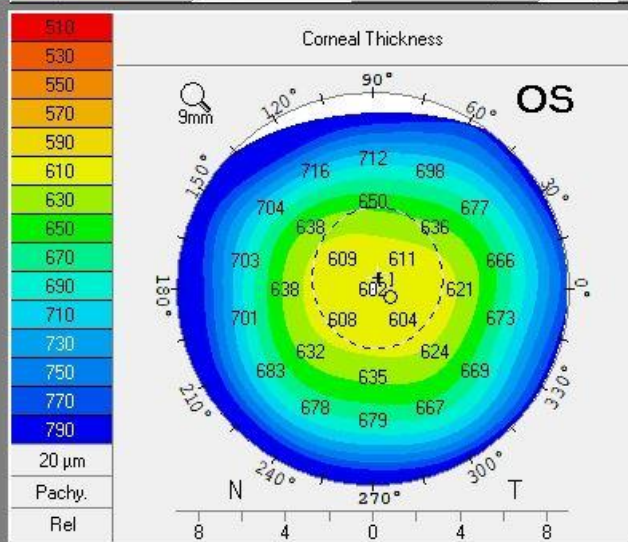
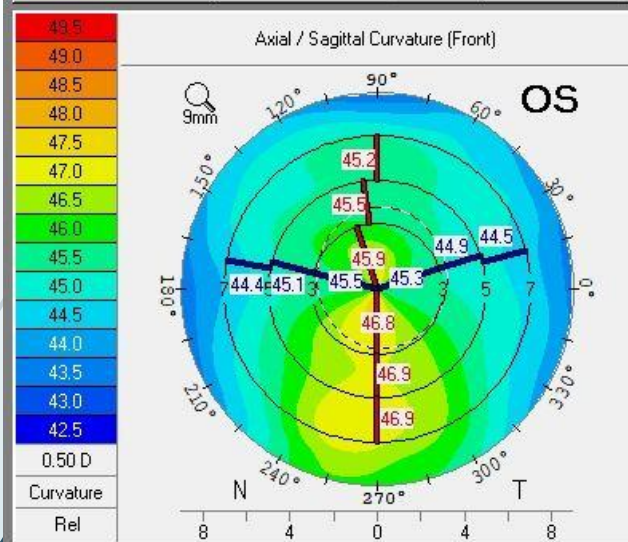
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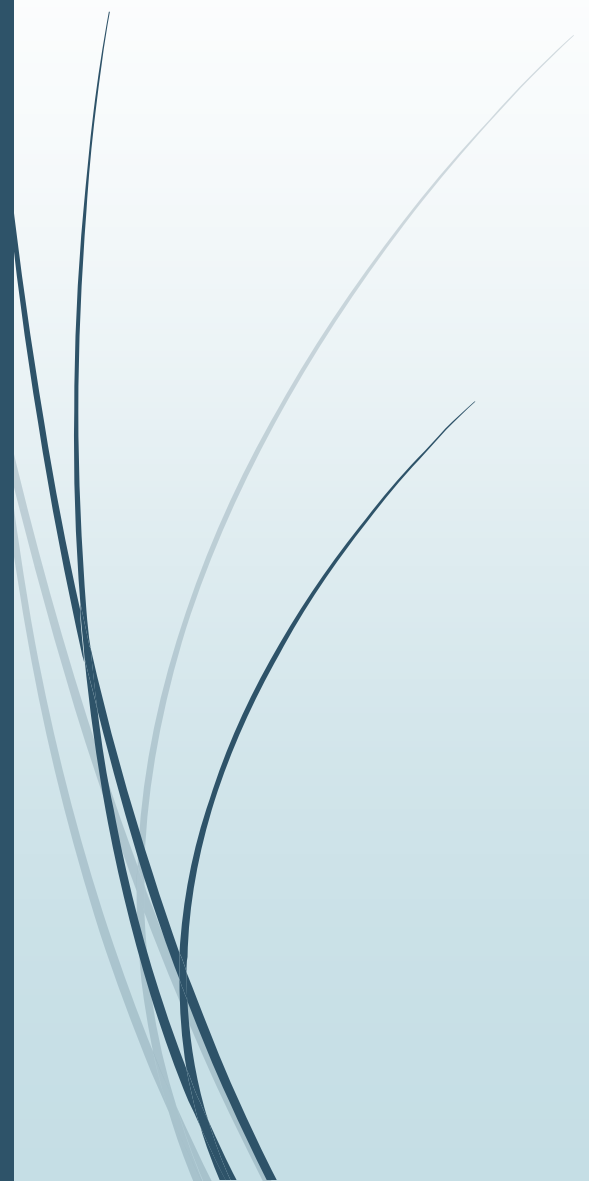
Date of Birth: Eye: Left

Exam Date: 01/12/2022 Time: 10:44:11

Equiv K-Readings 65 (4.5mm Zone)			Details
EKR65 Flat K1:	45.16 D (177 °)	Q (6.0mm):	-0.14
EKR65 Steep K2:	45.83 D (87 °)	Total SA: Z(4+6+8.0)	+0.228 μ
EKR65 Mean:	45.50 D	Radii Ratio (B/F):	81.9 %
Astig EKR65:	0.67 D	RMS HOA WE (6mm)	0.535 μm

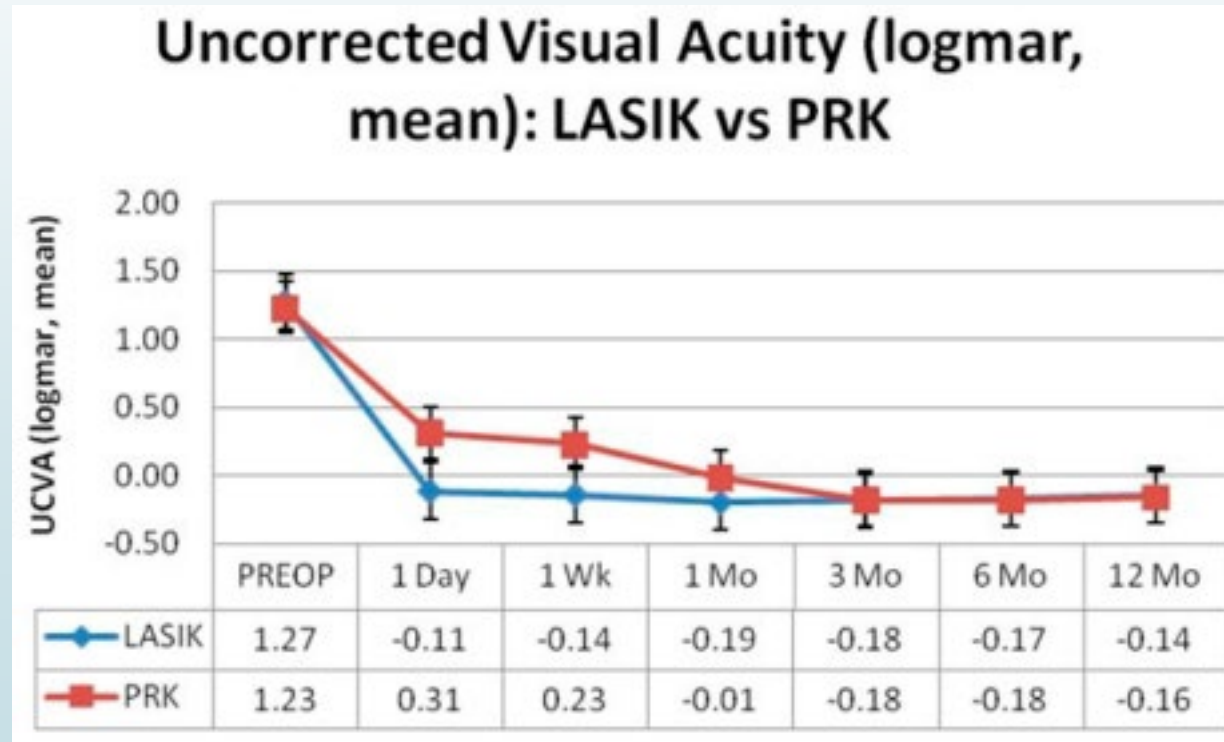
Pupil Dia:	+ 3.10 mm	x: 0.10 mm T	y: 0.25 mm S	(rel.VN)
HWTW:	[] 12.1 mm	x: 0.27 mm T	y: 0.23 mm S	(rel.VN)
Pachy Min:	○ 602 μm	x: 0.40 mm T	y: 0.20 mm I	(rel.VN)
Est. Pre-Ref. Kr	46.2 D	Refr.Chang -0.3 D		
ACD (Ext.):	4.05 mm	Chord μ:	0.27 m	QS: Blinking!



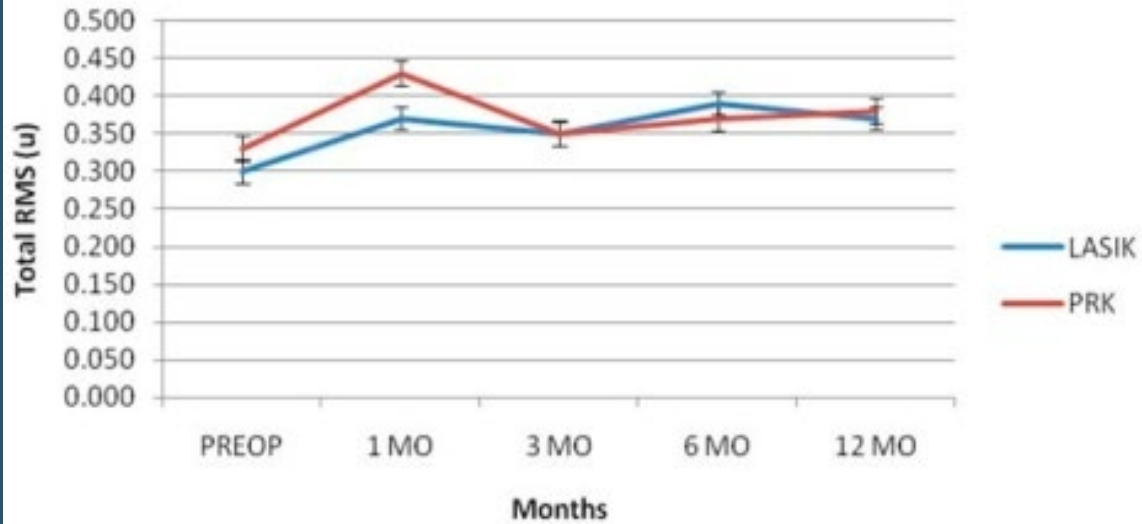


LASIK vs. PRK

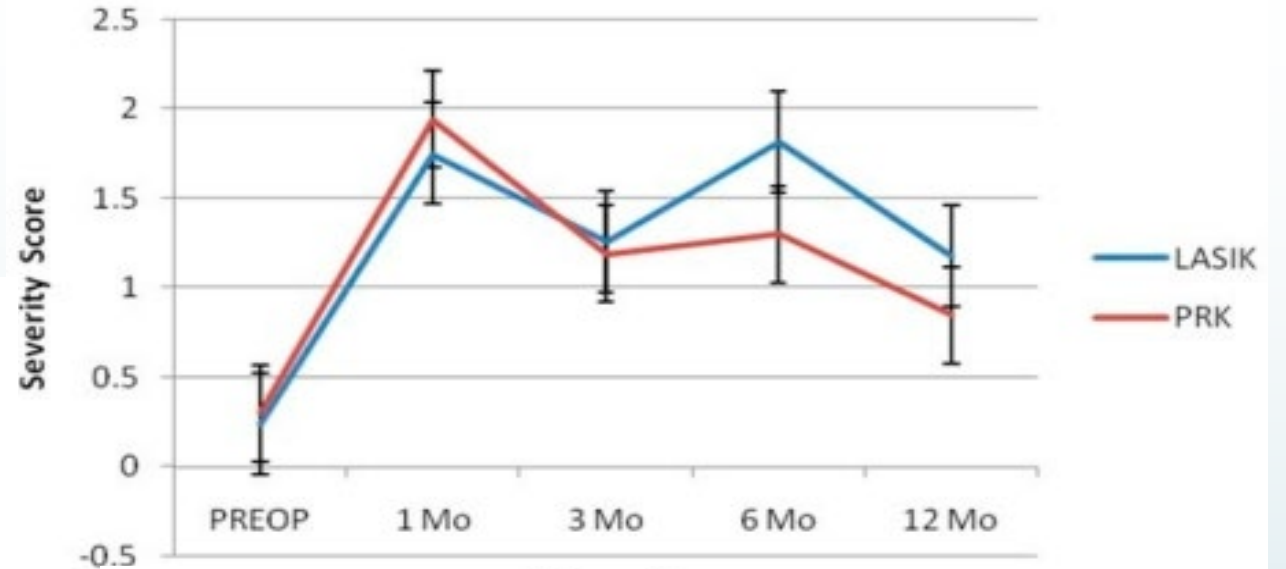
68 eyes followed to 12 months randomized to WFG LASIK or WFG PRK



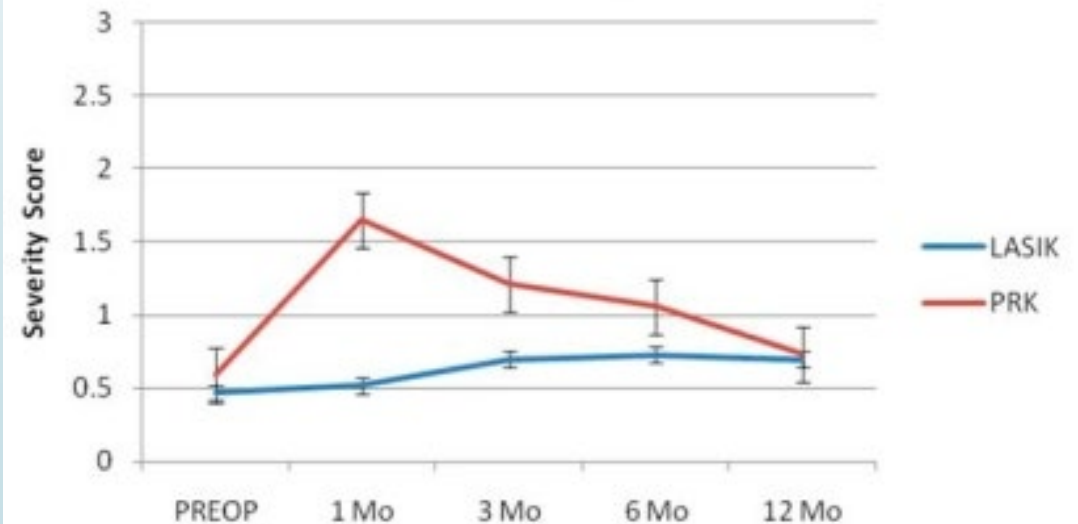
Higher Order Aberrations (RMS)



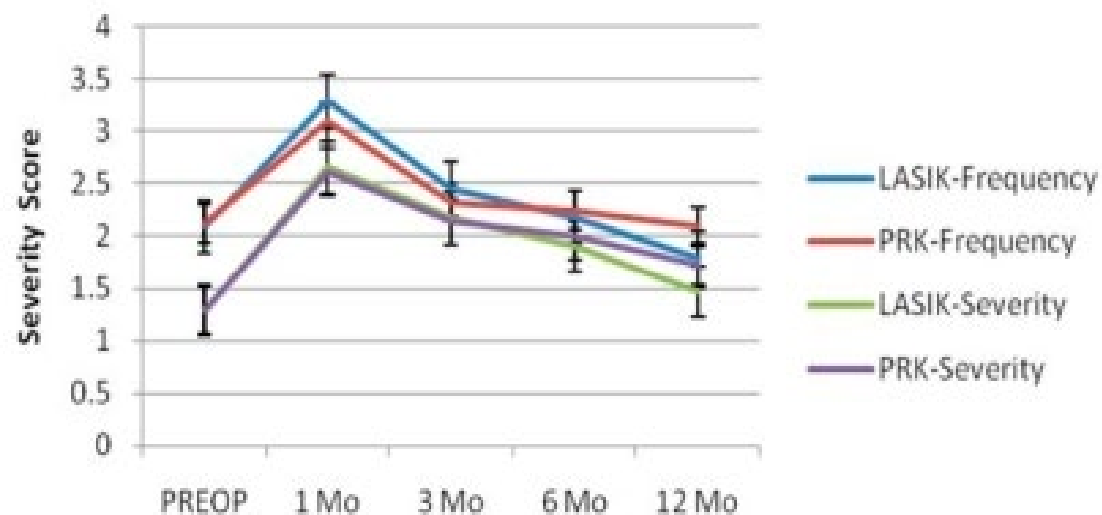
Haze



Ghosting

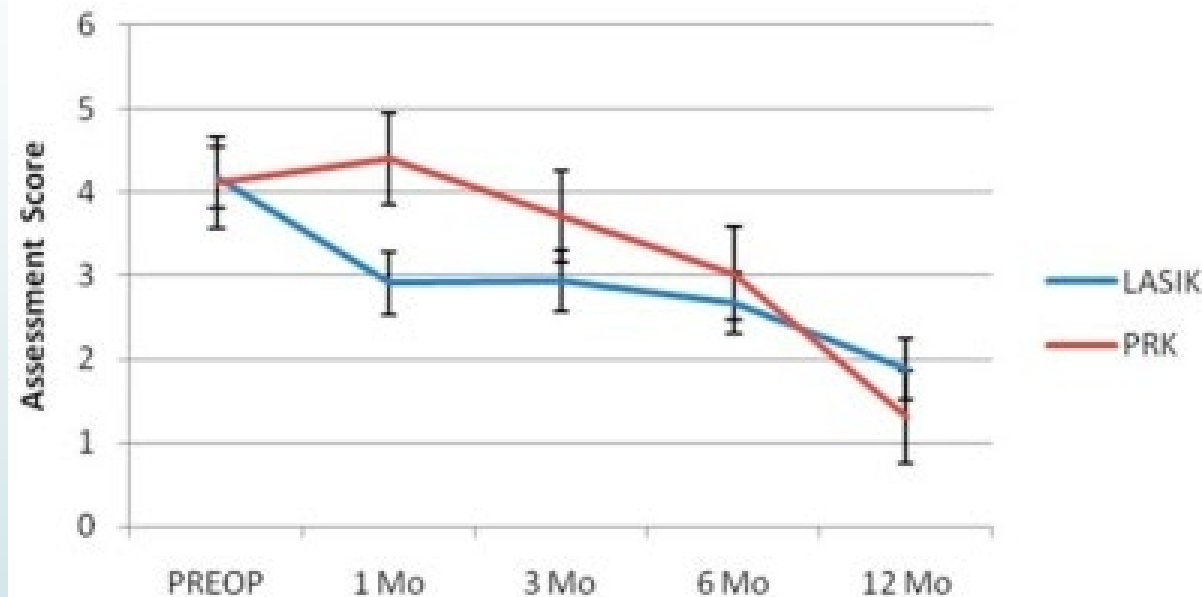


Dry Eye Symptoms: Frequency & Severity



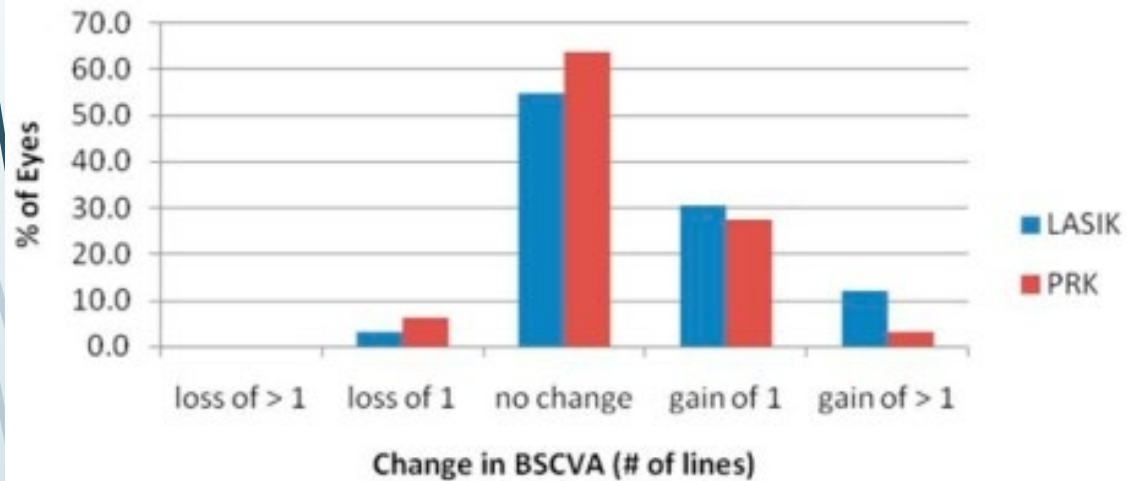
Frequency and severity of dry eye symptoms for each of the designated postoperative intervals for LASIK and PRK eye

Self Assessment of Overall Vision



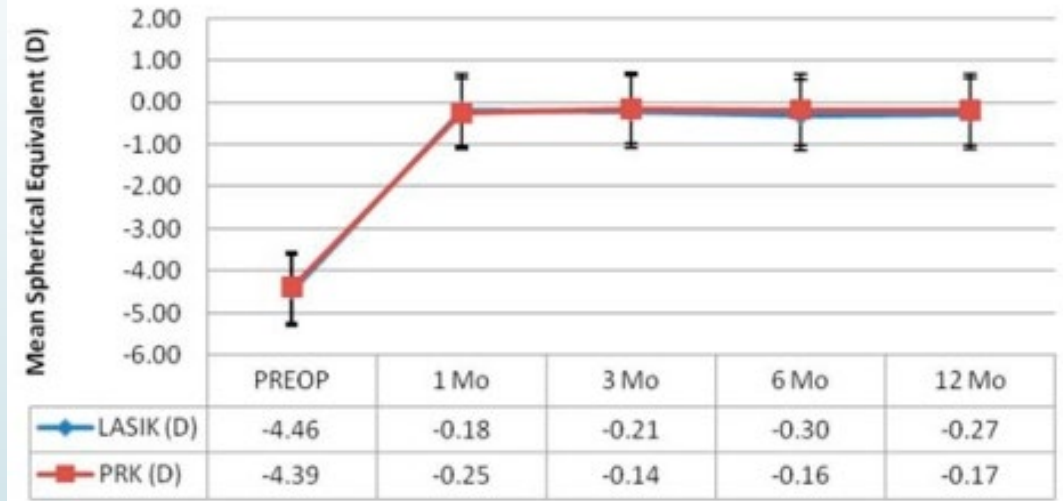
Self-assessment of overall vision for each of the designated postoperative intervals for LASIK and PRK eyes. "0" was described as "excellent" vision.

Change in Best Spectacle Corrected Visual Acuity (BSCVA) at 12 Months



No eyes in the LASIK or PRK groups lost more than 1 line of BSCVA

Mean Spherical Equivalent (Diopters): LASIK vs. PRK



Refractive stability was achieved at 1 month for both LASIK and PRK groups.



LASIK vs. PRK



“Wavefront-guided LASIK and PRK are safe and effective at reducing myopia. At 1 month postoperatively, LASIK demonstrates an advantage over PRK in UCVA, BSCVA, low-contrast acuity, induction of total HOAs, and several subjective symptoms.

At postoperative month 3, these differences between PRK and LASIK results had resolved.”

PRK>>LASIK dryness

Bringing LASIK and dry eye into focus

May 3, 2019

Cheryl Guttman Krader, BS, Pharm



Conferences |
ASCRS

During Refractive Day at ASCRS 2019, Julie Schallhorn, MD, MS, shed some new light on the topic by challenging conventional wisdom about dry eye and LASIK.



STODS

Surgical Temporary Ocular Discomfort Syndrome



International Journal of
Molecular Sciences



[Int J Mol Sci.](#) 2022 Jul; 23(14): 7512.

PMCID: PMC9320097

Published online 2022 Jul 6. doi: [10.3390/ijms23147512](https://doi.org/10.3390/ijms23147512)

PMID: [35886858](https://pubmed.ncbi.nlm.nih.gov/35886858/)

Changes of Subjective Symptoms and Tear Film Biomarkers following Femto-LASIK

[Teresa Tsai](#),^{1,†} [Mohannad Alwees](#),^{1,†} [Anika Rost](#),² [Janine Theile](#),¹ [H. Burkhard Dick](#),¹ [Stephanie C. Joachim](#),^{1,*†} and [Suphi Taneri](#)^{1,2,*†}

Marcos López Hoyos, Academic Editor



Case 3

- ▶ 27 y.o. HM – Works in construction. CL causing dryness and glasses are challenging on the job site
 - ▶ Told by another LASIK center he was a poor candidate
 - ▶ BCVA
 - ▶ OD:20/30 ⁺¹
 - ▶ OS: 20/20
 - ▶ MRx
 - ▶ OD: +8.25 -1.75 x 120
 - ▶ OS: +6.50 -2.50 x 068

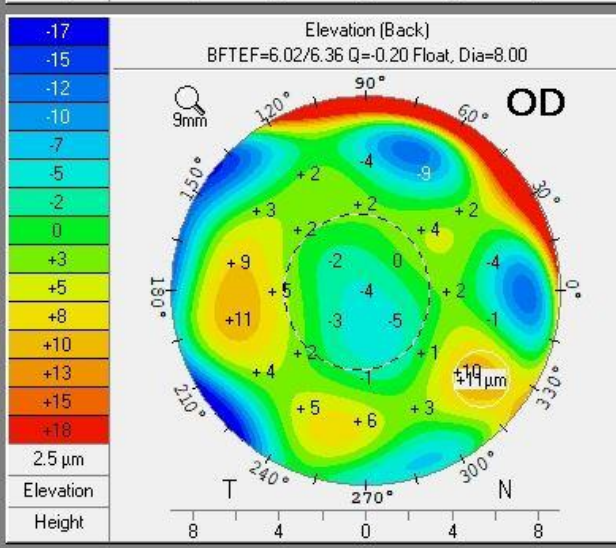
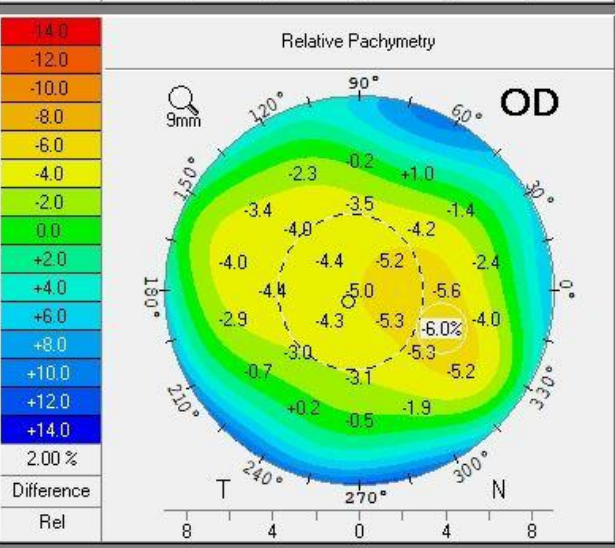
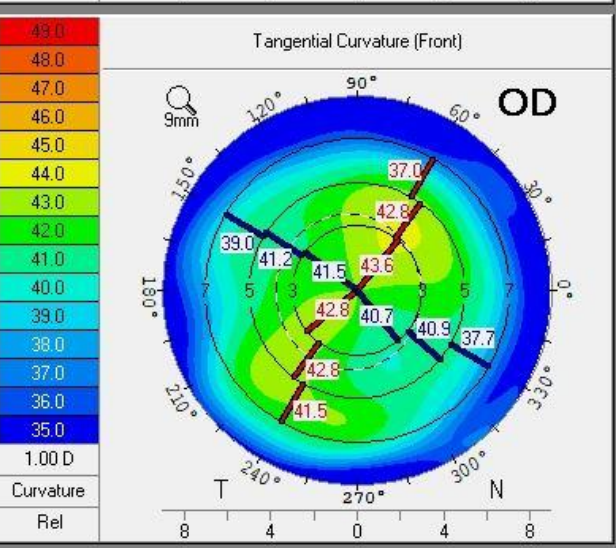
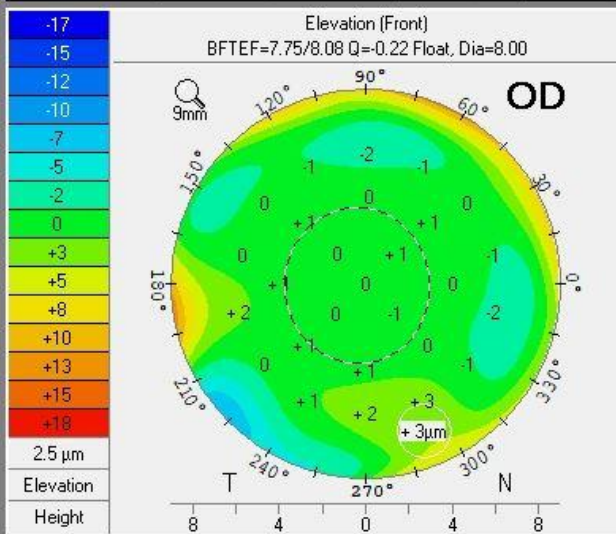
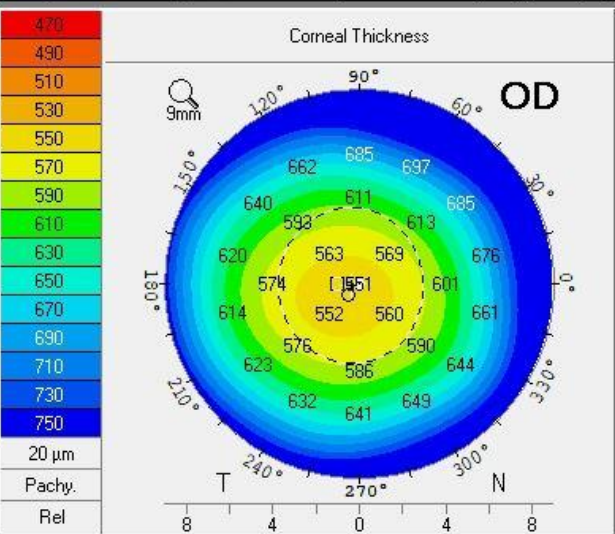
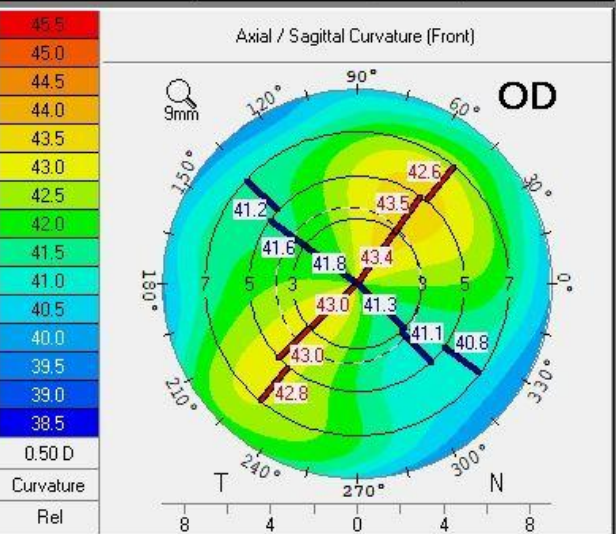
OCULUS - PENTACAM Holladay Report

1.25 R

Last Name: _____
 First Name: _____
 ID: _____
 Date of Birth: _____ Eye: Right
 Exam Date: 08/09/2022 Time: 15:26:56

Equiv K-Readings 65 (4.5mm Zone)		
EKR65 Flat K1:	41.62 D (134 °)	Q (6.0mm): -0.17
EKR65 Steep K2:	43.13 D (44 °)	Total SA: Z(4+6+8.0) +0.198 μ
EKR65 Mean:	42.37 D	Radii Ratio (B/F): 79.8 %
Astig EKR65:	1.51 D	RMS HOA W/E (6mm) 0.345 μm

Pupil Dia:	+ 3.47 mm	x: 0.20 mm T	y: 0.04 mm I	(rel.VN)
HW/TW:	[] 11.7 mm	x: 0.50 mm T	y: 0.01 mm I	(rel.VN)
Pachy Min:	○ 549 μm	x: 0.27 mm T	y: 0.27 mm I	(rel.VN)
Est. Pre-Ref. Km	43.7 D	Refr. Change: -1.3 D		
ACD (Ext.):	5.28 mm	Chord μ:	0.20 mm	QS: <input type="checkbox"/> OK



OCULUS - PENTACAM Holladay Report

1,25r

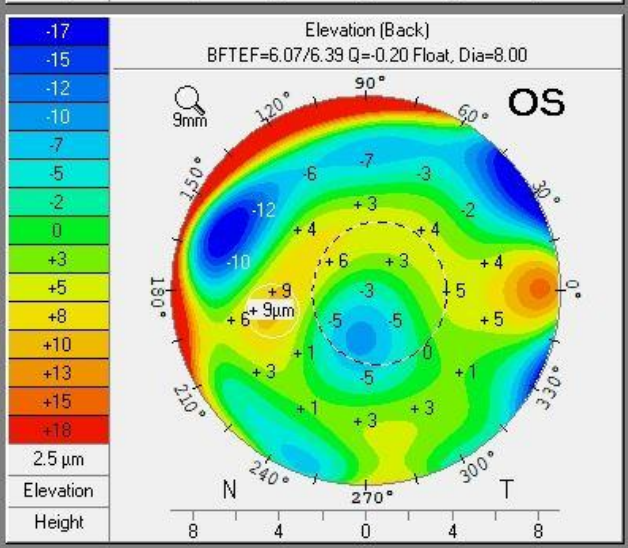
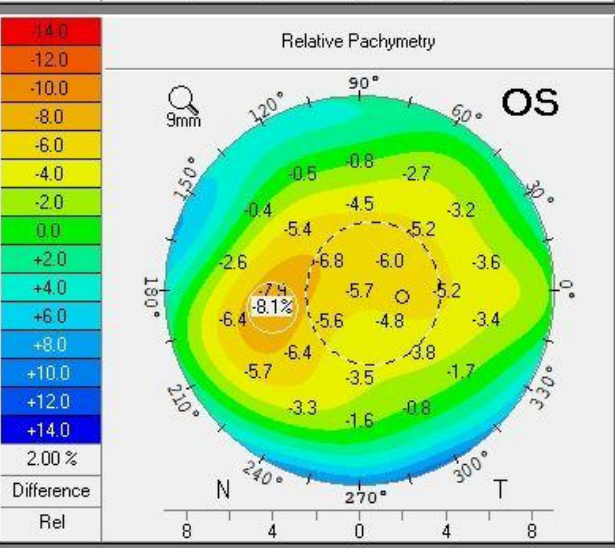
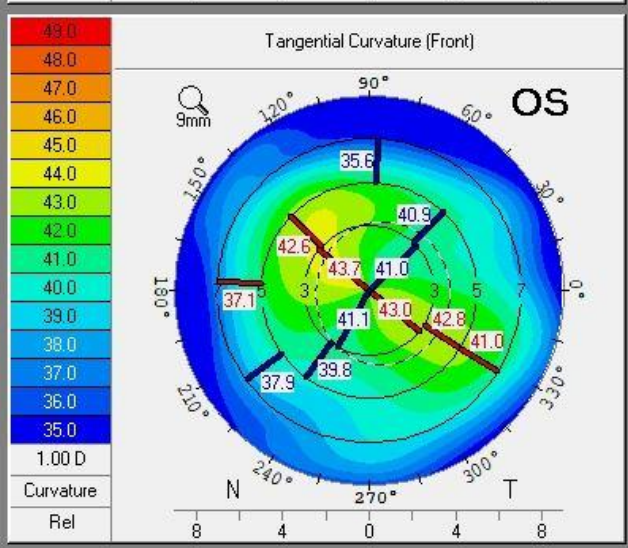
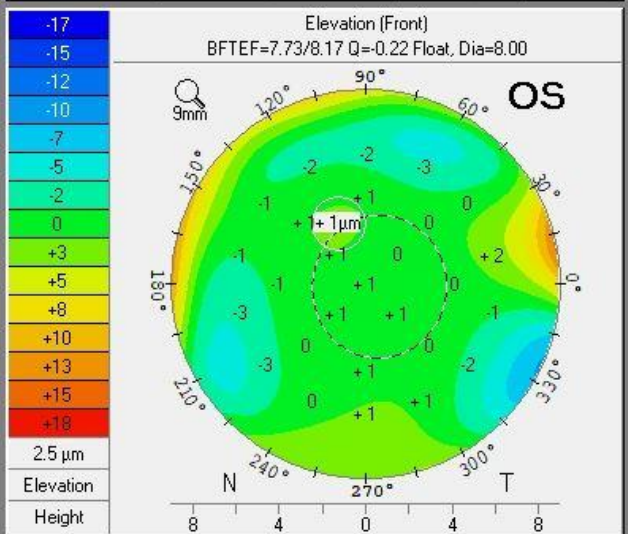
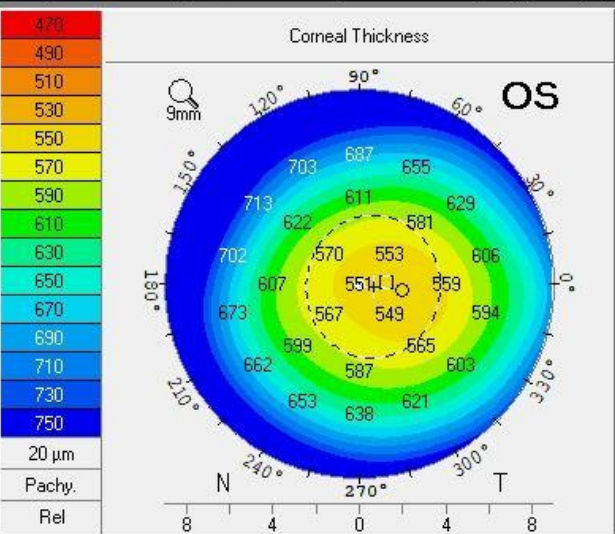
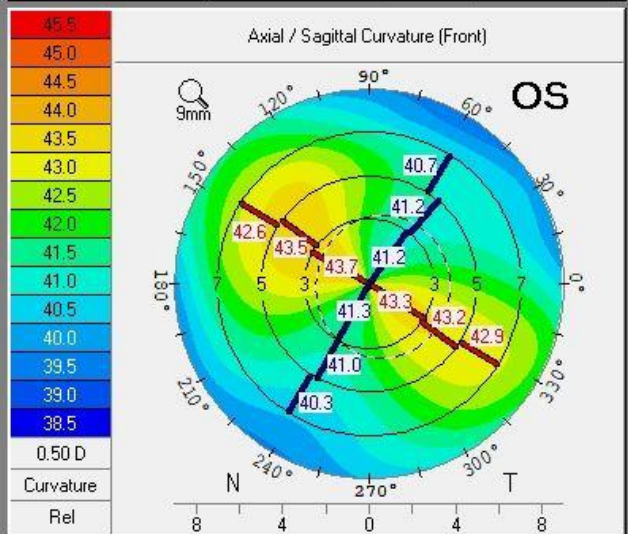
Last Name:
 First Name:
 ID:
 Date of Birth:
 Exam Date: 08/09/2022

Eye: Left
 Time: 15:29:08

Equiv K-Readings 65 (4.5mm Zone)

EKR65 Flat K1:	41.38 D (61 °)	Q (6.0mm):	-0.23
EKR65 Steep K2:	43.49 D (151 °)	Total SA: Z(4+6+8.0)	+0.151 μ
EKR65 Mean:	42.44 D	Radii Ratio (B/F):	80.2 %
Astig EKR65:	2.11 D	RMS HOA W/E (6mm)	0.366 μm

Pupil Dia:	+ 3.20 mm	x:	0.32 mm T	y:	0.07 mm I	(rel.VN)
HW/TW:	[] 11.7 mm	x:	0.61 mm T	y:	0.02 mm S	(rel.VN)
Pachy Min:	○ 544 μm	x:	0.98 mm T	y:	0.14 mm I	(rel.VN)
Est. Pre-Refr. Km	43.3 D	Refr. Change:	-0.9 D			
ACD (Ext.):	5.30 mm	Chord μ:	0.33 mm	QS:	OK	





RLE in Pre-Presbyopes



Reserved for our hyperopes

Hyperopia And Glaucoma

The prevalence of PACG scales with the amount of hyperopia !



HHS Public Access

Author manuscript

Ophthalmology. Author manuscript; available in PMC 2017 January 01.

Published in final edited form as:

Ophthalmology. 2016 January ; 123(1): 92–101. doi:10.1016/j.ophtha.2015.07.002.

The Association of Refractive Error with Glaucoma in a Multiethnic Population

Ling Shen, PhD^{1,2}, Ronald B. Melles, MD³, Ravikanth Metlapally, PhD⁴, Lisa Barcellos, PhD², Catherine Schaefer, PhD¹, Neil Risch, PhD^{5,6}, Lisa J. Herrinton, PhD¹, Christine Wildsoet, PhD⁴, and Eric Jorgenson, PhD¹

¹Division of Research, Kaiser Permanente Northern California, Oakland, California.

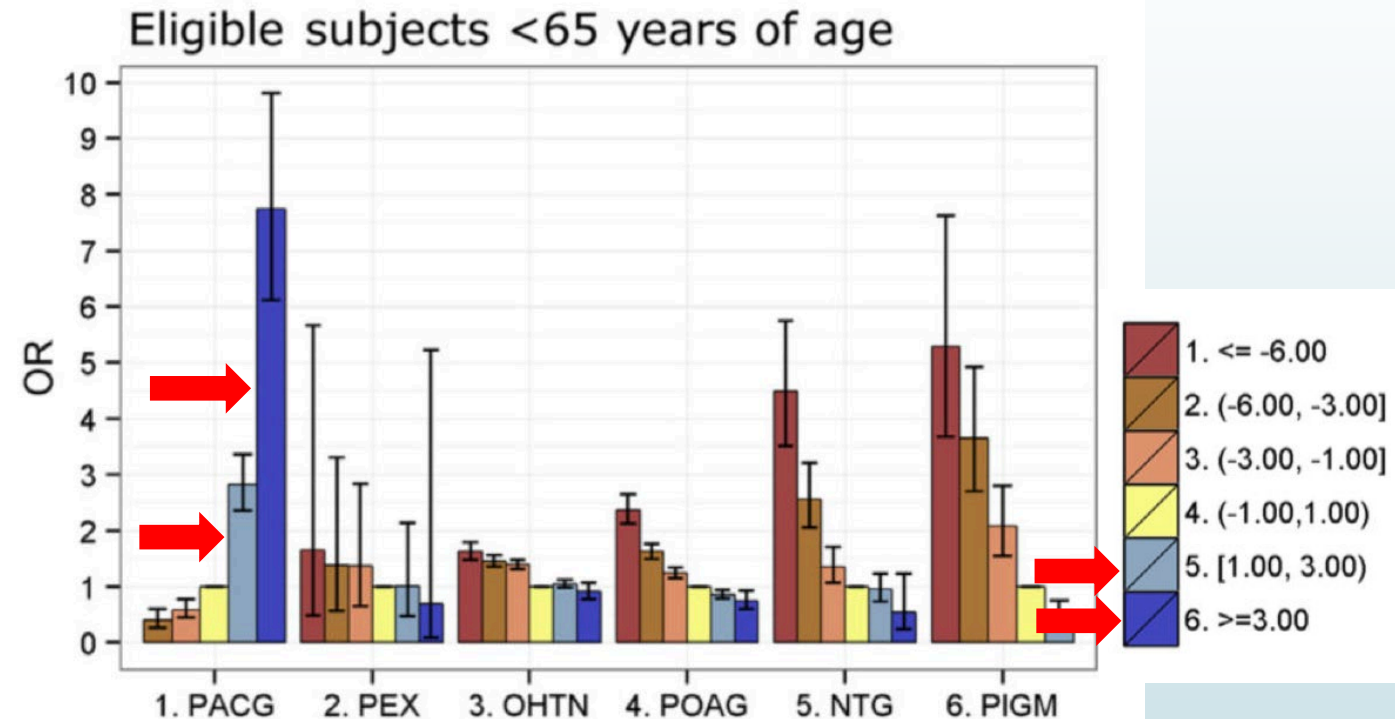
²Division of Epidemiology, School of Public Health, University of California - Berkeley, Berkeley, California.

³Department of Ophthalmology, Redwood City Medical Center, Kaiser Permanente Northern California, Redwood City, California.

⁴School of Optometry/Vision Science Program, University of California - Berkeley, Berkeley, California.

⁵Institute for Human Genetics, University of California San Francisco - San Francisco, California.

⁶Department of Epidemiology and Biostatistics, University of California - San Francisco, San Francisco, California.



Methods—We identified 34 040 members with glaucoma or ocular hypertension (OHTN; cases) and 403 398 members without glaucoma (controls). Glaucoma cases were classified as primary angle-closure glaucoma (PACG); 1 of the 4 forms of open-angle glaucoma: primary open-angle glaucoma (POAG), normal-tension glaucoma (NTG), pigmentary glaucoma (PIGM), and

Long-Term Effect of Early Phacoemulsification in Primary Angle Closure Glaucoma Patients with Cataract: A 10-Year Follow-Up Study

Hazem Helmy in Clinical Ophthalmology 2021:15 3969–3981

➤ Materials and Methods

➤ A prospective cohort long term follow-up study that included 102 eyes of 102 patients with PACG on medical treatment and reasonable cataract. Anterior chamber angle grade 2 or more according to Shaffer grading scale in 3 or all quadrants is an essential parameter in cases to be eligible for the study. All patients underwent phacoemulsification plus foldable IOL implantation.

➤ **Conclusion:** Phacoemulsification with IOL implantation is a safe and effective early modality for long-term control of IOP in PACG patients with coexisting cataract. The effects can persist for at least 10 years.

08.05.2023

Courtesy: O. Kermani

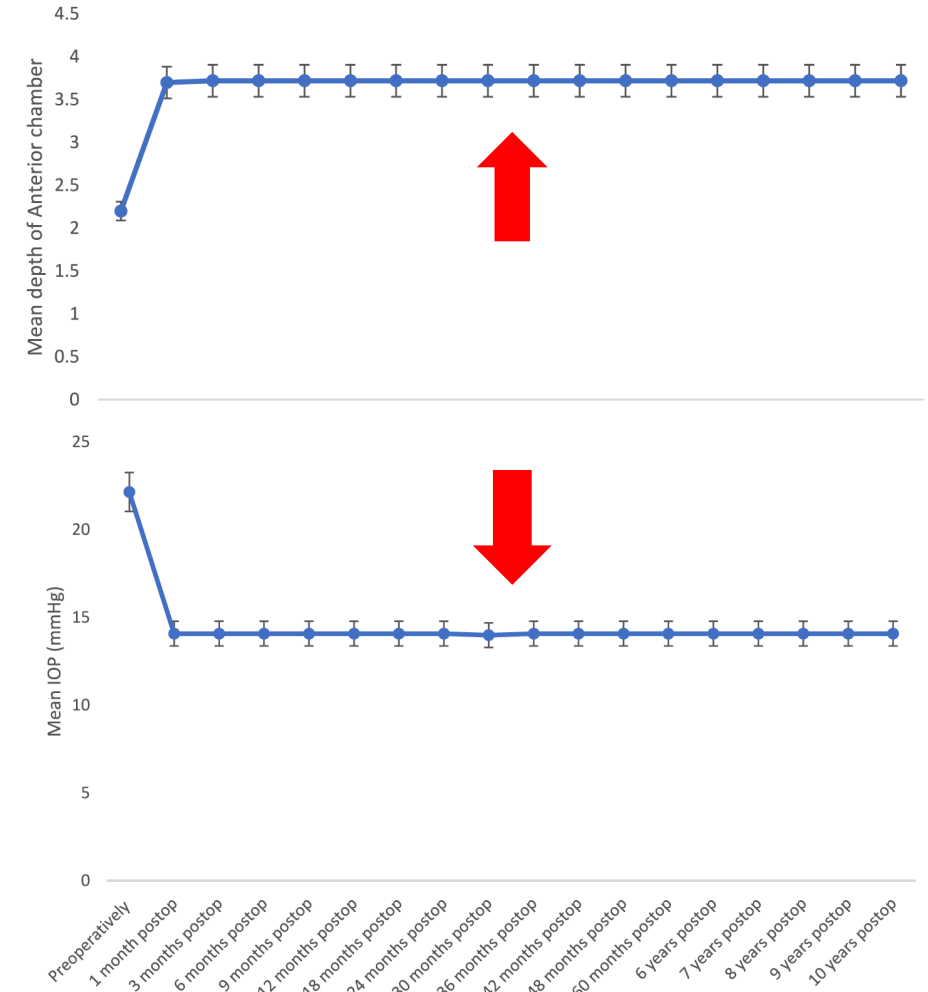


Figure 3 Line graph showing change in IOP pre and postoperatively among the studied patients.

RLE (>+3D / UCVA<20/40) In Non-Presbyopic Eyes

The Objectives Of Refractive Lens Exchange In Treatment Of Moderate And High Hyperopia:

Cost & Health Saving Procedure !

- **Approved procedure** (>8 Million/Year Phako & PCL in Europe)
- **Preventing** transformation to dysfunctional lens syndrome (**cataract**)
- **Preventing** PAC**Glaucoma** (less monitoring effort)
- **Less risky** than PIOL (crowded eye; multiple surgeries)
- **Better optical quality** compared to LVC (nodal point correction)
- **Stable correction** of total hyperopia (PCL doesn't change shape)

- **Loss of natural accommodation ?**
- High-end **pseudo-accommodative optics** available
- Excellent **neuro-adaption** in young adults
- Extremely **motivated patients**

Die Grillenmacher
Wallstadt



Hyperopia correction with glasses is stigmatizing and uncomfortable. Contact lenses are not well tolerated because of the optics thickness

Case 4

► 20 yo WF - Student

► Both glasses and CL are uncomfortable. CL dry out and specs are heavy on her nose.

Wears Spectacle:	OD: -7.25 Sph	OS: -7.00 -0.75 x 179
AR Dry:	OD: -7.25 -0.75 x 175	OS: -6.75 -1.25 x 170
MR Dry:	OD: -7.25 -0.75 x 170 = D 20/20. AW	OS: -6.50 -1.25 x 176 = D 20/20. AW
MR Wet:	OD: -7.50 -0.75 x 170 = D 20/20. AW	OS: -6.75 -1.25 x 176 = D 20/20. AW
CL Overrefraction:	OD: -4.50 Sph -1.75 -0.50 170 = D 20/20. AG	OS: -4.50 Sph -1.75 -1.00 176 = D 20/20. AG

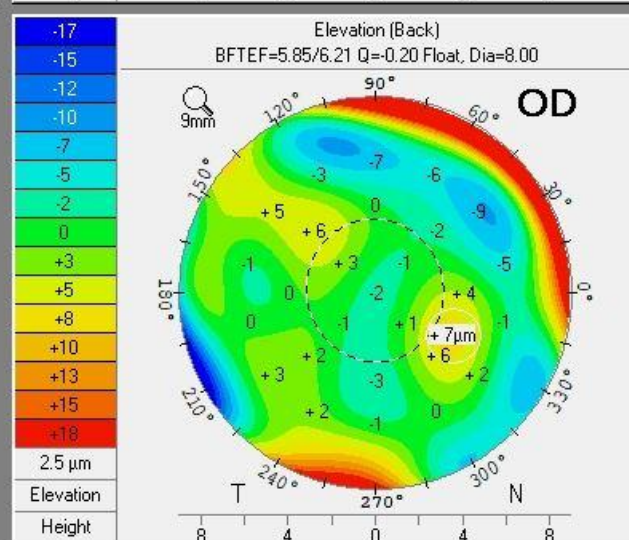
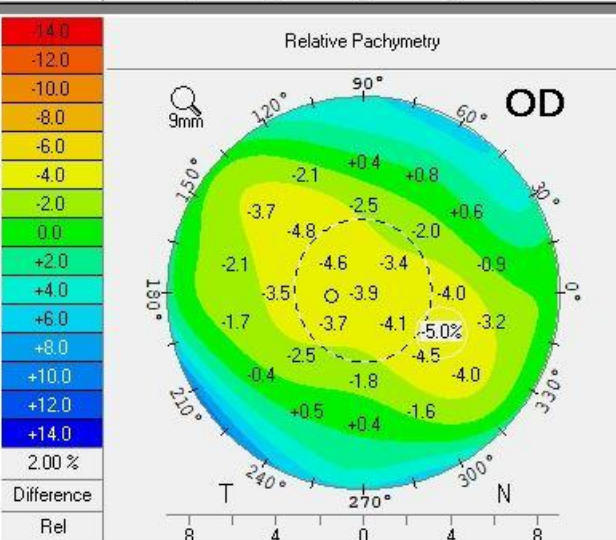
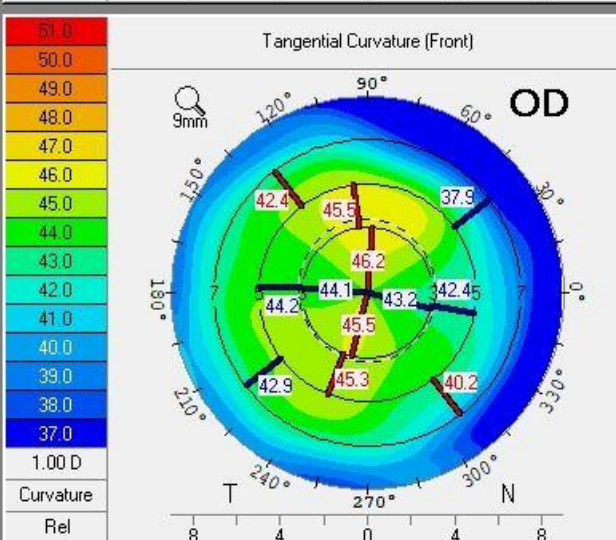
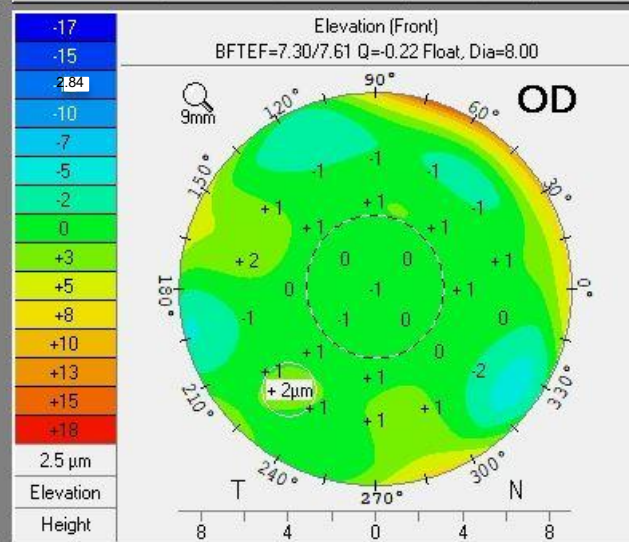
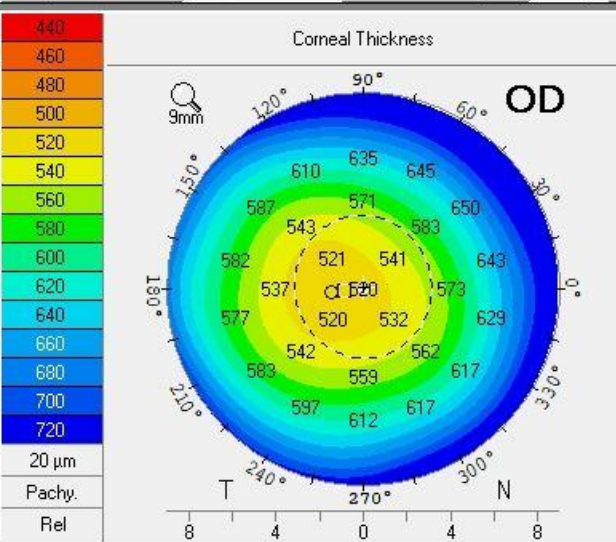
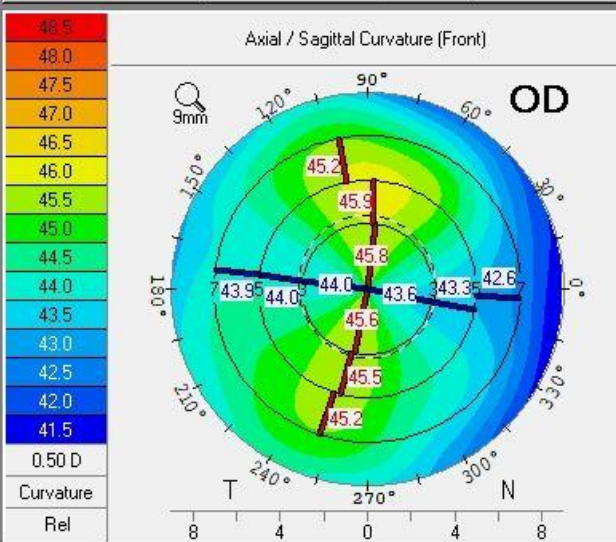
OCULUS - PENTACAM Holladay Report

1.22r09

Last Name: _____
 First Name: _____
 ID: _____
 Date of Birth: _____ Eye: Left Right
 Exam Date: Time:

Equiv K-Readings 65 (4.5mm Zone)			Details
EKR65 Flat K1:	43.61 D (171 °)	Q (6.0mm):	-0.15
EKR65 Steep K2:	45.28 D (81 °)	Total SA: Z(4+6+8.0)	+0.313 μ
EKR65 Mean:	44.44 D	Radii Ratio (B/F):	81.3 %
Astig EKR65:	1.67 D	RMS HOA WE (6mm)	0.434 μm

Pupil Dia:	+ 3.20 mm	x:	0.01 mm T	y:	0.05 mm S (rel.VN)
HWTW:	[] 12.2 mm	x:	0.43 mm T	y:	0.04 mm I (rel.VN)
Pachy Min:	○ 516 μm	x:	0.73 mm T	y:	0.07 mm I (rel.VN)
Est. Pre-Ref. Kn:	45.2 D	Refr.Chang: -0.5 D			
ACD (Ext.):	3.84 mm	Chord μ:	0.05 m	QS:	OK



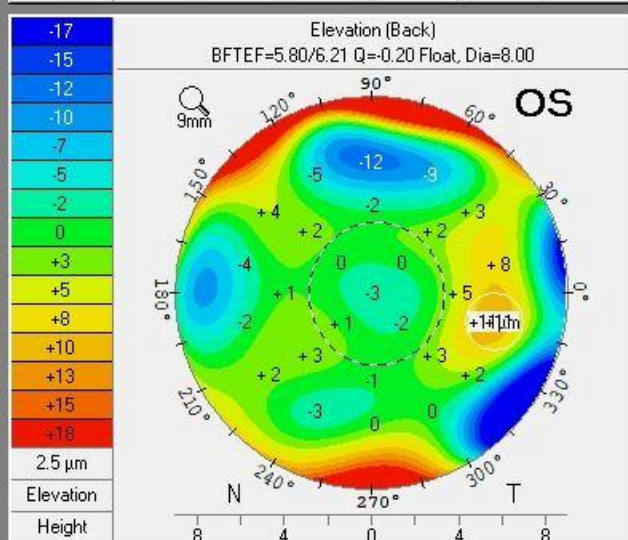
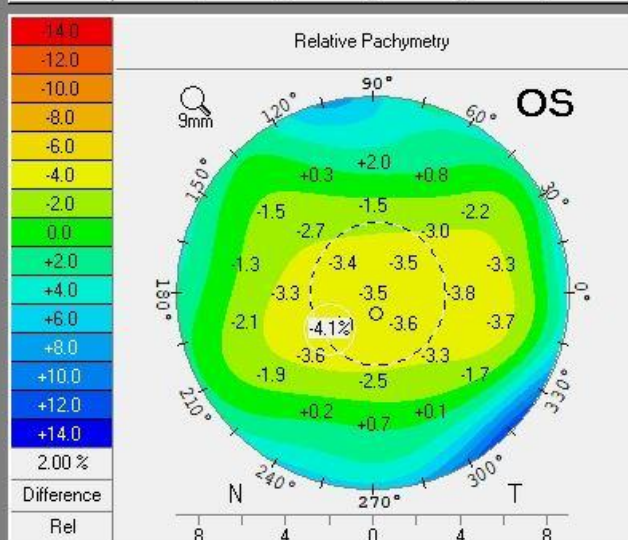
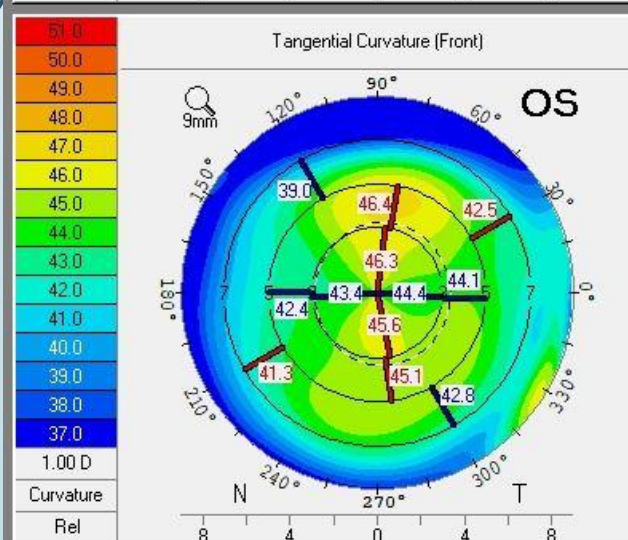
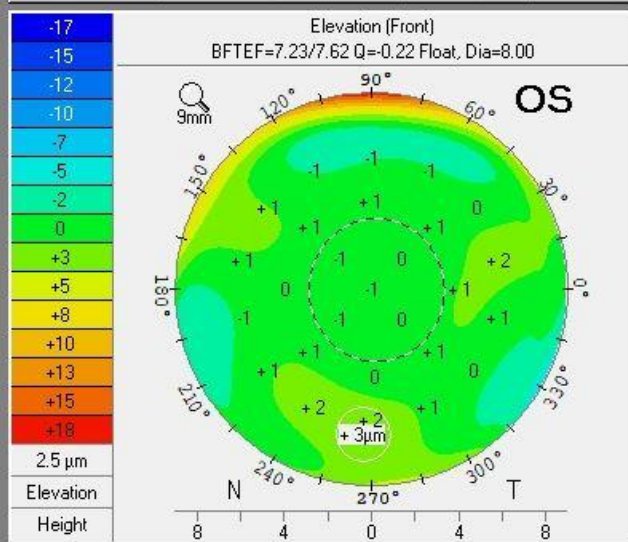
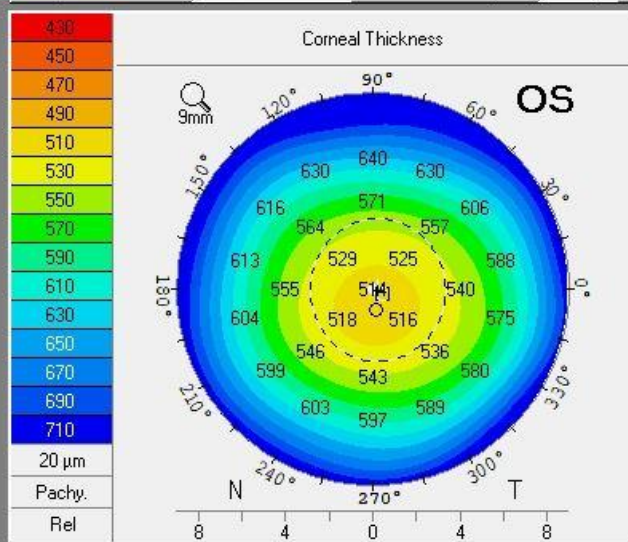
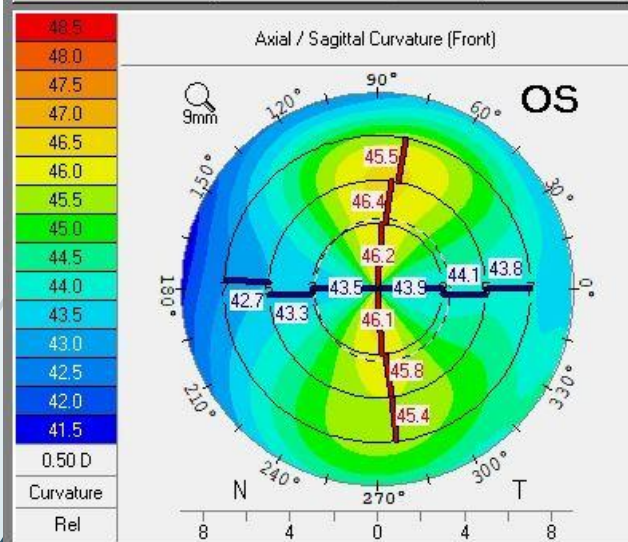
OCULUS - PENTACAM Holladay Report

1.22/09

Last Name: _____
 First Name: _____
 ID: _____
 Date of Birth: _____ Eye: Left
 Exam Date: 08/01/2022 Time: 10:16:42

Equiv K-Readings 65 (4.5mm Zone)			Details
EKR65 Flat K1:	44.11 D (178 °)	Q (6.0mm):	-0.14
EKR65 Steep K2:	46.27 D (88 °)	Total SA: Z(4+6+8,0)	+0.316 μ
EKR65 Mean:	45.19 D	Radii Ratio (B/F):	81.6 %
Astig EKR65:	2.16 D	RMS HOA WE (6mm)	0.434 μm

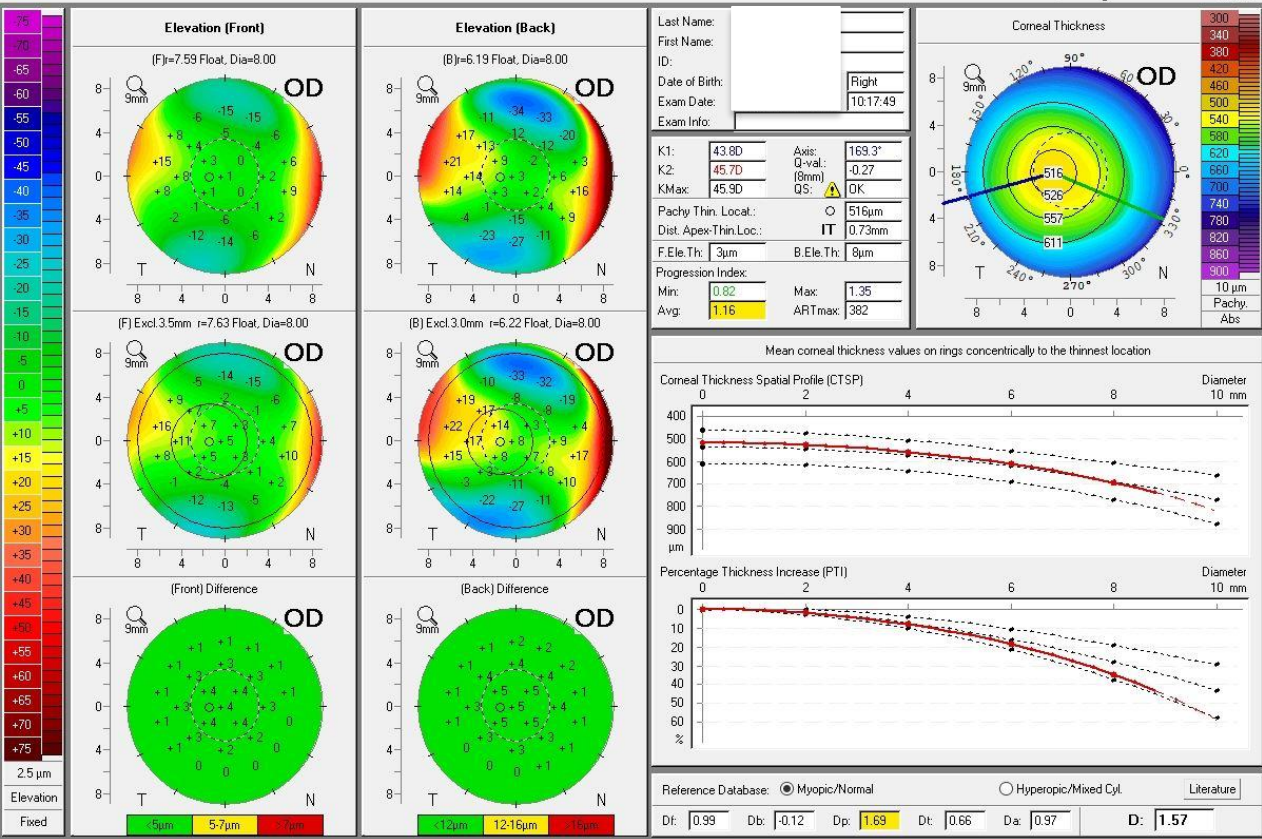
Pupil Dia:	+ 3.18 mm	x: 0.12 mm T	y: 0.03 mm I	(rel.VN)
HWTW:	[] 12.3 mm	x: 0.22 mm T	y: 0.10 mm I	(rel.VN)
Pachy Min:	○ 512 μm	x: 0.07 mm T	y: 0.46 mm I	(rel.VN)
Est. Pre-Ref. Kr	45.3 D	Refr.Chang -0.4 D		
ACD [Ext.]:	3.80 mm	Chord μ:	0.12 m	QS: OK





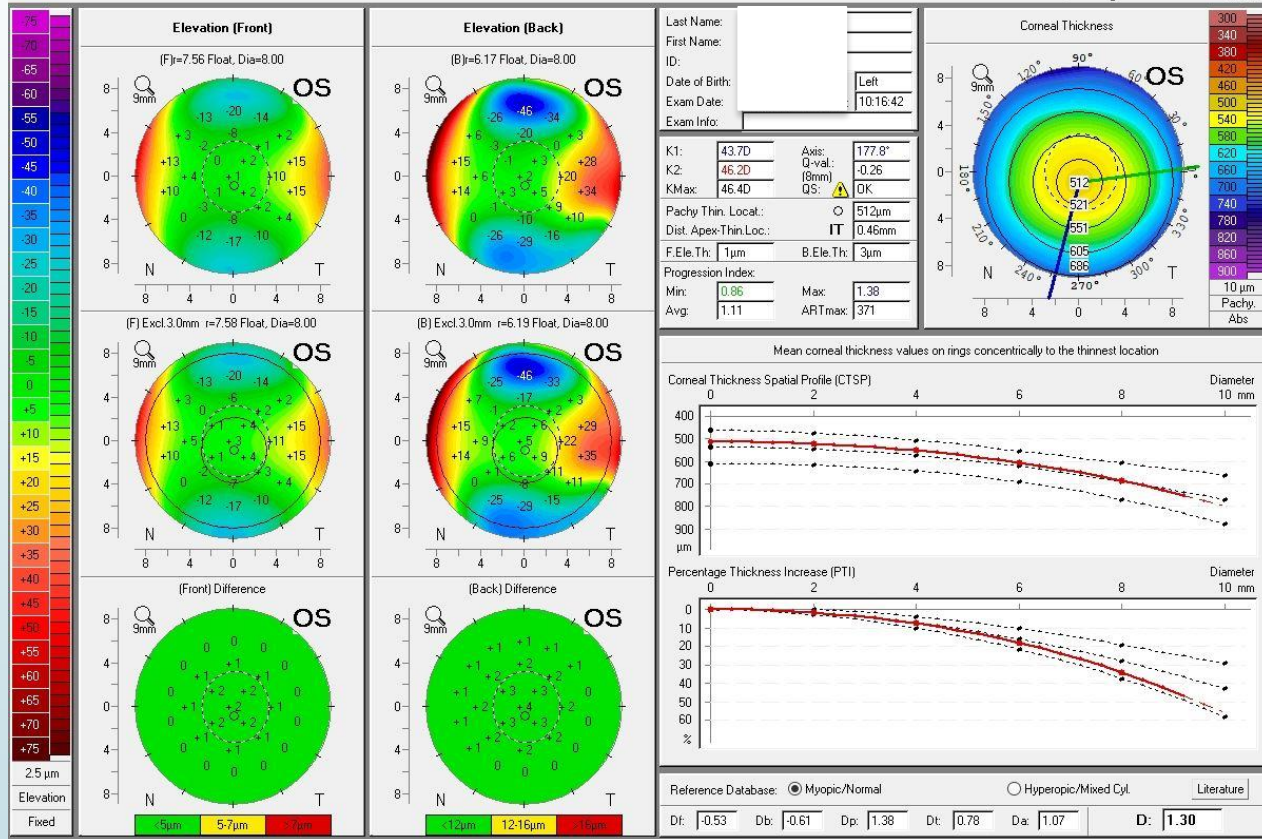
OCULUS - PENTACAM Belin/Ambrósio Enhanced Ectasia Display

1.22.09

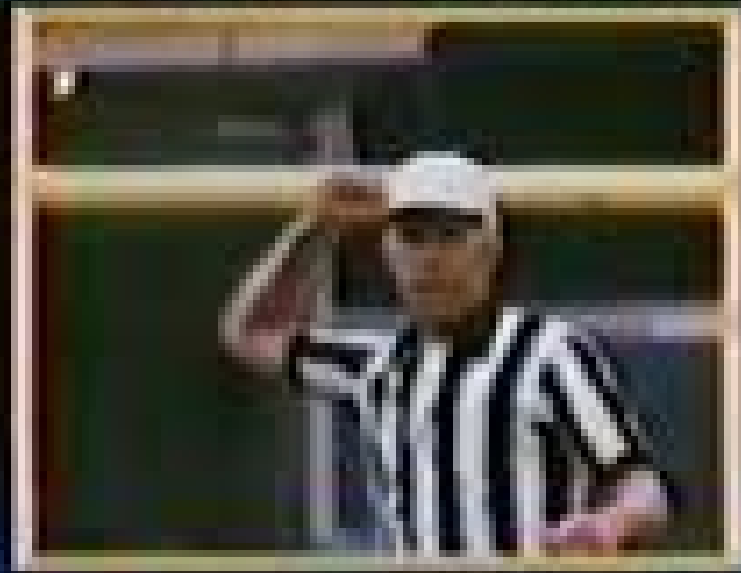


OCULUS - PENTACAM Belin/Ambrósio Enhanced Ectasia Display

1.22.09



Presenting



You Make The Call

When poll is active, respond at pollev.com/sandberg

Text **SANDBERG** to **22333** once to join

What procedure would you recommend for this patient?

LASIK

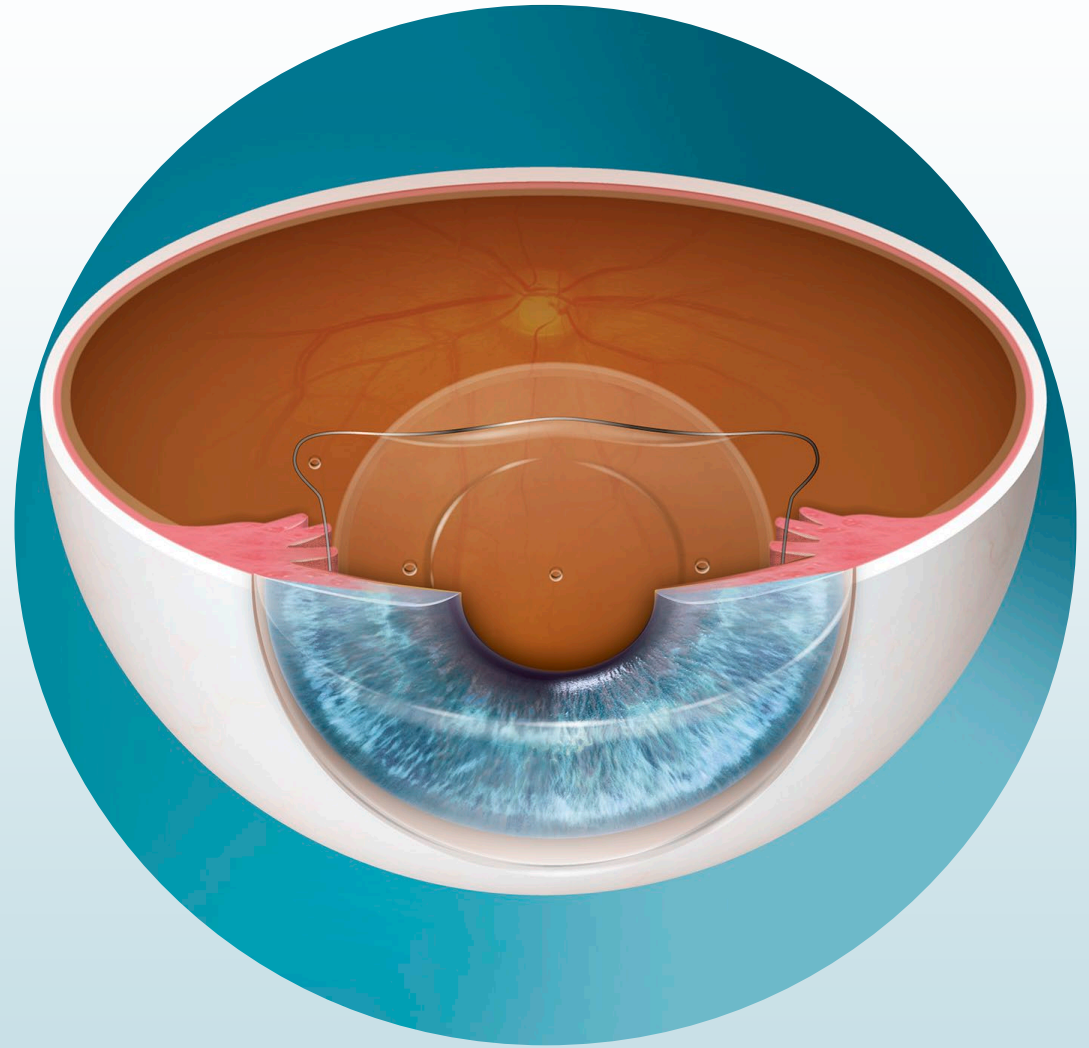
PRK

SMILE

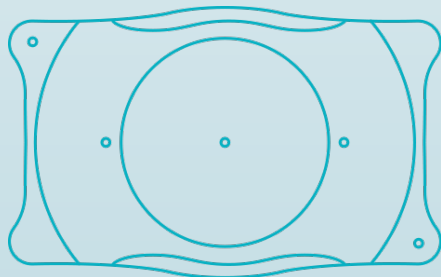
ICL

NO Surgery

*The Case
for Phakic
IOLs
aka
EVO ICL*



The CASE for
EVO Visian ICL



1,000,000+
ICLs WORLDWIDE



What can we correct with toric ICLs?

- ▶ Up to 16D of myopia
- ▶ 4D astigmatism
- ▶ BUT really....
- ▶ 20D of myopia and 6D of astigmatism
- ▶ So a **-15.00 -4.00 x 180**

Low Hanging Fruit: Non-LVC Candidates

- ICL Predictability: 90% +/- 0.50 D, 99% +/- 0.75 D

ORIGINAL ARTICLE

Phakic Intraocular Lens Implantation in United States Military Warfighters: A Retrospective Analysis of Early Clinical Outcomes of the Visian ICL

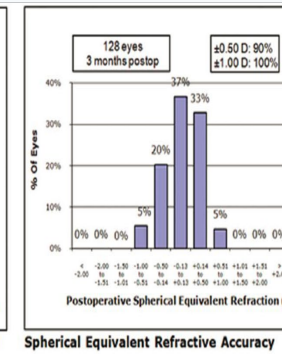
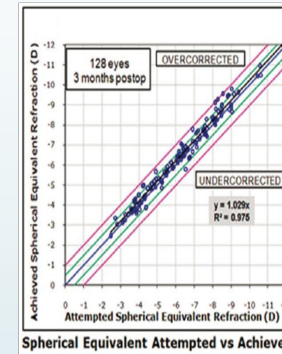
MAJ Gregory D. Parkhurst, MD; LTC Maximilian Psolka, MD; Guy M. Kezirian, MD, FACS

ABSTRACT

PURPOSE: To assess short-term clinical outcomes after implantation of phakic intraocular lenses (Visian ICL).

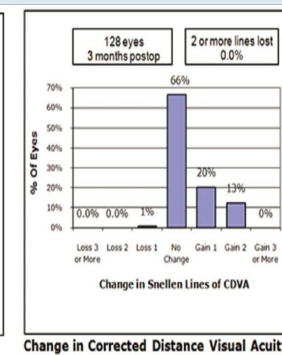
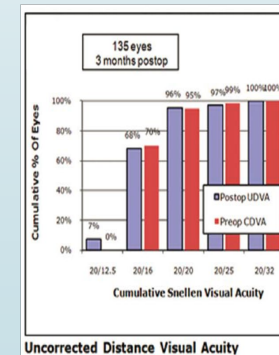
The United States Army Warfighter Refractive Eye Surgery Program was designed to reduce the limitations posed by corrective eyewear in combat arms soldiers. Refractive surgery is offered as an elective procedure

Journal of Refractive Surgery: Indications for ICL surgery in the Military Vol.27;7, July 2011, pages 473-481



ICL Visual Acuity

- ICL Visual Acuity



A prospective comparison of phakic collamer lenses and wavefront-optimized laser-assisted in situ keratomileusis for correction of myopia

[Gregory D Parkhurst](#)^{1,2}

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This article has been [cited by](#) other articles in PMC.

Abstract

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Purpose

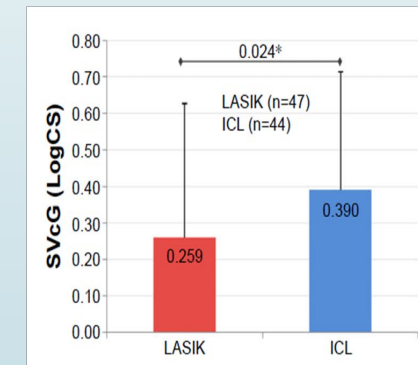
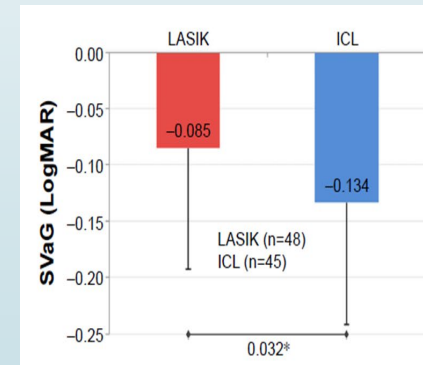
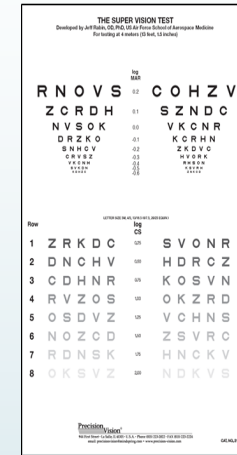
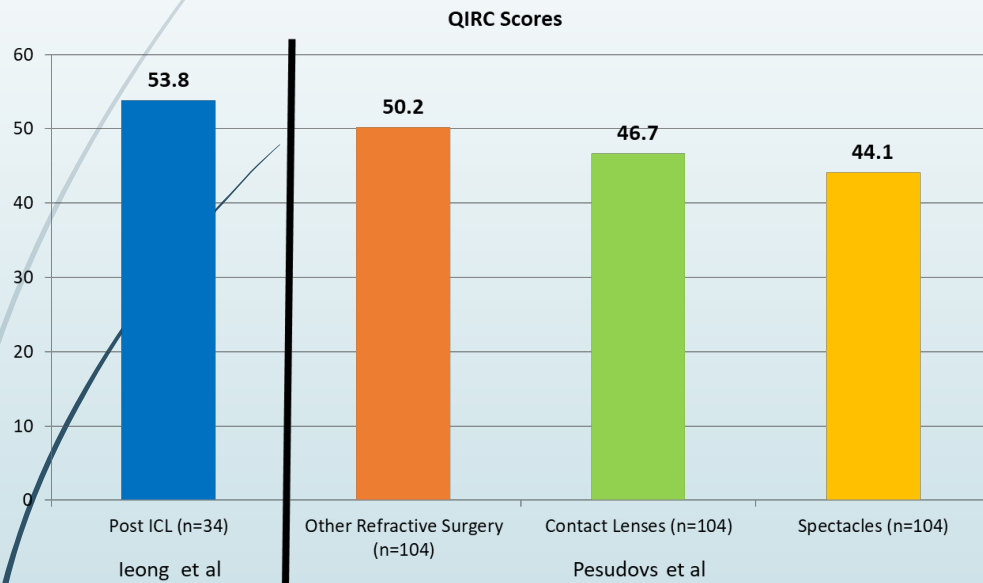
The aim of this study was to evaluate and compare night vision and low-luminance contrast sensitivity (CS) in patients undergoing implantation of phakic collamer lenses or wavefront-optimized laser-assisted in situ keratomileusis (LASIK).

Patients and methods

This is a nonrandomized, prospective study, in which 48 military personnel were recruited. Rabin Super Vision Test was used to compare the visual acuity and CS of Visian implantable collamer lens (ICL) and LASIK groups under normal and low light conditions, using a filter for simulated vision through night vision goggles.

Phakic IOLs Only for Non-LVC Candidates?

Visian ICL™ Quality of Life vs. Glasses, Contact Lenses and LASIK



1. leong A, Hau, S, Rubin GS, Allan, B. Quality of Life in High Myopia before and after Implantable Collamer Lens Implantation. Ophthalmology 2010; 117:2295-2300
2. Pesudovs K, Garamendi E, Elliott DB. A quality of life comparison of people wearing spectacles or contact lenses or having undergone refractive surgery. J Refract Surg 2006; 22:19-27.

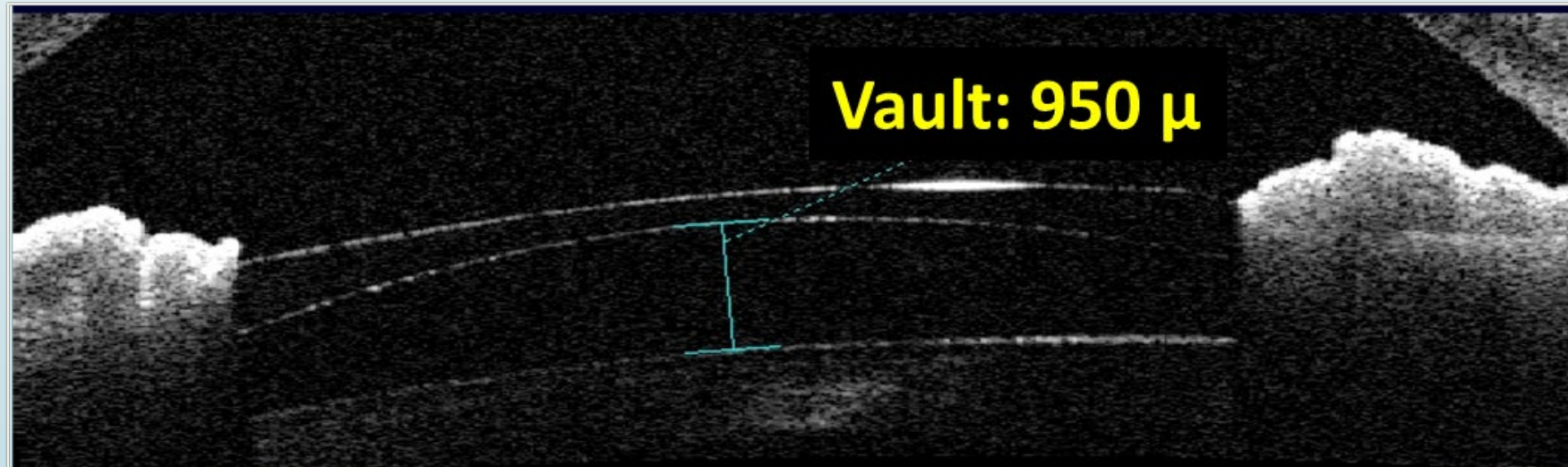
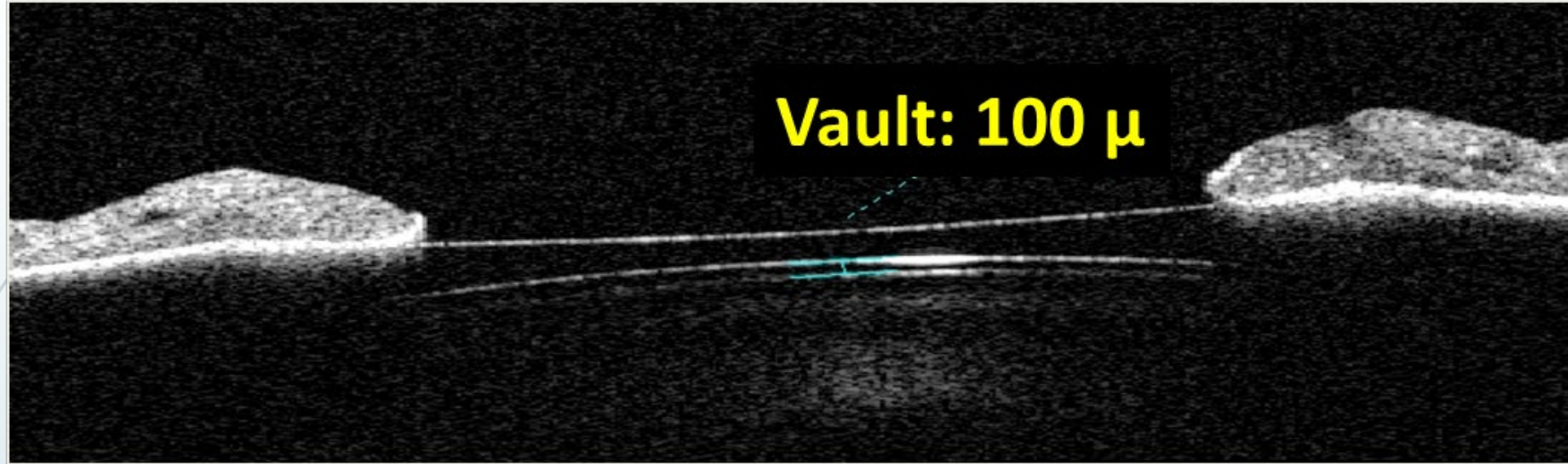
1. Parkhurst GD. A prospective comparison of phakic collamer lenses and wavefront-optimized laser-assisted in situ keratomileusis for correction of myopia. Clin Ophthalmol. 2016 Jun 29;10:1209-15.

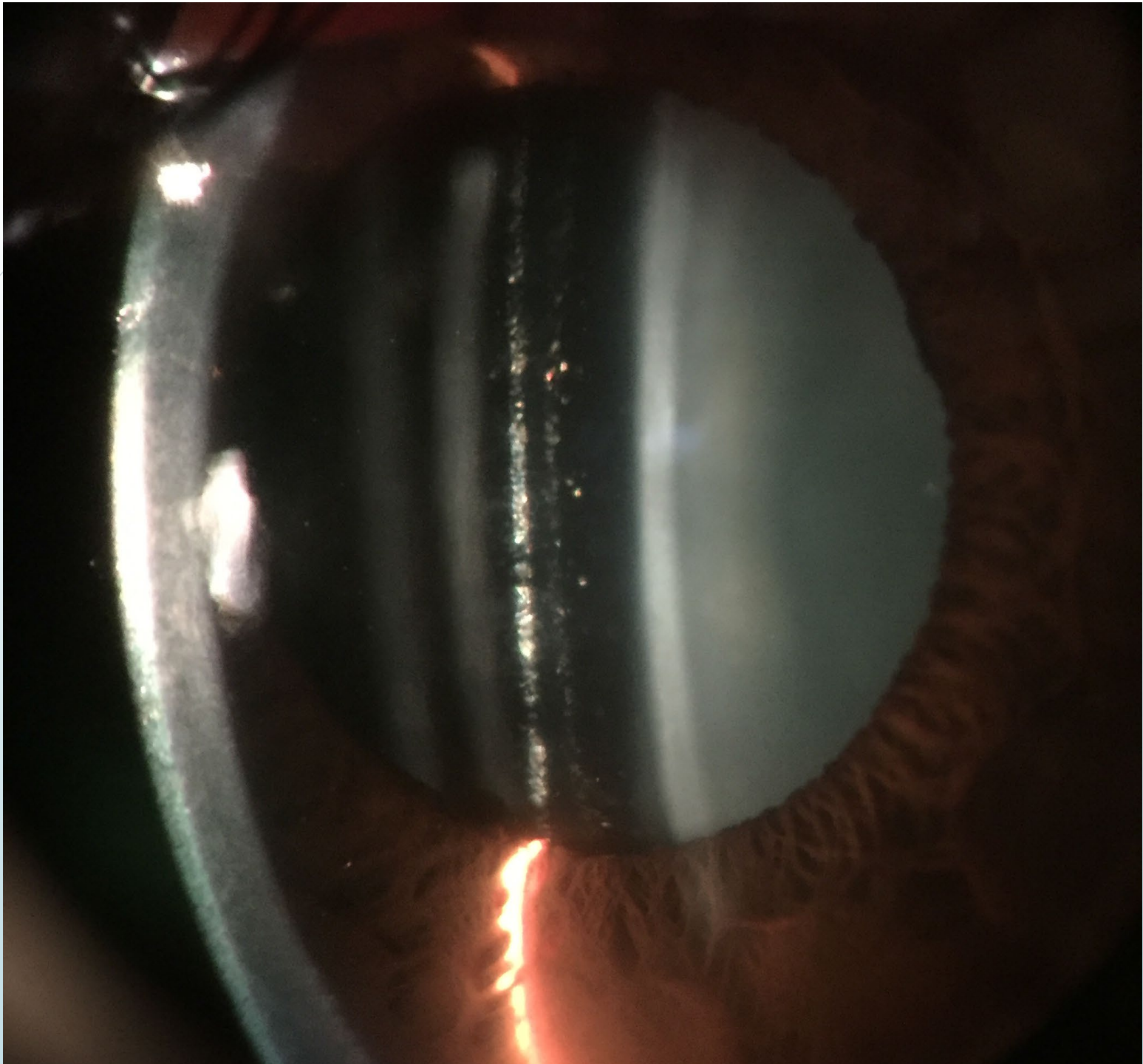
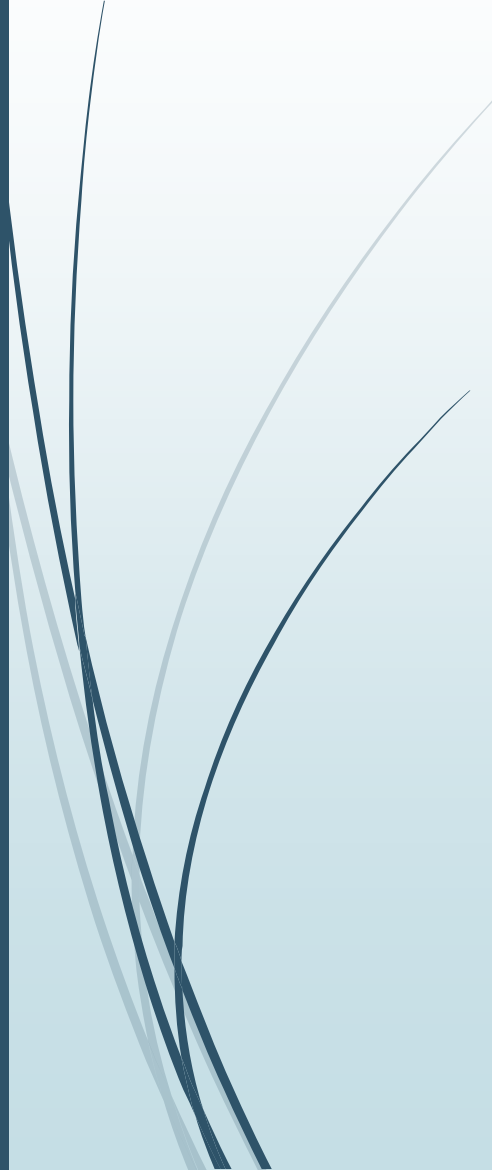
EVO ICL Co-management - IV

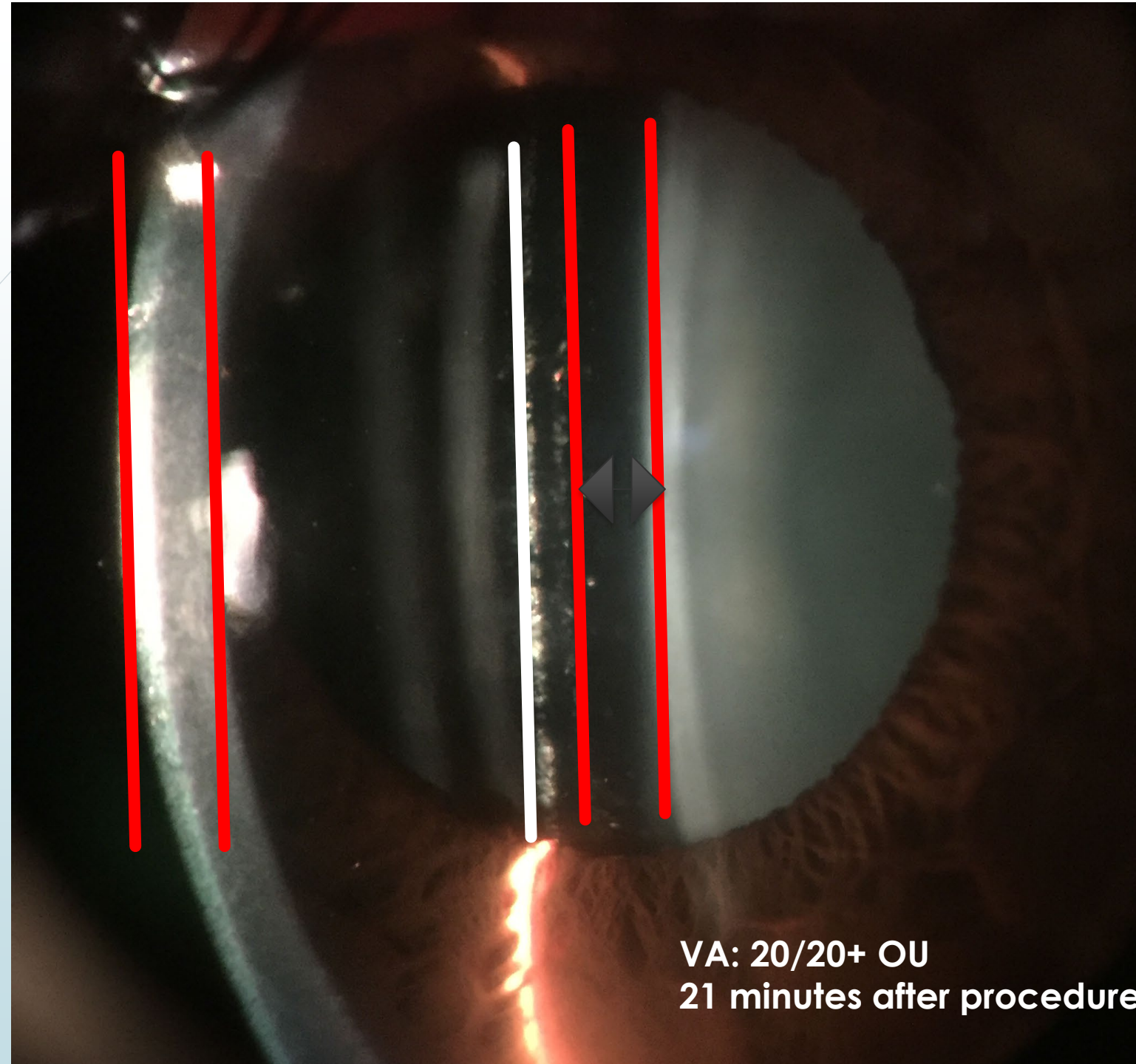
- ▶ Pre & Postop Care Similar to Cataract Surgery
- ▶ Monitor IOP
- ▶ Assess Vault - Ideal is typically between 0.5 CCT and 1.75 CCT



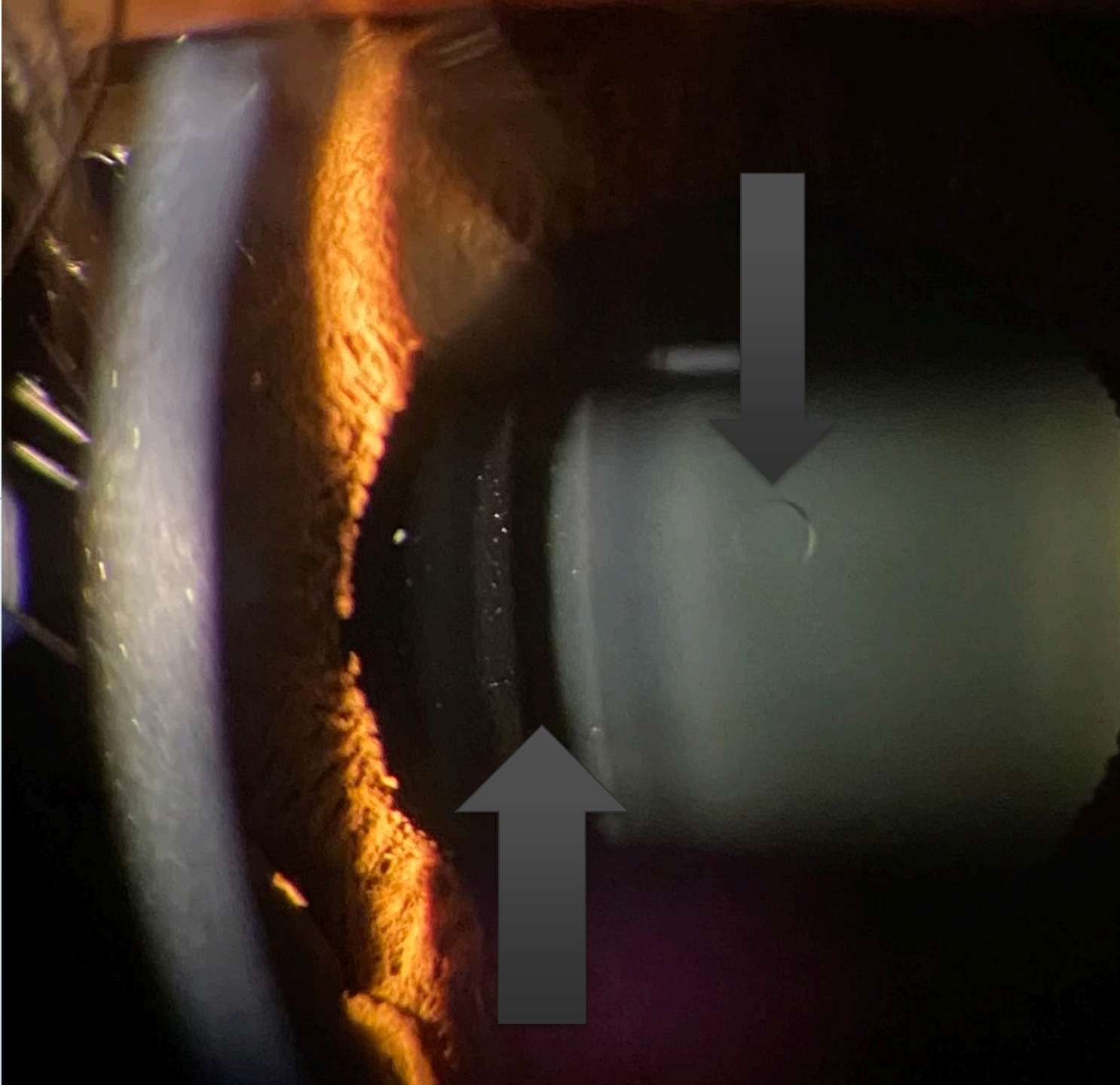
Assessment of Vault

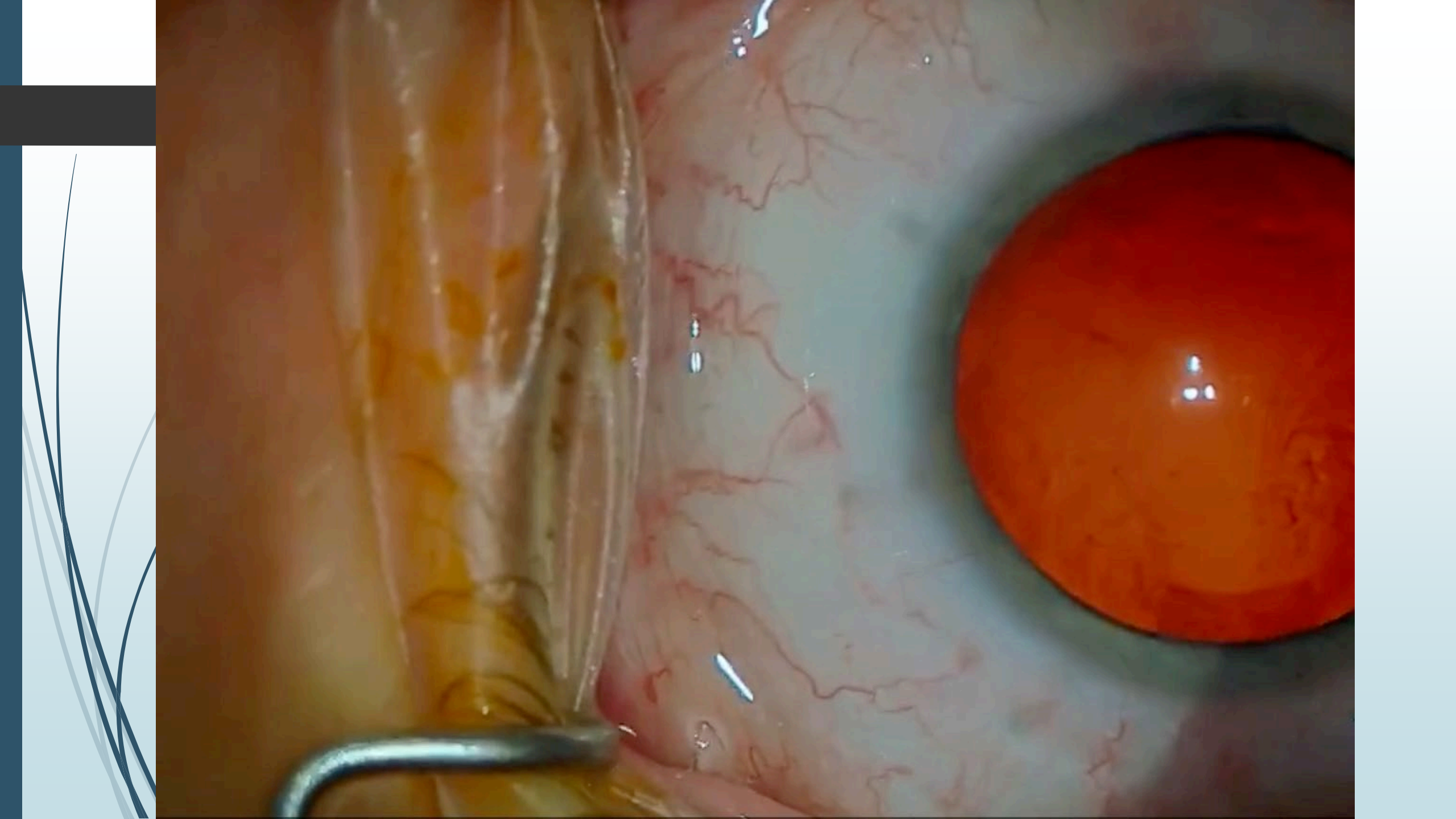




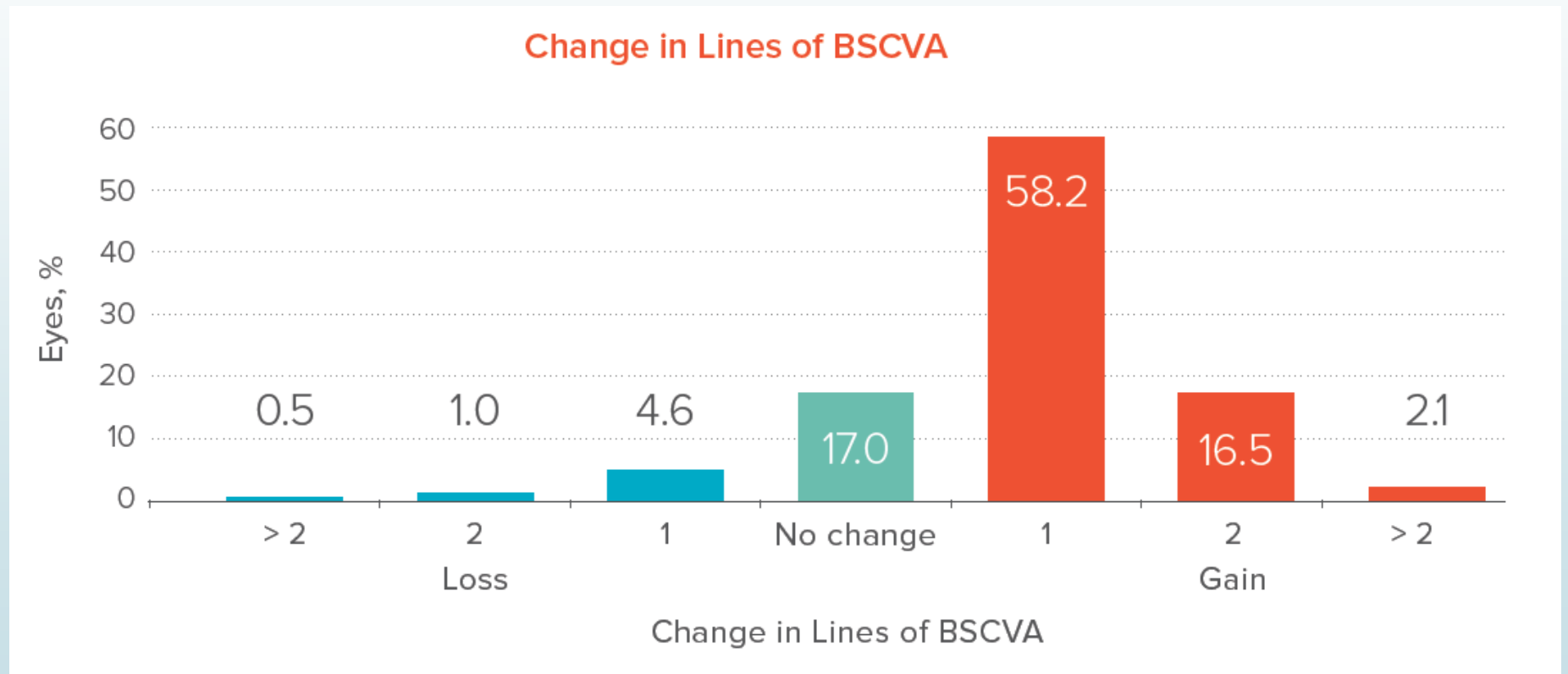


VA: 20/20+ OU
21 minutes after procedure





Visian Toric ICL – FDA Study: Change in BSCVA³



The Implantable Collamer Lens with a central port: review of the literature

[Mark Packer](#)

▸ [Author information](#) ▸ [Copyright and License information](#) [Disclaimer](#)

This article has been [cited by](#) other articles in PMC.

Abstract

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The purpose of this review is to summarize preclinical and clinical data from publications appearing in the peer-reviewed scientific literature relevant to the safety and effectiveness of the EVO Implantable Collamer Lens (ICL) posterior chamber phakic refractive lens with a central port (V4c Visian ICL with KS Aquaport, STAAR Surgical, Inc.). A literature search was conducted using [PubMed.gov](https://pubmed.ncbi.nlm.nih.gov/) to identify all articles relating to the EVO ICL. Articles were examined for their relevance, and the references cited in each article were also searched for additional relevant publications. On the basis of a total of 67 preclinical studies and clinical reports, including effectiveness data on 1,905 eyes with average weighted follow-up of 12.5 months and safety data on 4,196 eyes with weighted average follow up of 14.0 months, the EVO ICL is safe and effective for the correction of a broad range of refractive errors. High levels of postoperative uncorrected visual acuity, refractive predictability, and stability demonstrate the effectiveness of the EVO ICL. Safety data suggest reduced rates of anterior subcapsular cataract and pupillary block compared with earlier models. Improved safety and proven effectiveness make EVO an attractive option for surgeons and patients.

Keywords: myopia, astigmatism, hyperopia, phakic refractive lens



3 takeaways from this study



1. Cataracts

No visually significant cataracts have been reported to date following EVO implantation with up to 5 years of follow-up,



2. Fluid Dynamics

“unperforated ICLs cause cataracts, but placing a hole in the center of the optic appears to prevent the development of a secondary cataract. In addition, it was found that, even if the hole diameter is only 1.0 mm, cataracts can be prevented. The mechanism of cataract prevention is considered to be related to the aqueous humor circulation.”



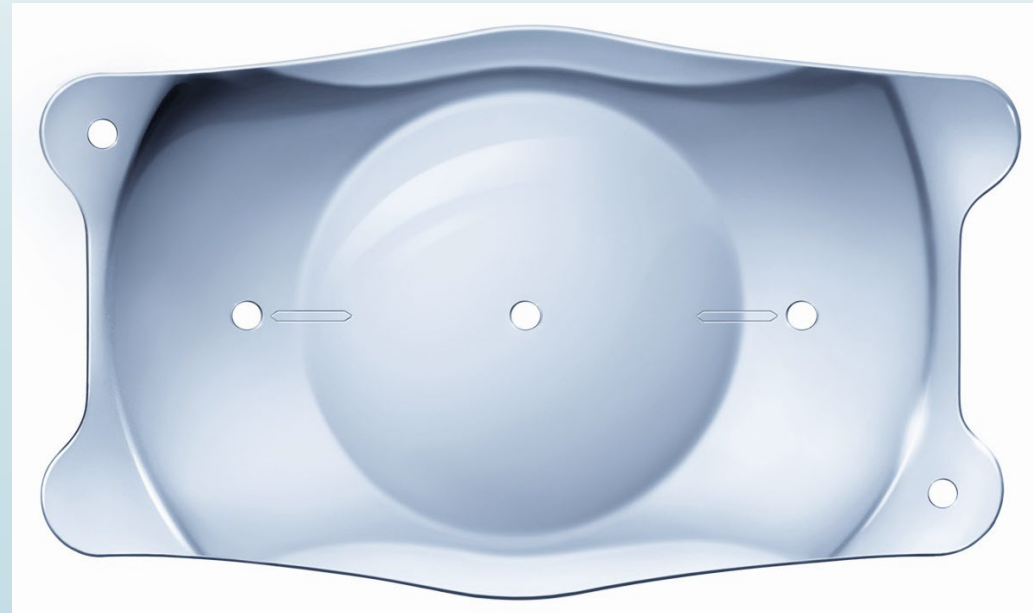
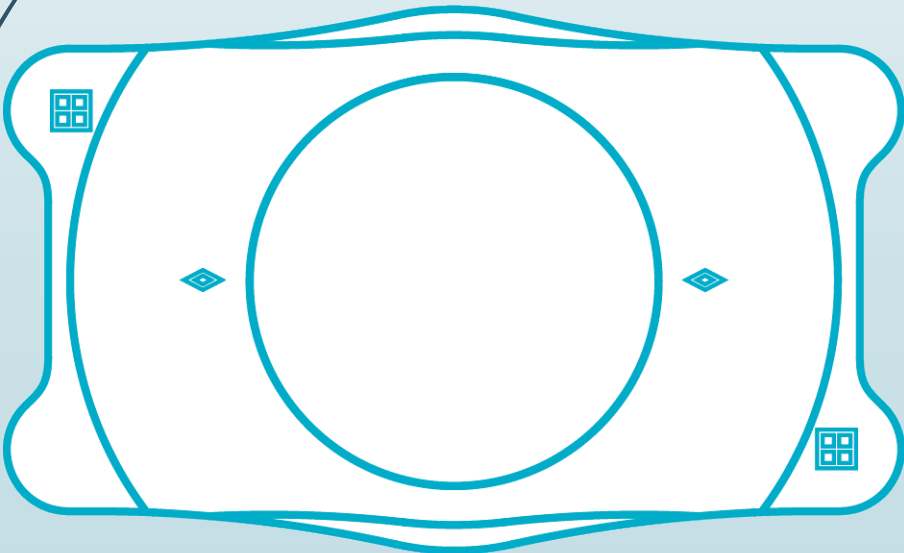
3. Visual Quality

- ▶ No difference in MTF
- ▶ No difference in aberration analysis
- ▶ No difference in vision analysis
 - ▶ Central hole in ICL v normal ICL

“DOES NOT COMPROMISE OPTICAL QUALITY”

s/p toric ICL

- ▶ 1 day post op OD 20/15- OS 20/20-
- ▶ 1 week post op OD 20/15- OS 20/20-
- ▶ 1 month post op OD 20/15- OS 20/20-



Performance and Safety of the Extended Depth of Focus Implantable Collamer® Lens (EDOF ICL) in Phakic Subjects with Presbyopia

Mark Packer,¹ Jose F Alfonso,² Jaime Arambert,³ Daniel Elies,⁴ Joaquin Fernandez,⁵ and Erik Mertens⁶

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This article has been corrected. See [Clin Ophthalmol. 2020 October 09; 14: 3065.](#)

Abstract

[Go to:](#) ►

Purpose

To evaluate the performance and safety of the Extended Depth of Focus Implantable Collamer® Lens (EDOF ICL) for improvement of uncorrected near, intermediate and distance visual acuity in phakic subjects with myopia and presbyopia.

Design

Prospective multicenter study.

Methods

Presbyopic subjects who required an EDOF ICL in the range of -0.50 D to -18.00 D, exhibited ≤ 0.75 D refractive astigmatism and required from $+1.00$ to $+2.50$ D reading add were implanted bilaterally. Assessments at 6 months included uncorrected near, intermediate and distance visual acuities, defocus curves, contrast sensitivity, responses to the National Eye Institute Refractive Error Quality of Life Questionnaire and a Task Assessment Questionnaire.

Results

A total of 34 subjects completed the study. Investigators targeted emmetropia in all eyes. Mean binocular uncorrected near, intermediate and distance visual acuities measured logMAR -0.01 ± 0.05 (20/20), -0.02 ± 0.08 (20/19) and 0.07 ± 0.10 (20/23), respectively. Mean monocular uncorrected near, intermediate and distance visual acuities measured logMAR 0.068 ± 0.09 (20/23), 0.062 ± 0.10 (20/23) and 0.16 ± 0.12 (20/29). There were no clinically or statistically significant differences in contrast sensitivity between baseline and 6 months under any testing conditions. Subjects reported significant improvements in measures of vision-related quality of life and ability to perform tasks at all distances without glasses or contact lenses. Overall, satisfaction with the EDOF ICL was high: postoperatively, 91.2% of subjects were satisfied with their vision.

Conclusion

This multicenter, prospective clinical investigation demonstrated the ability of the EDOF ICL to correct myopia and presbyopia, resulting in improvement of uncorrected near, intermediate and distance visual acuity without compromising the quality of vision. The EDOF ICL allowed subjects to perform tasks of daily living without glasses or contact lenses. Subjects reported significant improvements in quality of life with high levels of spectacle independence and satisfaction.

Keywords: presbyopia, myopia, phakic refractive lens, implantable Collamer lens



EVO VIVA

If you were having cataract surgery tomorrow, which lens would you choose?

Monofocal

Monofocal near target

Panoptix

Synergy

Vivity/Eyhance - EDOF

LAL

Blended Vision

SBL-3

Case 5: 57yo WM, h/o LASIK OS only

Visual Acuity: **OD:** Dsc: 20/150+1 Nsc: J6 PH: 20/30+2 **OS:** Dsc: 20/20 Nsc: J6

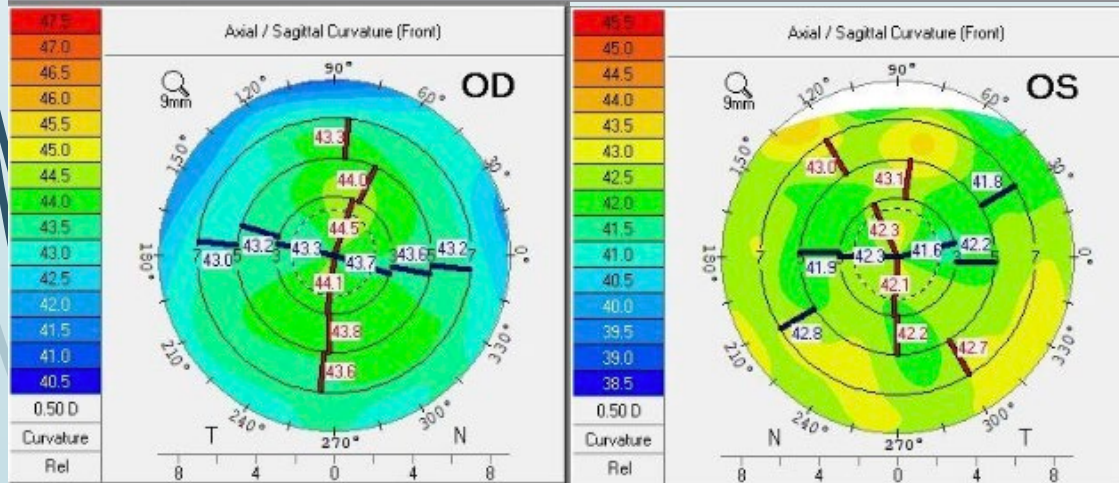
Dominant Eye: OS

Keratometry: **OD** K1: 43.75 @ 158 K2: 44.25 @ 68 Astig: 0.5 **OS** K1: 42.00 @ 4 K2: 42.50 @ 94 Astig: 0.5

IOP: iCare OD: 9 OS: 7 10:18 AM

Dilation: OU Tech: GM 10:28 AM Proparacaine 0.5%; Tropicamide 1%; Phenylephrine 2.5%

Spectacle: • AR Dry: OD: -4.00 -0.25 x 126 OS: +0.50 -0.25 x 177



Why didn't they do LASIK on the other eye?

Which lens would you use for this Patient?

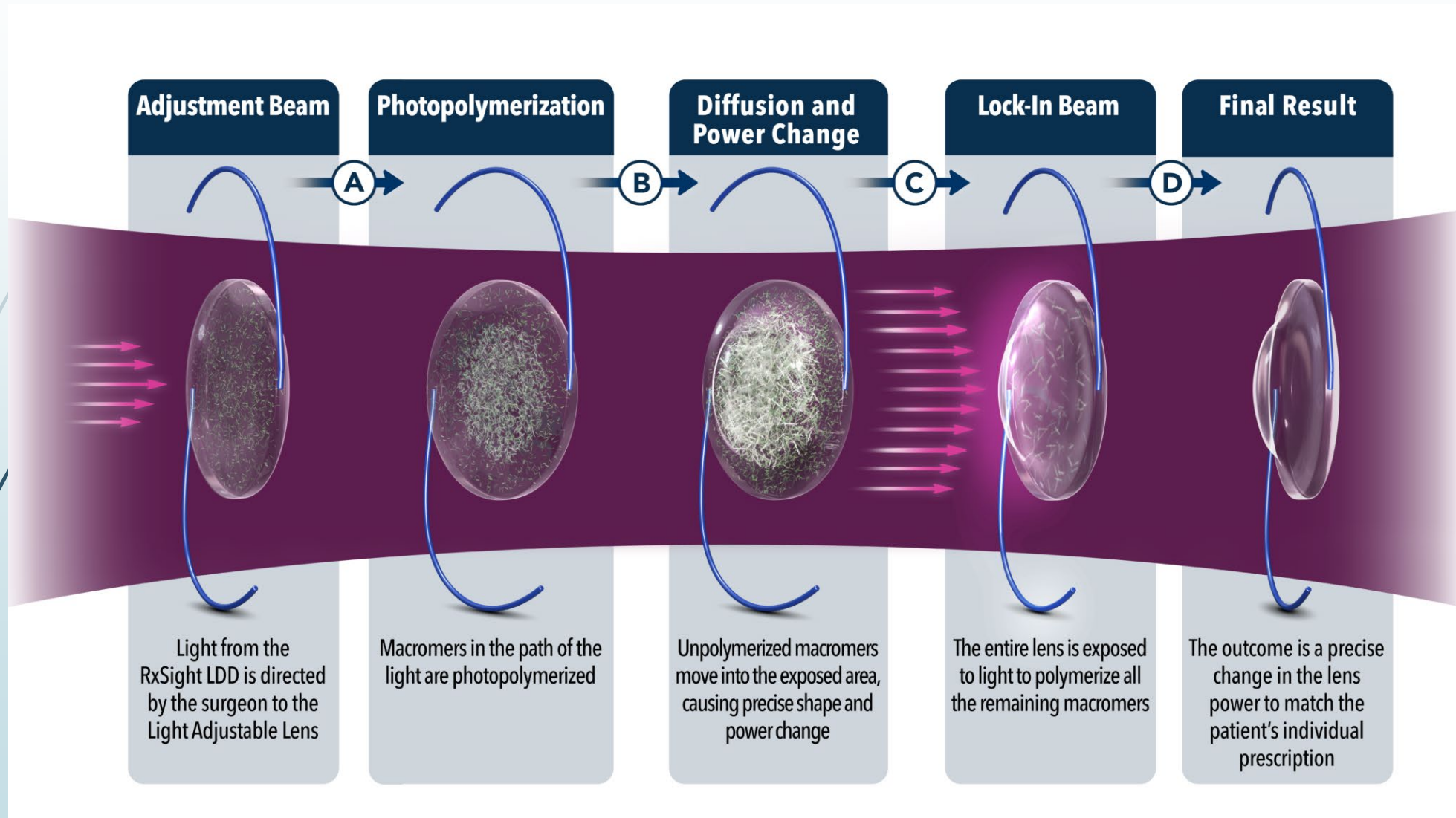
THE LIGHT ADJUSTABLE LENS

Light Delivery Device

- UV light projection system
- Anterior segment biomicroscope, projection screen, electronic control and a UV source
- Focused through a lens on the cornea
- Can treat -2.00D to +2.00D sphere and -0.50DC to -2.00DC



The Light Adjustable Lens (LAL)





Post ops

- ▶ 1 day post op (-0.75sph target): 20/30, J1, J1
- ▶ 1 week post op: 20/25, J1, J1
- ▶ 1 month post op: 20/30-2, J1, J1
 - ▶ -1.25-0.50x144 20/15
- ▶ 1st treatment
- ▶ 20/15, J1, J1
 - ▶ Mrx -1.00 -0.25 x 144 -----> **LOCK IN**

Case 6

- ▶ 55 AAM – Works in IT, but enjoys the outdoors. Hates his glasses
 - ▶ Oc Hx: RK OU 1991

Visual Acuity: OD:	Dsc: 20/50-2	Nsc: J8-2	Dcc: 20/20-1	OS:	Dsc: 20/30-2	Nsc: J8-1	Dcc: 20/25-1	PH: 20/20-1
Dominant Eye:	OD							
Keratometry:	OD K1: 36.75 @ 113 K2: 37.75 @ 23 Astig: 1 OS K1: 37.00 @ 41 K2: 39.50 @ 131 Astig: 2.5							
IOP:	iCare OD: 12 OS: 14 9:44 AM							
Dilation:	OU Tech: BS 9:55 AM Proparacaine 0.5%; Tropicamide 1%; Phenylephrine 2.5%							
Spectacle:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Wears Spectacle:	OD: +2.75 -1.25 x 001 ADD +1.50	OS: +2.75 -0.75 x 016 ADD +1.50			
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	AR Dry:	OD: +2.50 Sph	OS: +2.50 -1.25 x 036			

- ▶ SLE shows Tr NS and Tr Cort Cats OU

OCULUS - PENTACAM Holladay Report

1.25 R

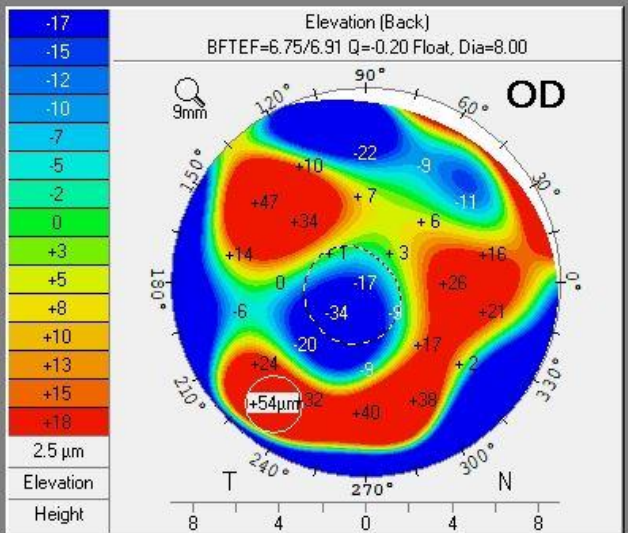
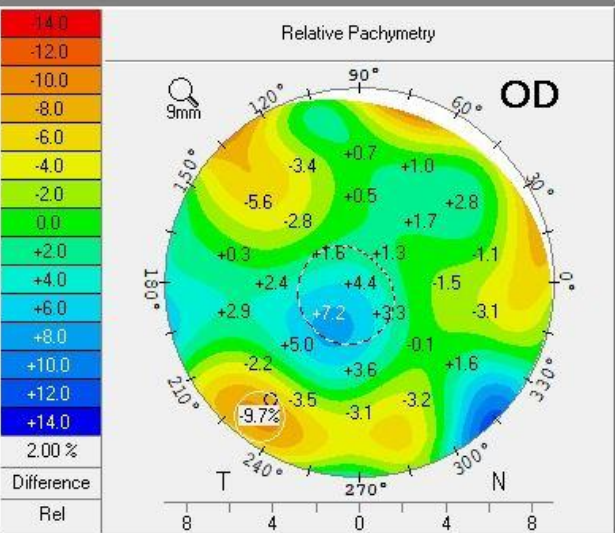
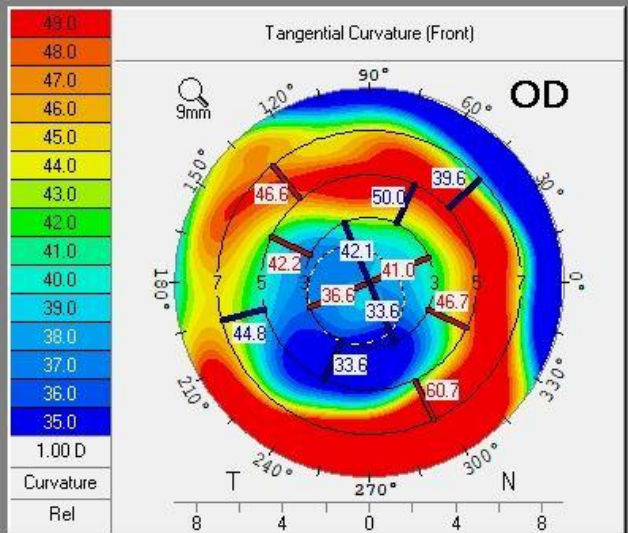
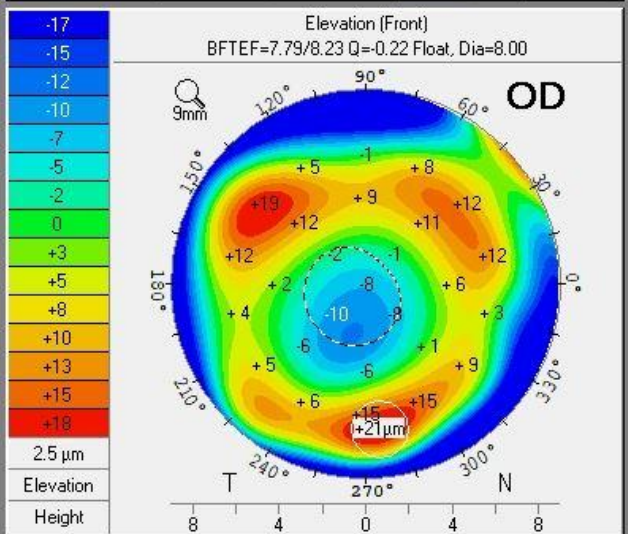
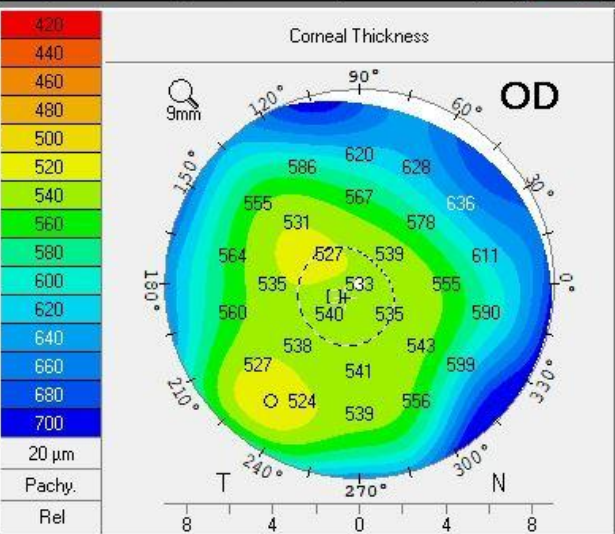
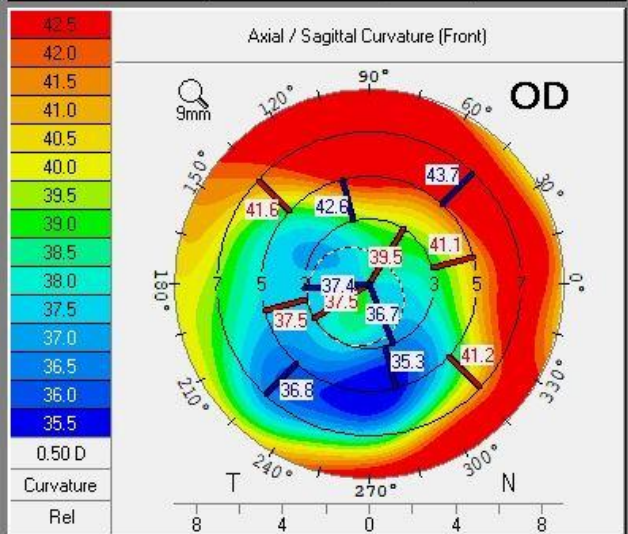
Last Name:
 First Name:
 ID:
 Date of Birth:
 Exam Date: 03/28/2022

Eye: Right
 Time: 09:07:17

Equiv K-Readings 65 (4.5mm Zone)

EKR65 Flat K1:	37.87 D (130 °)	Q (6.0mm):	1.11
EKR65 Steep K2:	38.45 D (40 °)	Total SA:	+0.708 μ
EKR65 Mean:	38.16 D	Radii Ratio (R1/R2):	88.5 %
Astig EKR65:	0.58 D	RMS HOA WE (6mm):	1.837 μm

Pupil Dia:	+ 2.23 mm	x:	0.34 mm T	y:	0.32 mm I	(rel.VN)
HW/TW:	[] 11.6 mm	x:	0.58 mm T	y:	0.30 mm I	(rel.VN)
Pachy Min:	○ 515 μm	x:	2.04 mm T	y:	2.70 mm I	(rel.VN)
Est. Pre-Refr. Km:	35.2 D	Refr. Change:	+2.9 D			
ACD (Ext.):	2.82 mm	Chord μ:	0.47 mm	QS:	<input type="checkbox"/> OK	



OCULUS - PENTACAM Holladay Report

1,25r

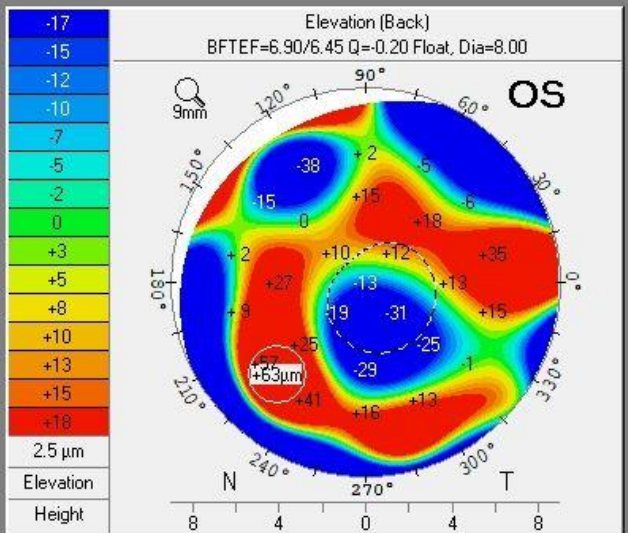
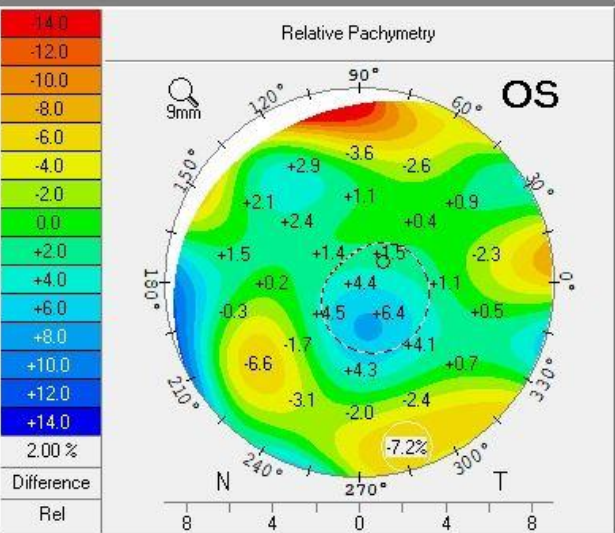
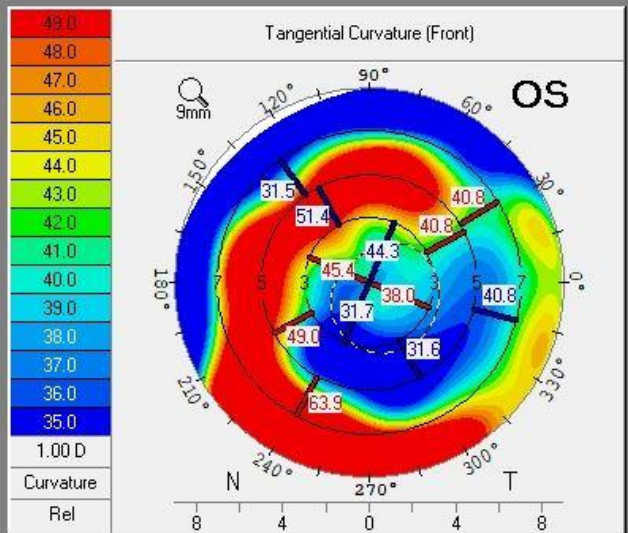
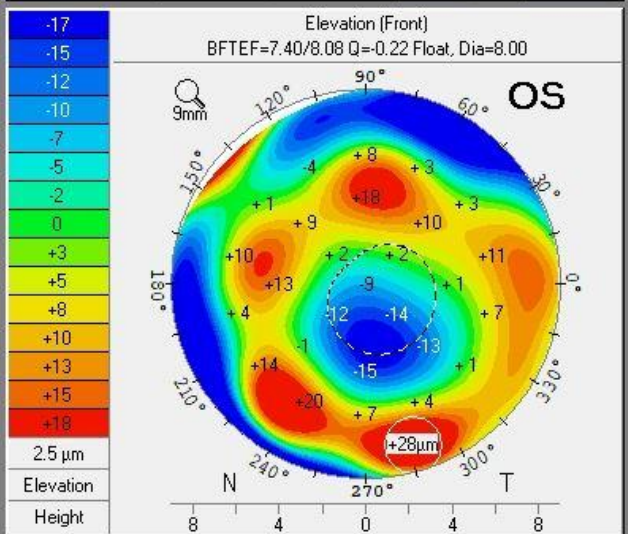
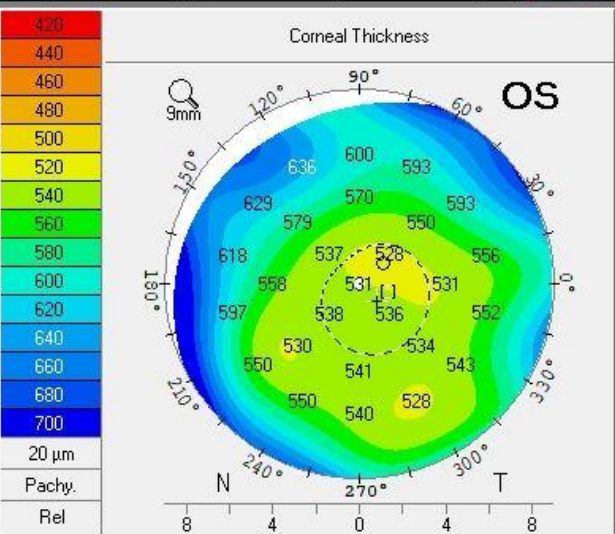
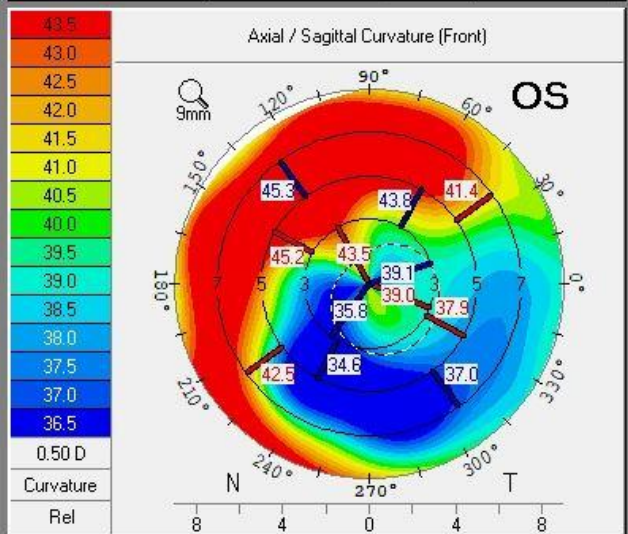
Last Name:
 First Name:
 ID:
 Date of Birth:
 Exam Date: 03/28/2022

Eye: Left
 Time: 09:10:47

Equiv K-Readings 65 (4.5mm Zone)

EKR65 Flat K1:	38.56 D (40°)	Q (6.0mm)	0.65
EKR65 Steep K2:	39.81 D (130°)	Total SA:	+0.773 μ
EKR65 Mean:	39.18 D	Radii Ratio (R1/R2)	88.9%
Astig EKR65:	1.25 D	RMS HOA WE (6mm)	2.739 μm

Pupil Dia:	+ 2.50 mm	x:	0.41 mm T	y:	0.40 mm I	(rel.VN)
HWTW:	11.5 mm	x:	0.67 mm T	y:	0.19 mm I	(rel.VN)
Pachy Min:	526 μm	x:	0.54 mm T	y:	0.48 mm S	(rel.VN)
Est. Pre-Ref. Km	36.2 D	Refr. Change	+3.3 D			
ACD (Ext.):	2.93 mm	Chord μ:	0.57 mm	QS:	Model!	



Exams not taken at the same time

INTERNAL - RMS Total, no Defocus 2.00 mm

z	Name	μ	1
3	Astigmatism	0.151	
5	Astigmatism	0.362	
6	Trefoil	0.015	
7	Coma	0.006	
8	Coma	0.027	
9	Trefoil	0.048	
10	Tetrafoil	0.007	
11	Astigmatism	0.001	
12	Spherical	0.015	
13	Astigmatism	0.025	
14	Tetrafoil	0.001	



TOTAL EYE - RMS Total, no Defocus 2.00 mm

z	Name	μ	1
3	Astigmatism	0.158	
5	Astigmatism	0.180	
6	Trefoil	0.024	
7	Coma	0.076	
8	Coma	0.009	
9	Trefoil	0.005	
10	Tetrafoil	0.008	
11	Astigmatism	0.005	
12	Spherical	0.005	
13	Astigmatism	0.005	
14	Tetrafoil	0.003	



03-28-2022 09:46:26

OD

Pupil 3.78 mm / Scan 2.00 mm

Tracey Refraction

+3.75 D -2.25 D x 159°

2.00 mm

+3.79 D -2.20 D x 159°

3.00 mm

5.00 mm

2.00 mm

+3.79 D -2.20 D x 159°

HO Total @ D <= 2.00 mm

0.087 μ

Coma

0.077 μ x 83°

Spherical Aberration

+ 0.005 μ

Trefoil

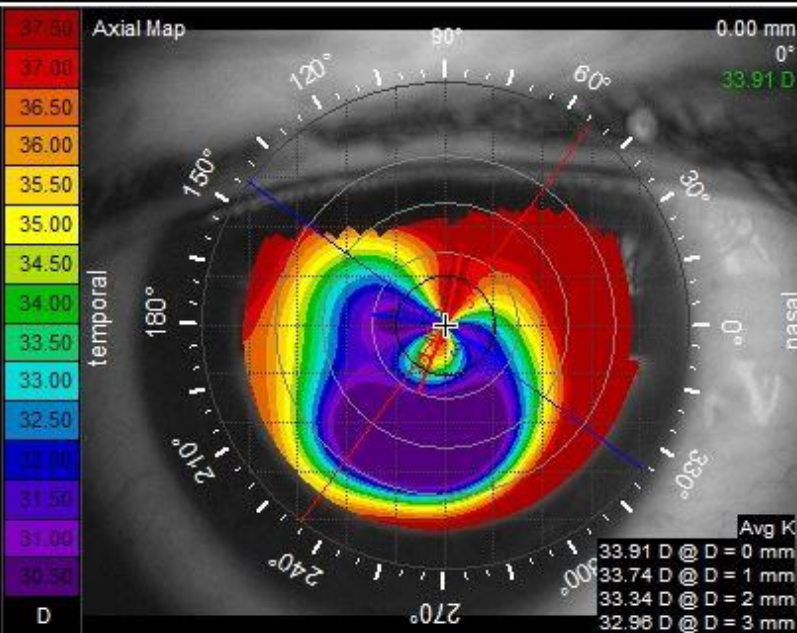
0.025 μ x 94°

Angle Alpha D =

0.736 mm @ 213°

CORNEA - RMS Total, no Defocus 2.00 mm

z	Name	μ	1
3	Astigmatism	0.309	
5	Astigmatism	0.542	
6	Trefoil	0.010	
7	Coma	0.070	
8	Coma	0.036	
9	Trefoil	0.053	
10	Tetrafoil	0.001	
11	Astigmatism	0.006	
12	Spherical	0.010	
13	Astigmatism	0.030	
14	Tetrafoil	0.003	



03-28-2022 09:47:23

OD

Refractive Power @ D <= 3.00 mm

Steep

35.42 D x 69°

Flat

31.48 D x 162°

Astigmatism

3.94 D x 69°

Effective RP

33.41 D

Central Radius / Power

9.95 mm / 33.91 D

Corneal SphAb @ D = 6.00 mm

0.628 μ

I-S Axial Power @ D = 6.00 mm

-7.07 D

Exams not taken at the same time

INTERNAL - RMS Total, no Defocus 2.30 mm

z	Name	μ	1
3	Astigmatism	0.127	
5	Astigmatism	0.137	
6	Trefoil	0.120	
7	Coma	0.004	
8	Coma	0.034	
9	Trefoil	0.004	
10	Tetrafoil	0.000	
11	Astigmatism	0.006	
12	Spherical	0.023	
13	Astigmatism	0.032	
14	Tetrafoil	0.030	



TOTAL EYE - RMS Total, no Defocus 2.30 mm

z	Name	μ	1
3	Astigmatism	0.415	
5	Astigmatism	0.276	
6	Trefoil	0.038	
7	Coma	0.126	
8	Coma	0.033	
9	Trefoil	0.043	
10	Tetrafoil	0.015	
11	Astigmatism	0.019	
12	Spherical	0.022	
13	Astigmatism	0.006	
14	Tetrafoil	0.000	



03-28-2022 09:49:25

OS

Pupil 4.05 mm / Scan 2.30 mm

Tracey Refraction

+2.62 D -3.62 D x 28°

2.00 mm

+2.84 D -3.71 D x 29°

3.00 mm

5.00 mm

2.30 mm

+2.67 D -3.62 D x 28°

HO Total @ D <= 2.30 mm

0.150 μ

Coma

0.130 μ x 105°

Spherical Aberration

+ 0.022 μ

Trefoil

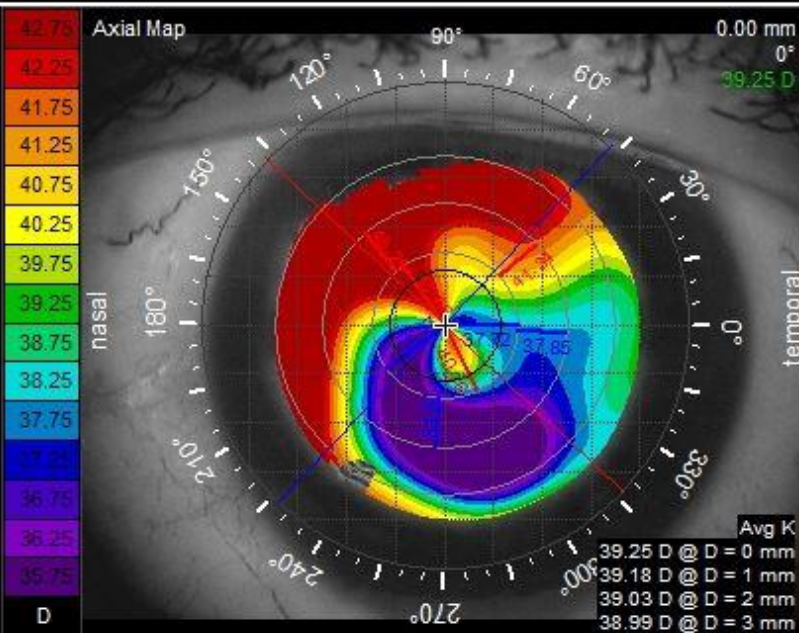
0.057 μ x 46°

Angle Alpha D =

0.708 mm @ 343°

CORNEA - RMS Total, no Defocus 2.30 mm

z	Name	μ	1
3	Astigmatism	0.543	
5	Astigmatism	0.413	
6	Trefoil	0.158	
7	Coma	0.122	
8	Coma	0.001	
9	Trefoil	0.047	
10	Tetrafoil	0.015	
11	Astigmatism	0.012	
12	Spherical	0.001	
13	Astigmatism	0.037	
14	Tetrafoil	0.031	



03-28-2022 09:49:45

OS

Refractive Power @ D <= 3.00 mm

Steep

41.47 D x 124°

Flat

37.52 D x 30°

Astigmatism

3.95 D x 124°

Effective RP

39.23 D

Central Radius / Power

8.60 mm / 39.25 D

Corneal SphAb @ D = 6.00 mm

0.710 μ

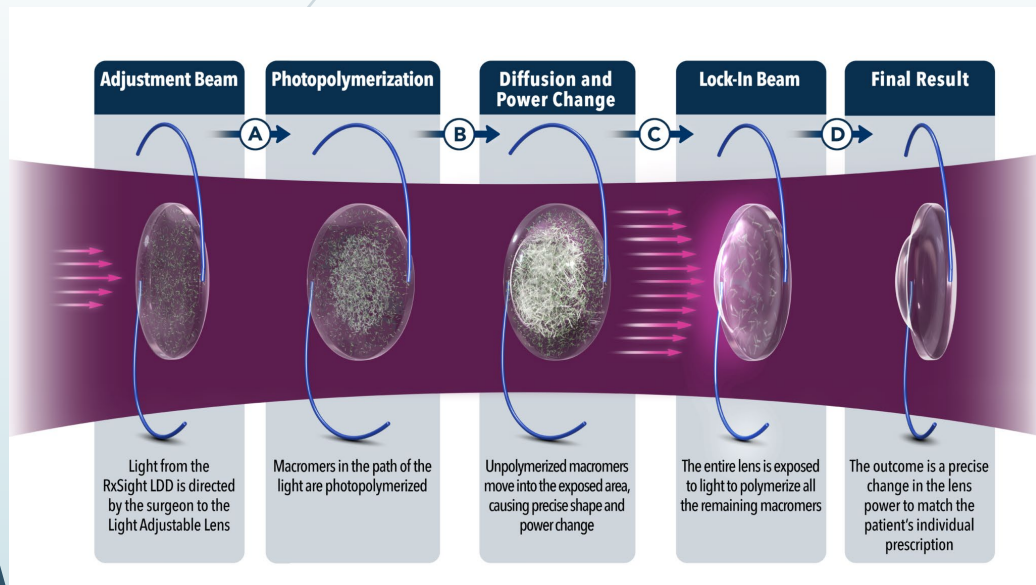
I-S Axial Power @ D = 6.00 mm

-7.11 D

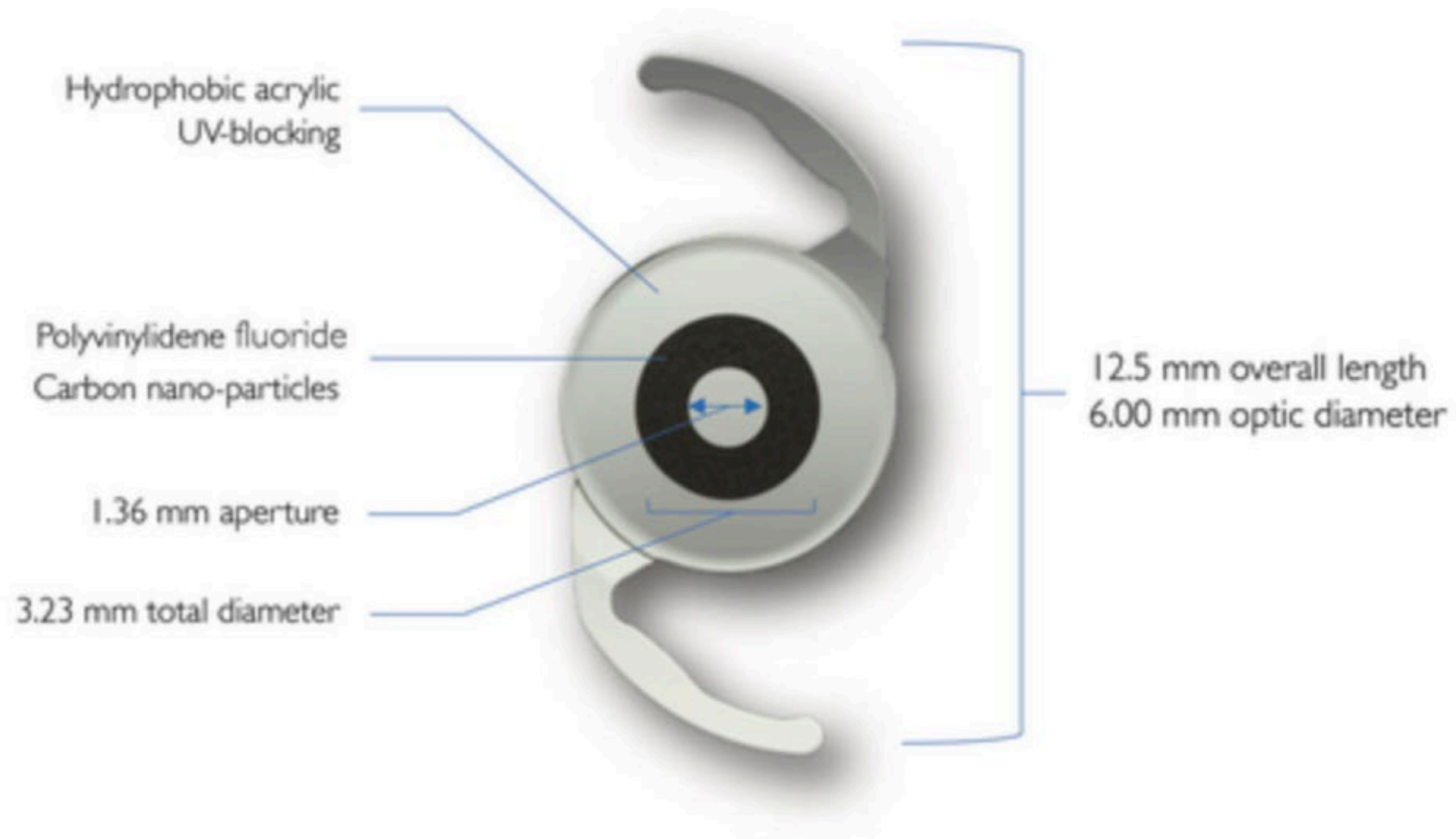


YOU MAKE THE CALL

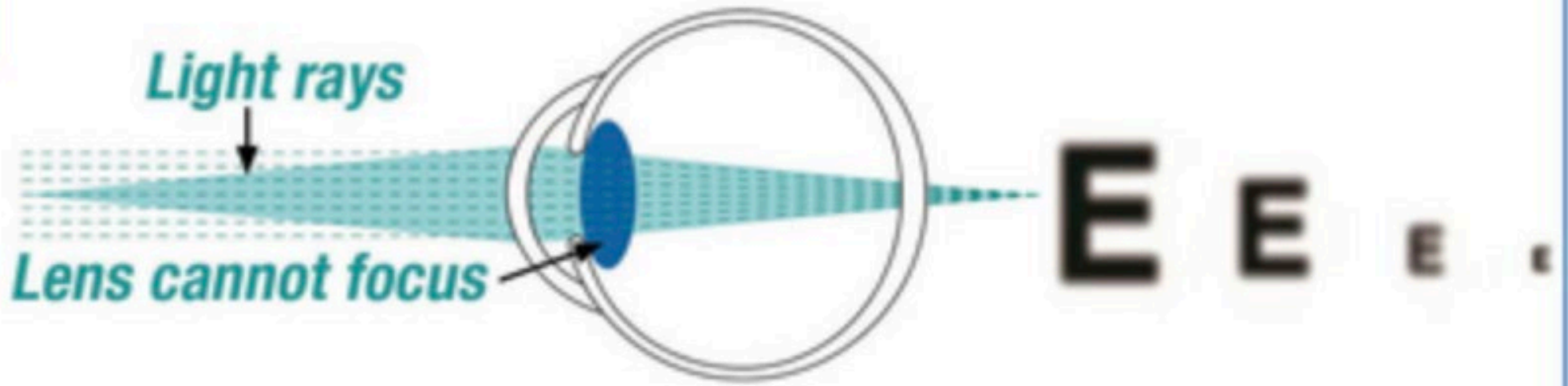
LAL v IC-8



The IC-8™ Small Aperture IOL



A



B

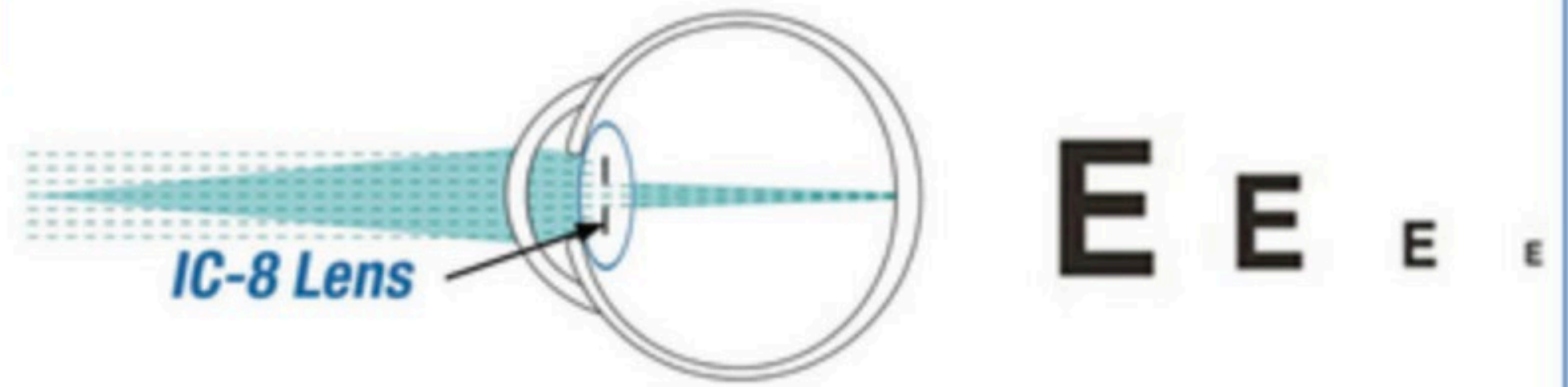
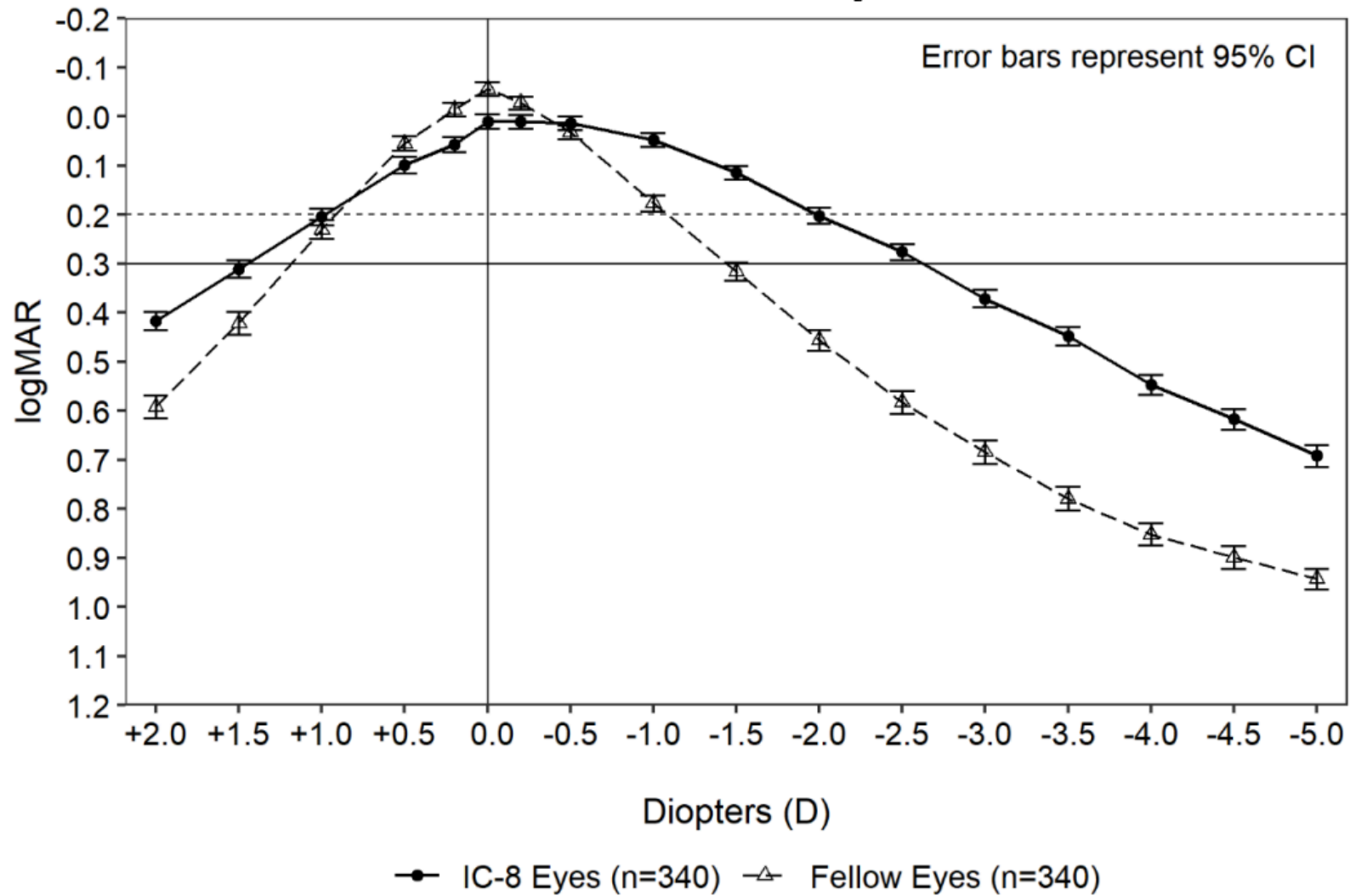


Figure 7
Monocular Defocus Curves at 3 Months (IC-8 IOL Group) (Mean, 95% CI)
IC-8 IOL and Fellow Eyes

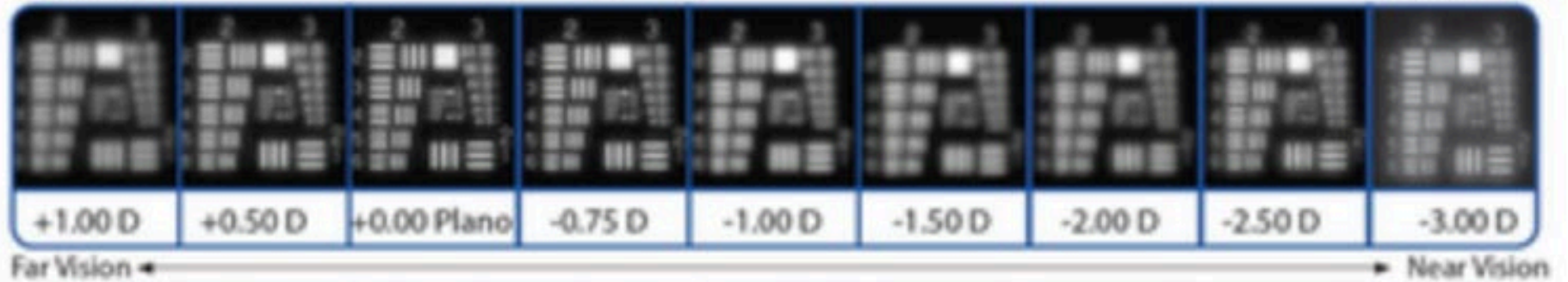


Quality and Quantity of Vision

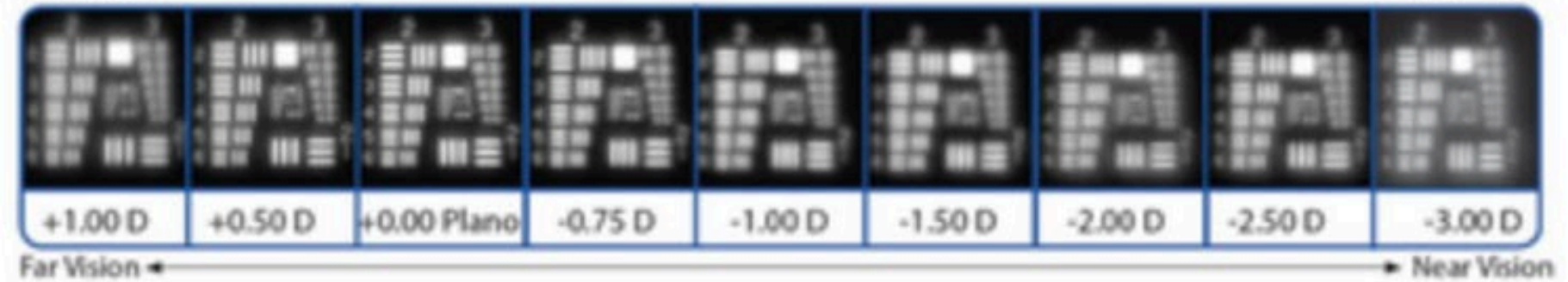
IC-8™ IOL
Target-corrected
to -0.75D



Diffraction
Multifocal IOL



Trifocal IOL



Thoughts from 1+ year of LALs

- Expectations from regular eyes
- Expectations from "special" eyes
 - Myopic LASIK, PRK, RK, KCN, PMD
 - Hyperopic LASIK
 - Monovision

[Clin Ophthalmol](#). 2022; 16: 2413–2420. PMID: 35957659
Published online 2022 Aug 4. doi: [10.2147/OPTH.S378525](https://doi.org/10.2147/OPTH.S378525)

Visual Outcomes of an Enhanced UV Protected Light Adjustable Lens Using a Novel Co-Managed, Open-Access Methodology

[David V Folden](#)^{1, 2, 3} and [Jennifer R Wong](#)⁴

[Author information](#) [Article notes](#) [Copyright and License information](#) [Disclaimer](#)

Abstract

[Go to:](#)

Purpose

To report on the safety and visual acuity (VA) outcomes using a co-managed, open-access methodology with a second-generation (ActivShield™) Light Adjustable Lens (LAL 2.0).

Patients and Methods

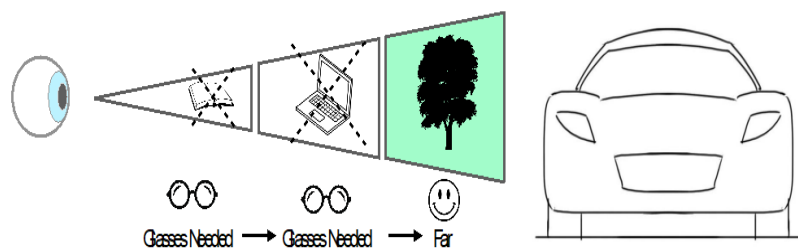
This retrospective observational case series of consecutive patients implanted with the LAL 2.0 choosing an emmetropic target in at least one eye were included in the study. All patients were co-managed with light treatments occurring at an open-access facility. Exclusion criteria included pathology of the macula and/or cornea with reduced best corrected visual acuity (BCVA). The primary outcome measures were uncorrected distance visual acuity (UDVA), spherical equivalent (SE), and residual cylinder for emmetropic goal eyes at the final 3- to 9-month postoperative visit.

Results

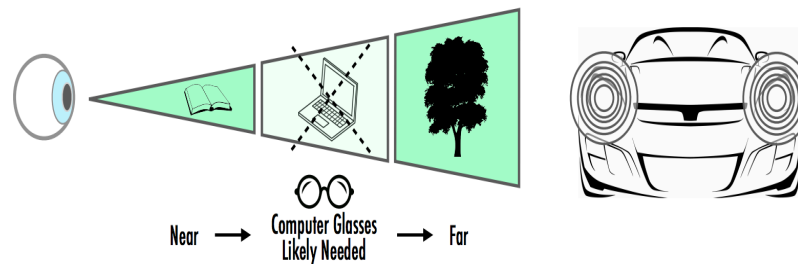
Thirty-three patients (62 eyes) were included in the study and implanted with the LAL 2.0. Thirty-three (53.2%) eyes had previous corneal refractive treatment(s) with 22 (66.7%) having no original historical refractive records available. Thirty-six (58.1%) total eyes and 20 (32.3%) postrefractive eyes had an emmetropic refractive target. Of all the emmetropic goal eyes, 35 (97.2%) saw 20/20 or better and 36 (100%) were within ± 0.50 D SE of plano and had a mean cylinder of -0.15 ± 0.26 D. Of the postrefractive emmetropic goal eyes, 19 (95%) saw 20/20 or better, 20 (100%) were within ± 0.50 D SE of plano and had a mean cylinder of -0.17 ± 0.28 D.

Conclusion

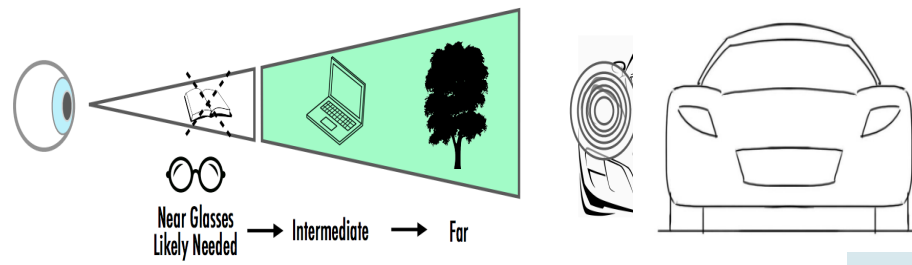
A co-managed, open-access methodology using the LAL 2.0 was safe and efficacious even in challenging postrefractive clinical scenarios.



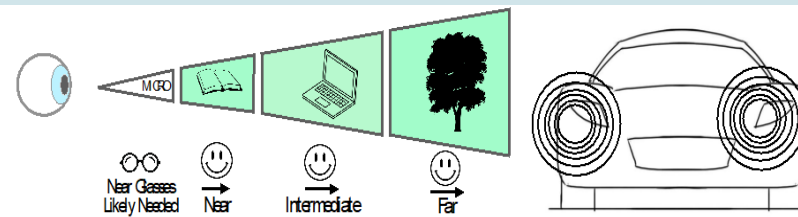
Monofocal



Bifocal



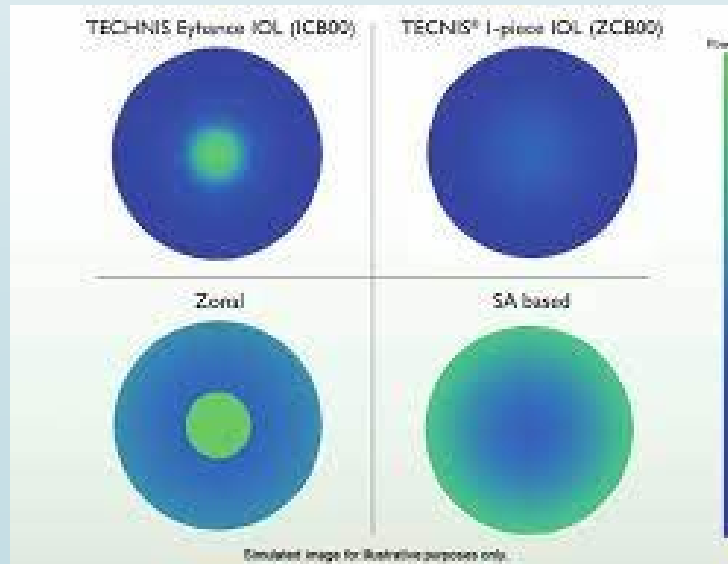
EDOF



Trifocal

Extended Depth of Focus Lens**

- ▶ PAST - Symfony
- ▶ PAST - Restor Active Focus
- ▶ NEW - ONLY TRUE EDOF: IC-8 (pinhole IOL)
- ▶ NEW - Vivity 1.5 D add
- ▶ NEW - Eyhance 1.3D add
- ▶ NEW - ClearView 3 - No torics



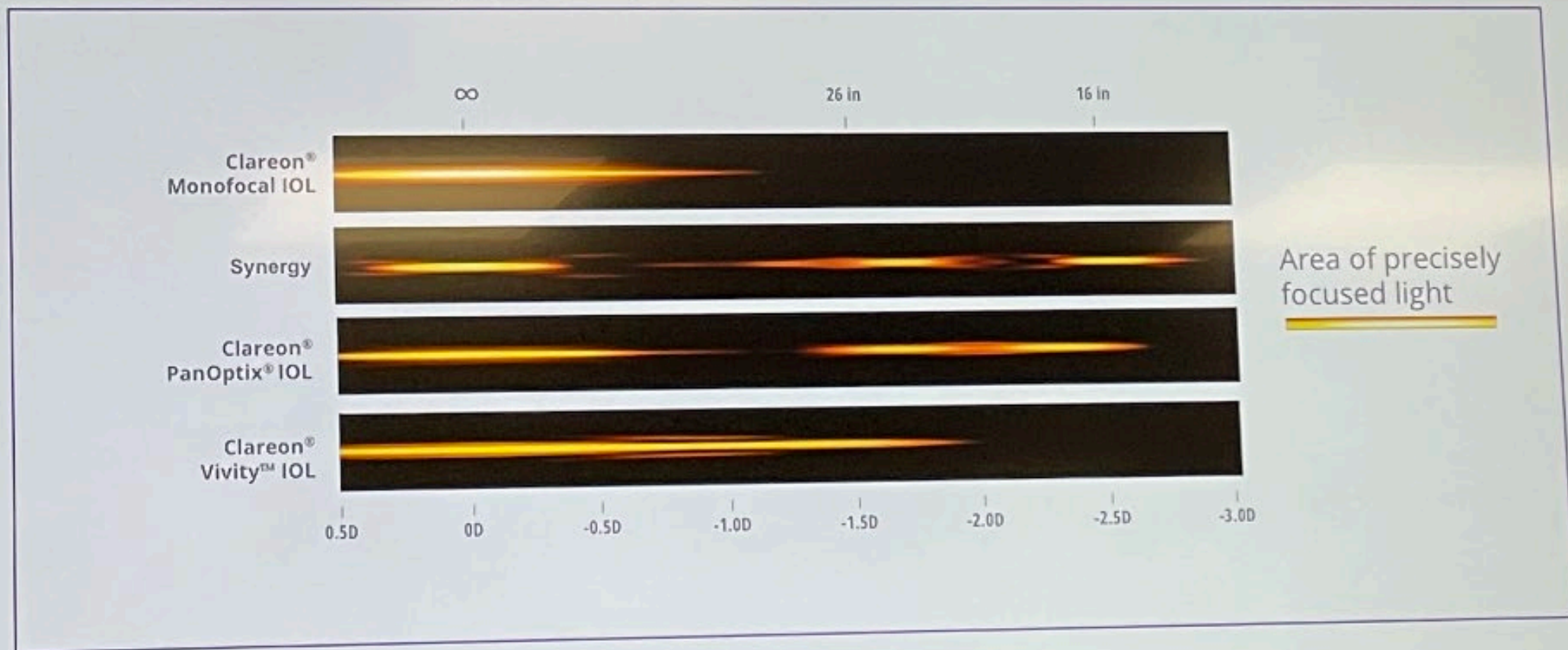
Multifocal and Extended Depth-of-Focus Intraocular Lenses in 2020

Radhika Rampat, MD,¹ Damien Gatinel, MD, PhD¹

Ophthalmic surgeons have been overwhelmed by the influx of multifocal intraocular lens (IOL) options in recent years, with close to 100 IOLs on the market in 2020. This practical and technical update on a representative group of established as well as newly launched multifocal IOLs on the market focuses on multifocal IOLs, including extended depth-of-focus lenses. We also describe the optical basis of lens platforms used and thorough pre-operative planning to aid decision making. This allows the surgeon the knowledge base to deliver the required relative customized spectacle independence with the least photic phenomenon and loss of contrast possible while achieving high individual patient satisfaction. Data of reviewed IOLs displayed in tabular format include mean monocular uncorrected distance, intermediate, and near visual acuities (logarithm of the minimum angle of resolution), with standard deviations and ranges where available. The range of vision targeted, pupil dependence, toric availability, as well as type of optical platform, are provided as a practical guide to demystify existing terminology on the market that may create interest around a seemingly new design that is actually not novel at all. Halos and glare experienced, levels of patient satisfaction, and spectacle independence achieved also are summarized. A wide range of multifocal IOLs options are available on the market to surgeons. Comprehensive patient selection and examination, combined with knowledge of the most recent options and adequate patient counseling, including neuroadaptation, can avoid dissatisfaction. Many recently available IOLs are awaiting formal results, but the methods by which we label and compare these types of IOLs must also be standardized. *Ophthalmology* 2020;■:1–22 © 2020 by the American Academy of Ophthalmology

Supplemental material available at www.aaojournal.org.

Light intensity distribution simulation*



* Simulated photopic through-focus point spread function (light intensity [energy]) – polychromatic. Trademarks are the property of their respective owners.

	Synergy	Panoptix
Halo		
<i>None</i>	32.8	54.8
<i>None to Little</i>	63.3	72.5
<i>Some what</i>	22.9	16.5
<i>Quite a bit and very much</i>	13.7	11.1
Starburst		
<i>None</i>	48.8	55.2
<i>None to Little</i>	69.4	72
<i>Some what</i>	19.1	16
<i>Quite a bit and very much</i>	11.4	12
Glare little to none	59.6	73.1

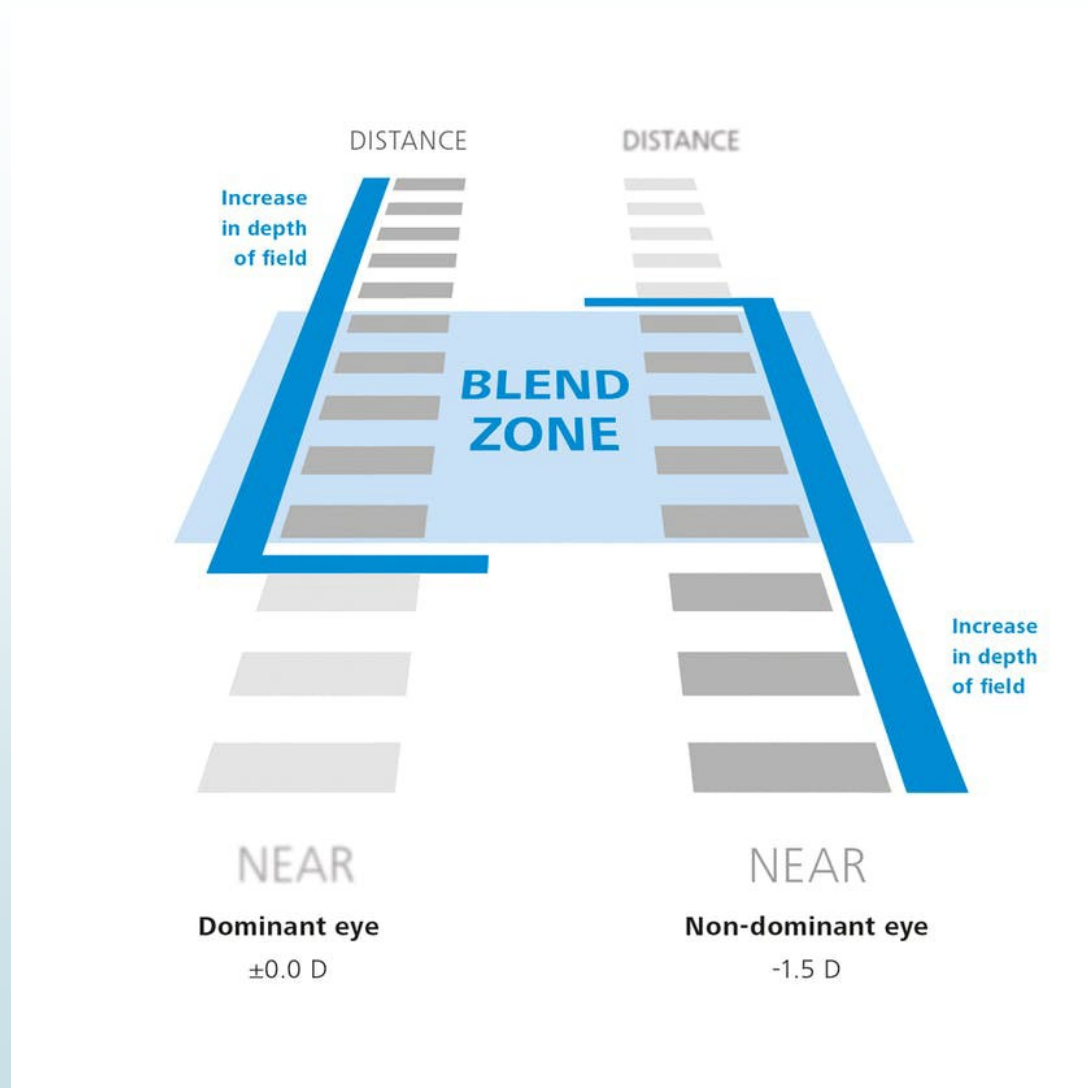
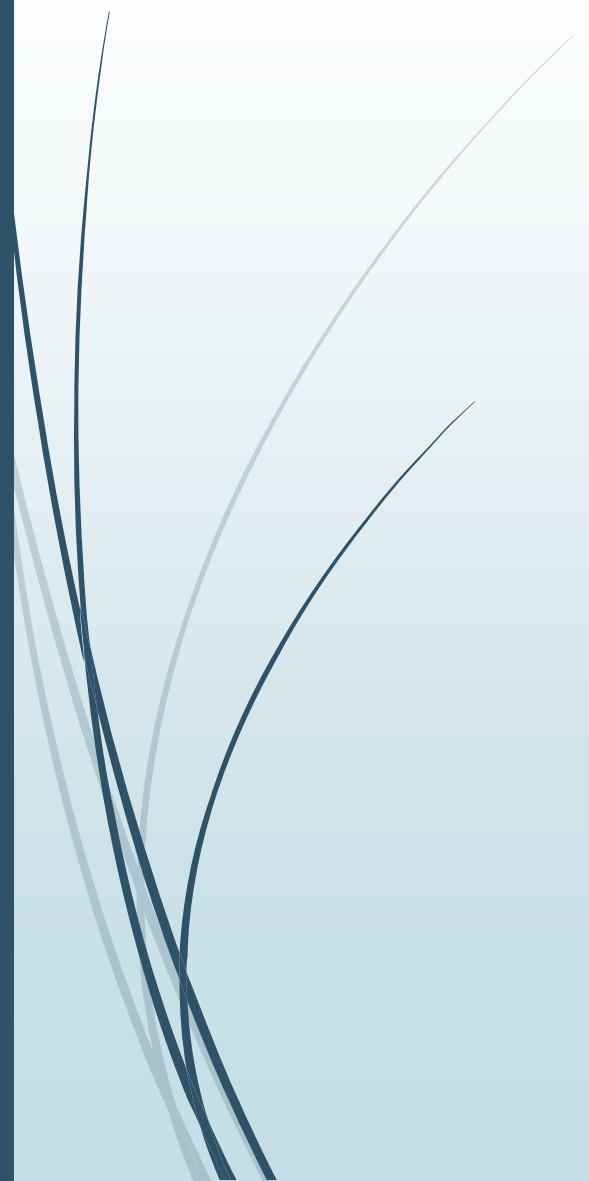
Vivacity

73.6

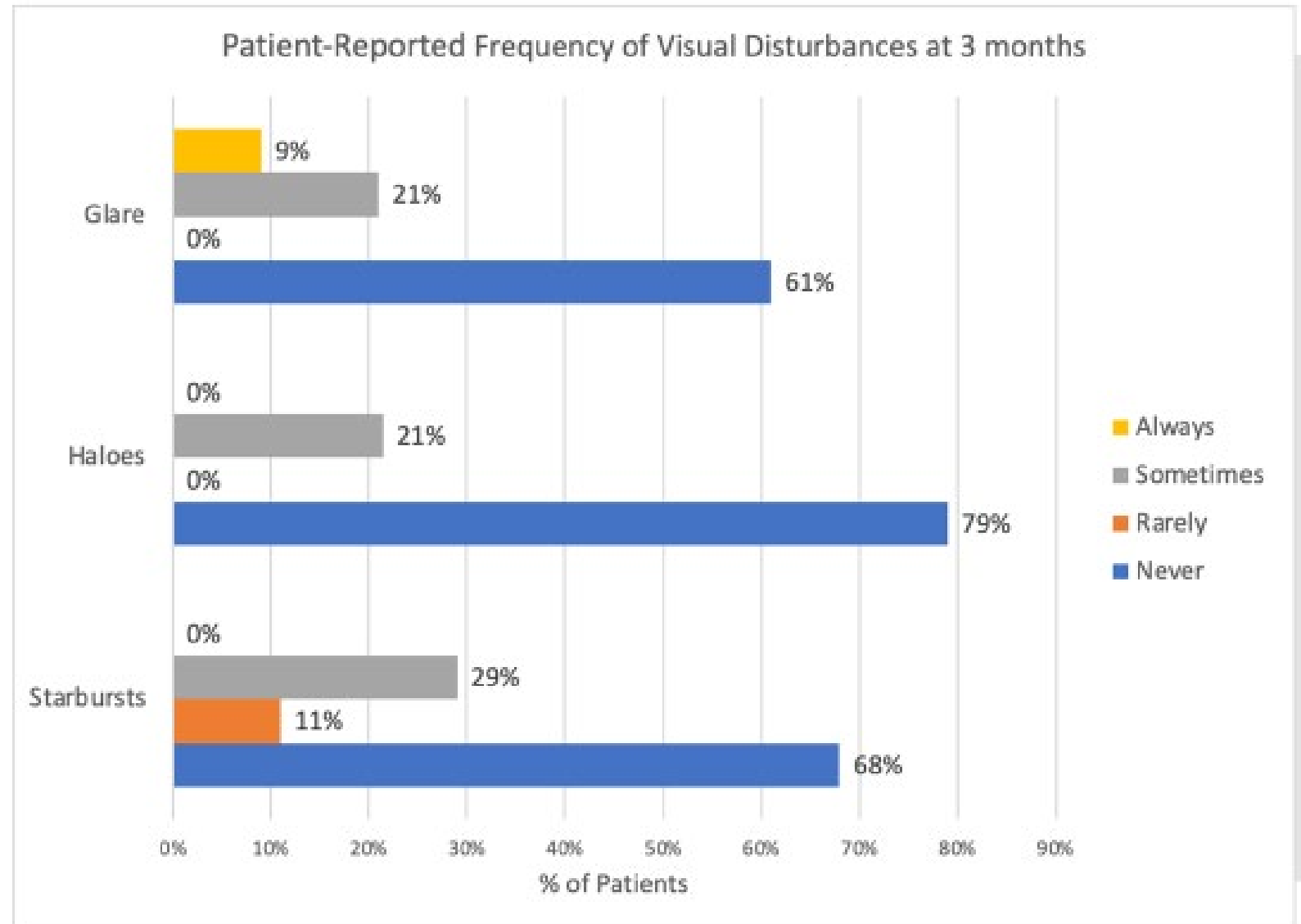
95.3

9.4

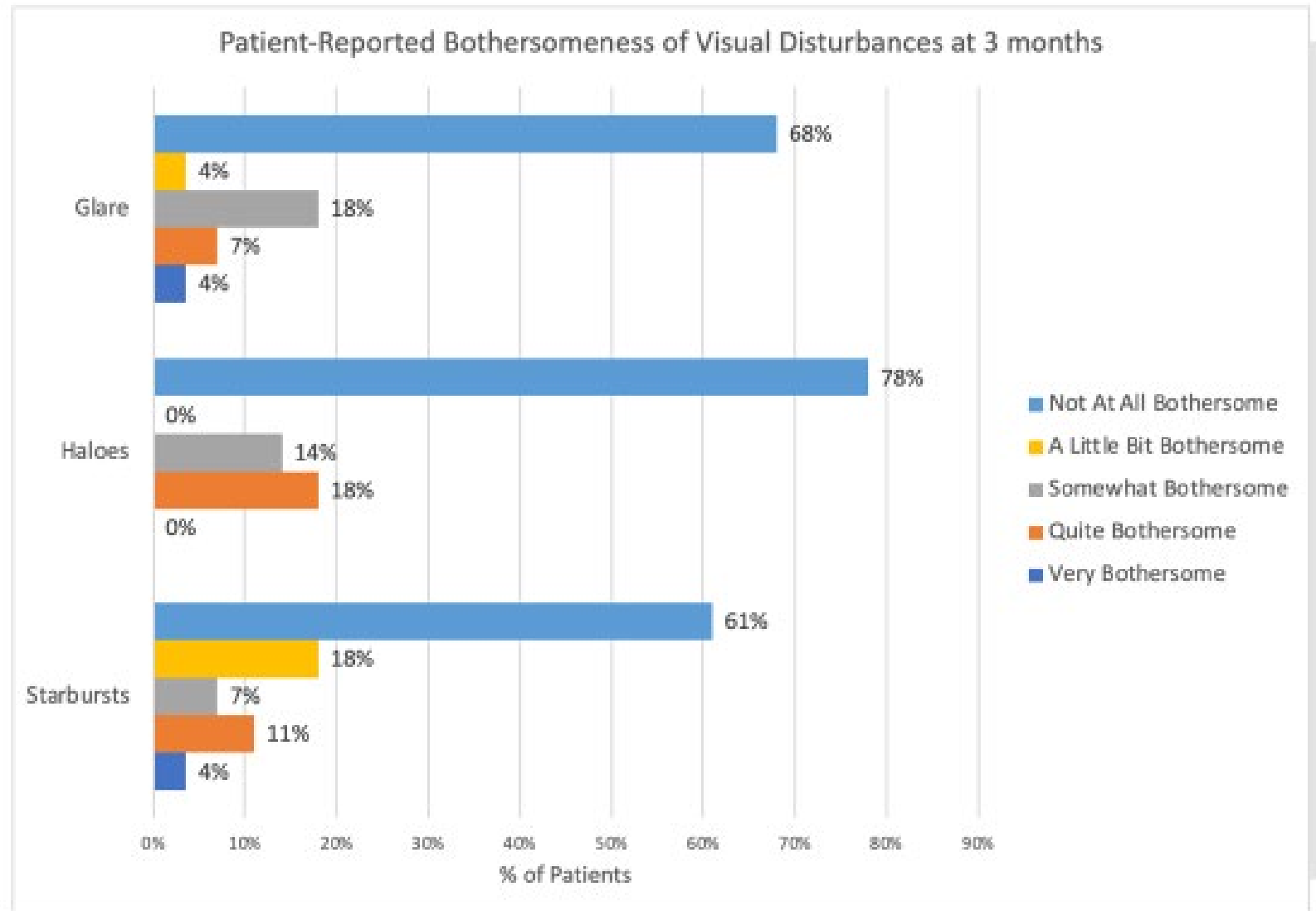
1.8



Frequency of Visual Disturbances

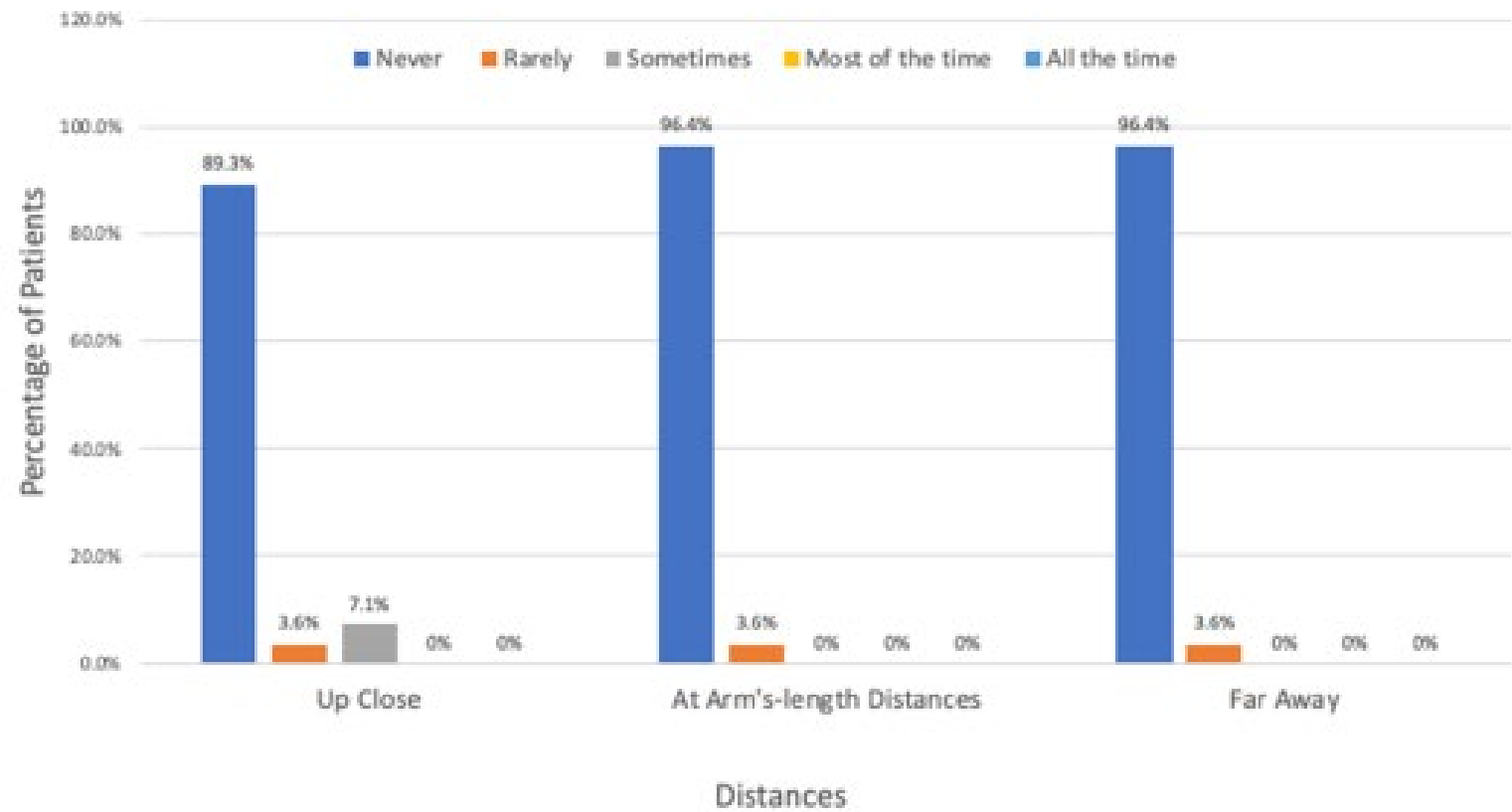


Bothersomeness of Visual Disturbances



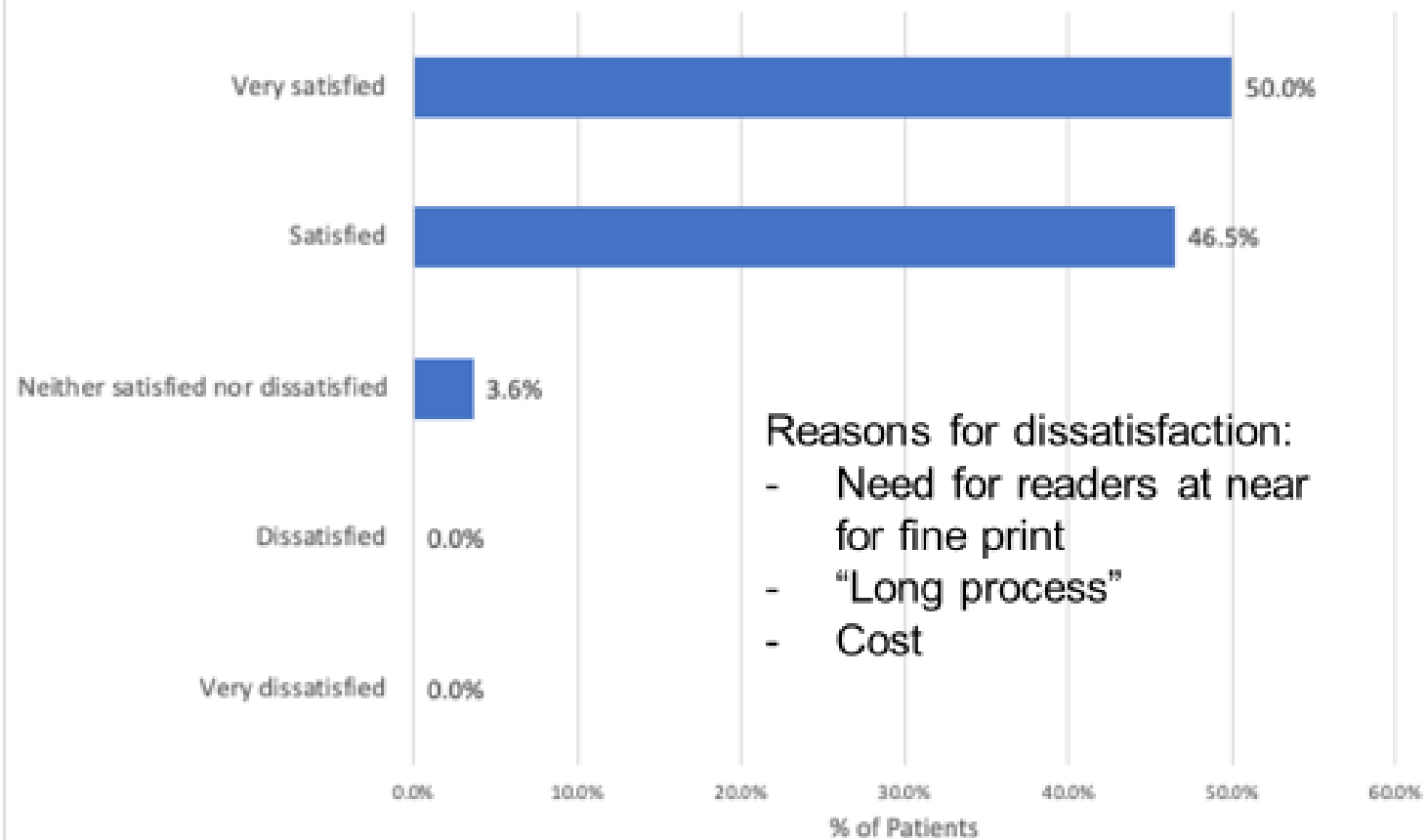
~90%
Spectacle
Independence

Patients Requiring Eyeglasses in General Lighting at 3 Months

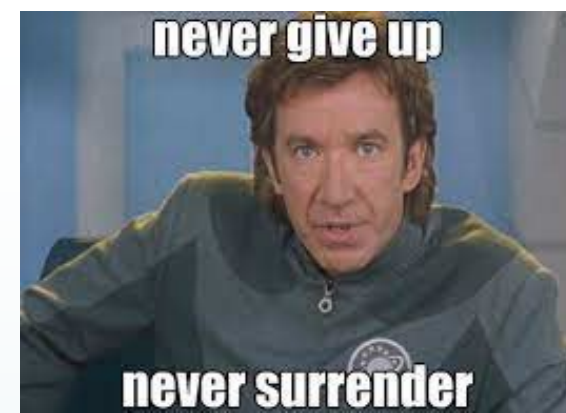


97% patient
satisfaction

Patient-Reported Satisfaction with Mix-and-Match PanOptix and Vivity RLE at 3 months



Case 7



- ▶ 42 yo HM – Army physician (OBGYN)
 - ▶ CC: Glasses are “almost unwearable”. Can rarely make it to mid-afternoon without CL bothering him.

■ MR Dry:

OD: -11.75 -0.50 x 164 = D 20/20 SN.

OS: -9.75 -2.50 x 180 = D 20/20 SN.

■ Wears Spectacle:

OD: -12.25 -0.50 x 169 = D 20/20 - SN.

OS: -10.50 -2.25 x 163 = D 20/20 SN.

- ▶ SLE: Unremarkable OU

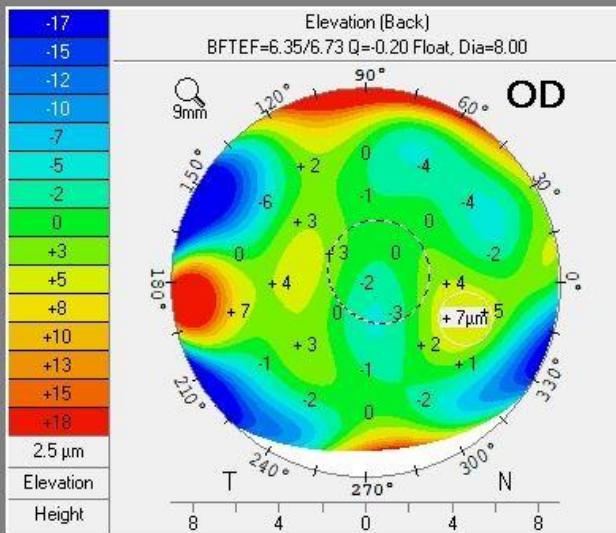
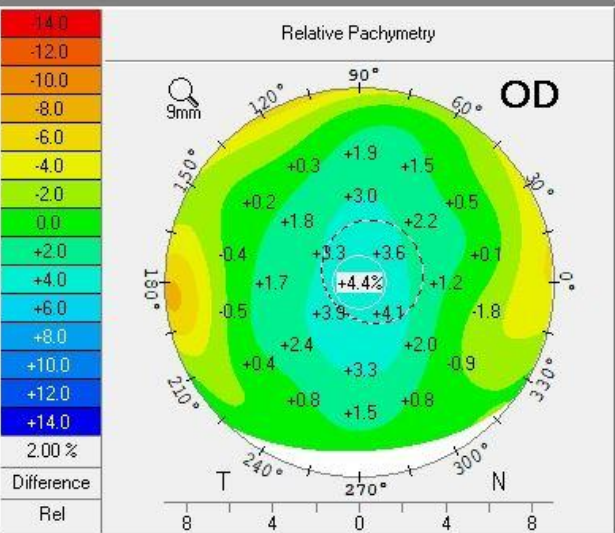
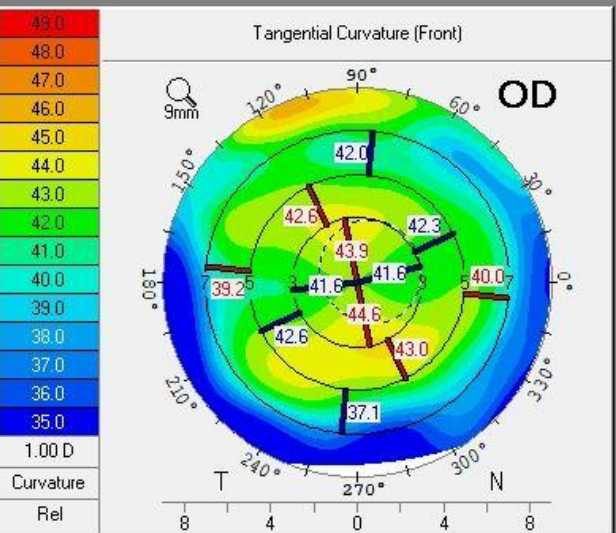
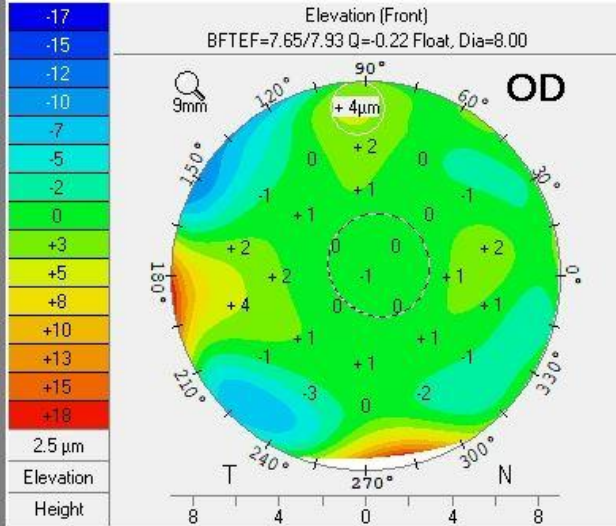
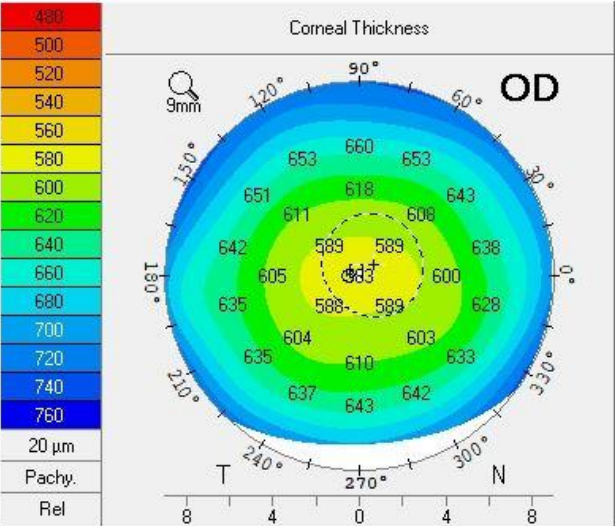
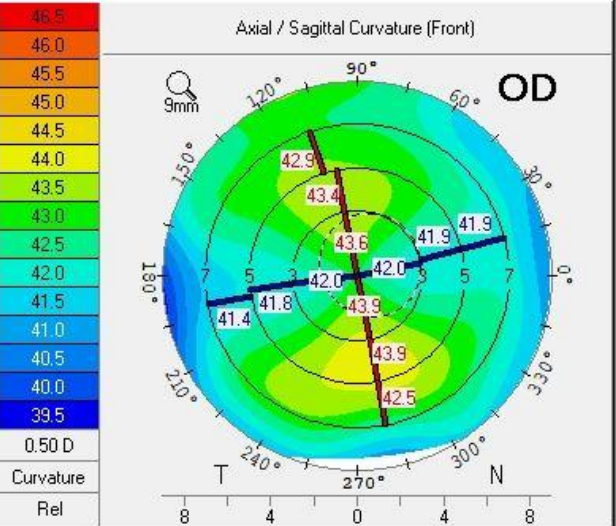
OCULUS - PENTACAM Holladay Report

1.25 R

Last Name:
 First Name:
 ID:
 Date of Birth:
 Exam Date:
 Eye: Right
 Time: 12:45:47

Equiv K-Readings 65 (4.5mm Zone)			Details
EKR65 Flat K1:	42.16 D (9°)	Q (6.0mm):	-0.20
EKR65 Steep K2:	43.48 D (99°)	Total SA: Z(4+6+8.0)	+0.299 μ
EKR65 Mean:	42.82 D	Radii Ratio (B/F):	84.5 %
Astig EKR65:	1.32 D	RMS HOA W/E (6mm)	0.439 μm

Pupil Dia:	+ 2.36 mm	x:	0.32 mm N	y:	0.26 mm S	(rel.VN)
HW/TW:	[] 11.9 mm	x:	0.07 mm T	y:	0.12 mm S	(rel.VN)
Pachy Min:	○ 583 μm	x:	0.26 mm T	y:	0.00 mm S	(rel.VN)
Est. Pre-Ref. Km	41.7 D	Refr. Change	+1.1 D			
ACD (Ext.):		Chord μ:	0.41 mm	QS:	<input type="checkbox"/> OK	



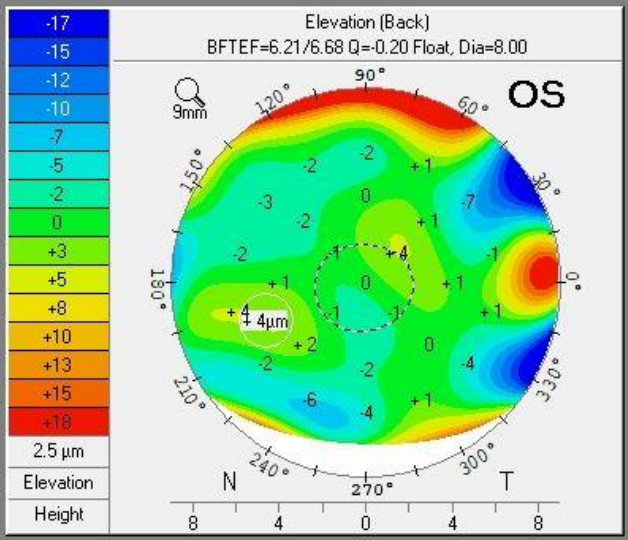
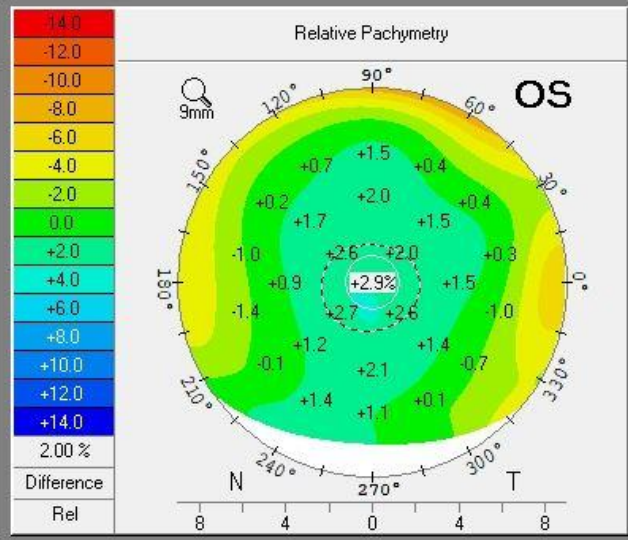
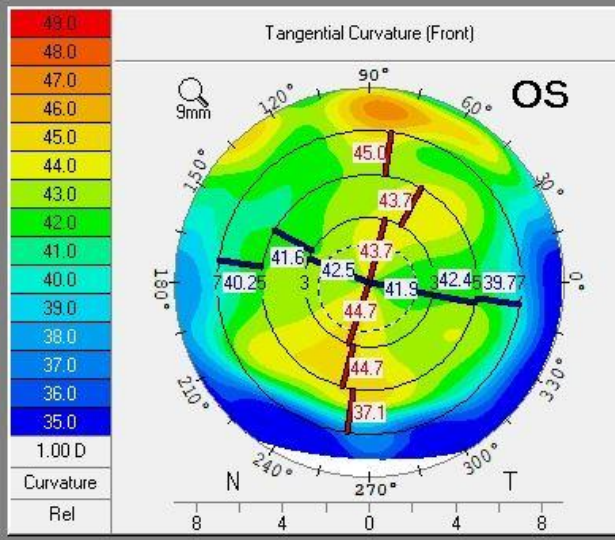
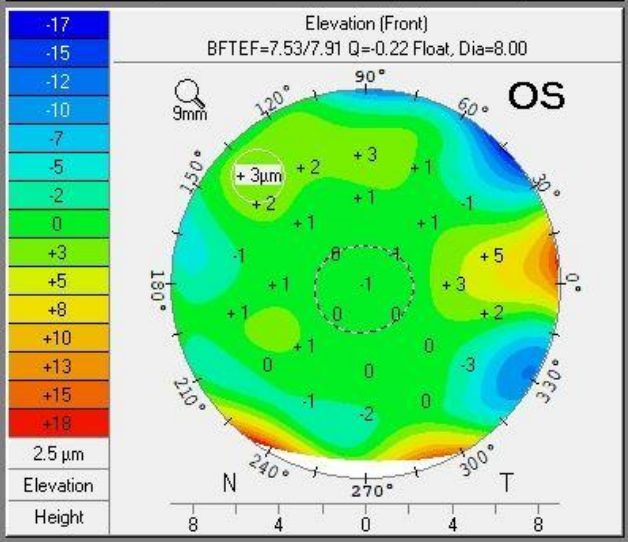
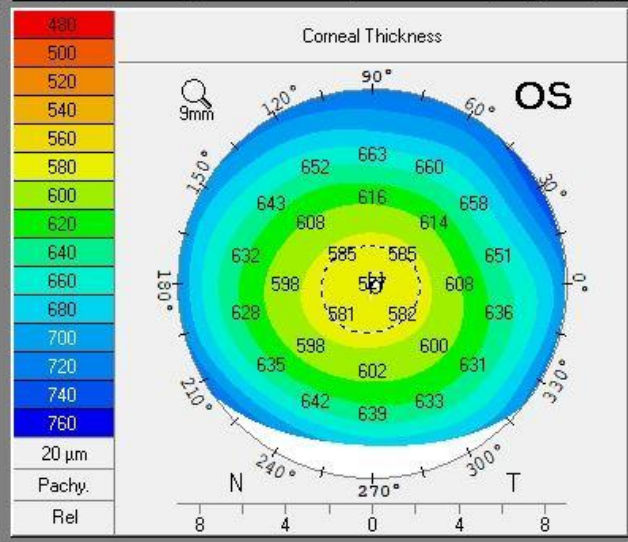
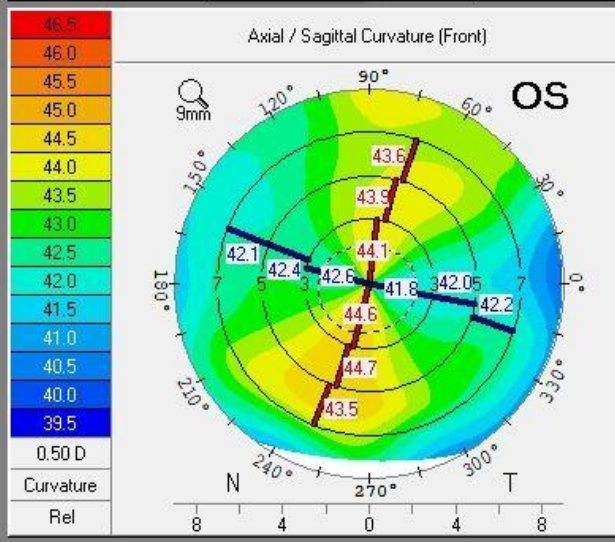
OCULUS - PENTACAM Holladay Report

1,25

Last Name:
 First Name:
 ID:
 Date of Birth:
 Exam Date:
 Eye: Right Left
 Time: 14:39:00

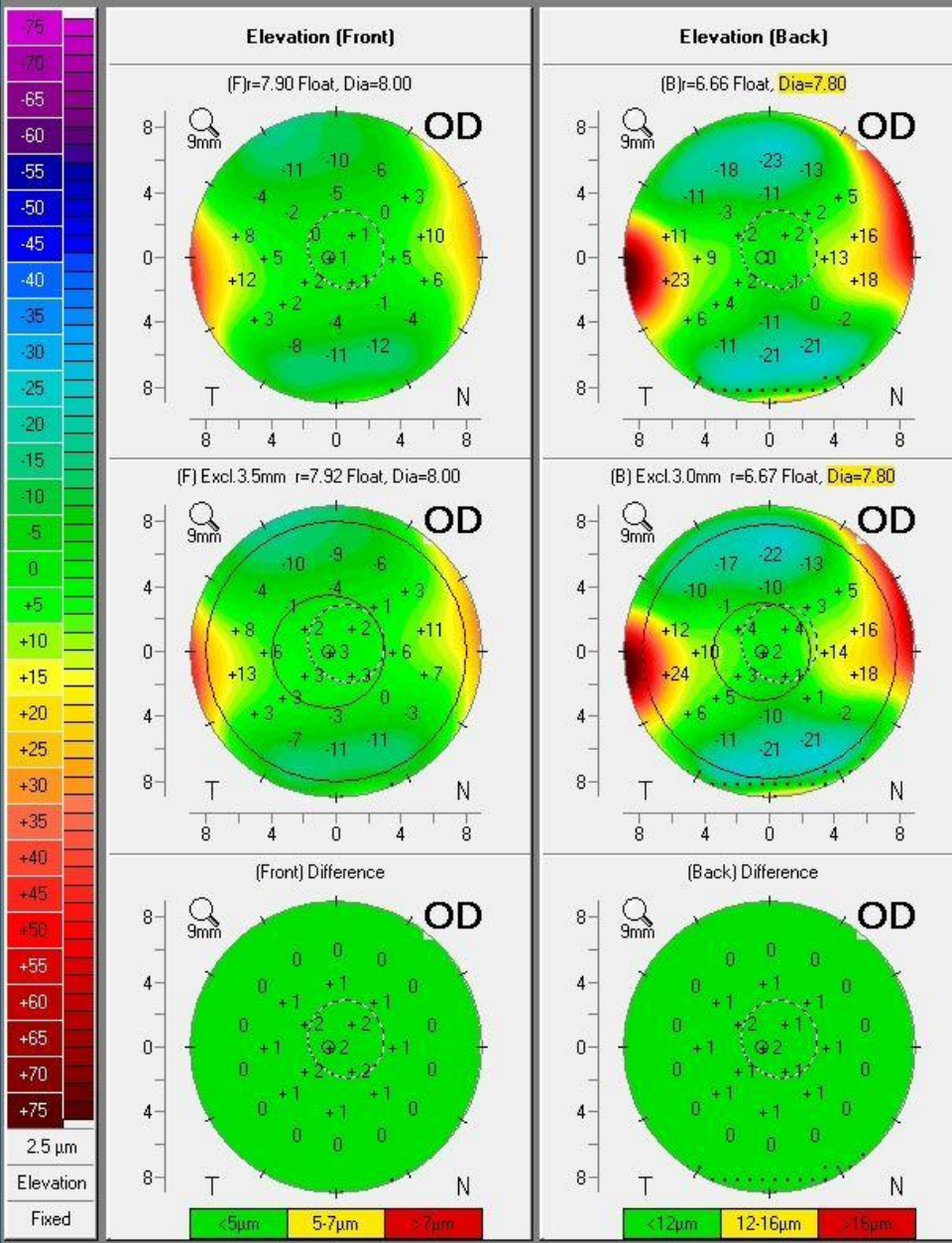
Equiv K-Readings 65 (4.5mm Zone)		
EKR65 Flat K1:	42.30 D (167°)	Q (6.0mm): -0.11
EKR65 Steep K2:	44.24 D (77°)	Total SA: Z[4+6+8.0] +0.332 μ
EKR65 Mean:	43.27 D	Radii Ratio (B/F): 83.3%
Astig EKR65:	1.94 D	RMS HOA W/E (6mm) 0.512 μ m

Pupil Dia:	+ 2.14 mm	x: [0.05 mm N	y: [0.12 mm I	(rel.VN)
HW/TW:	[] 11.8 mm	x: [0.09 mm T	y: [0.11 mm S	(rel.VN)
Pachy Min:	\varnothing 577 μ m	x: [0.06 mm T	y: [0.06 mm I	(rel.VN)
Est. Pre-Refr. Km	42.7 D	Refr. Change +0.6 D		
ACD (Ext.):	3.74 mm	Chord μ :	[0.13 mm	QS: <input checked="" type="checkbox"/> OK



OCULUS - PENTACAM Belin/Ambrósio Enhanced Ectasia Display

1.25 R

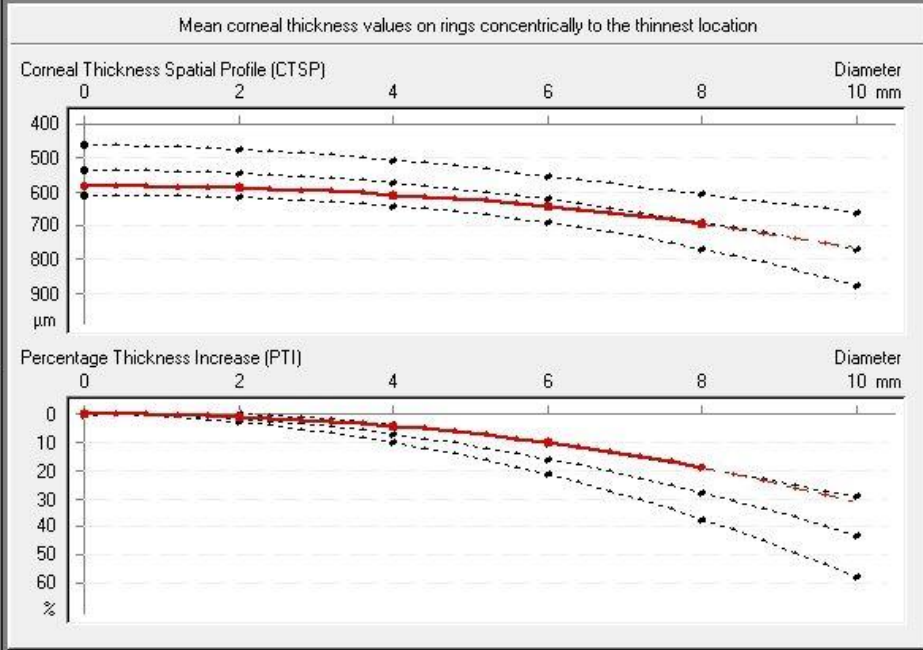
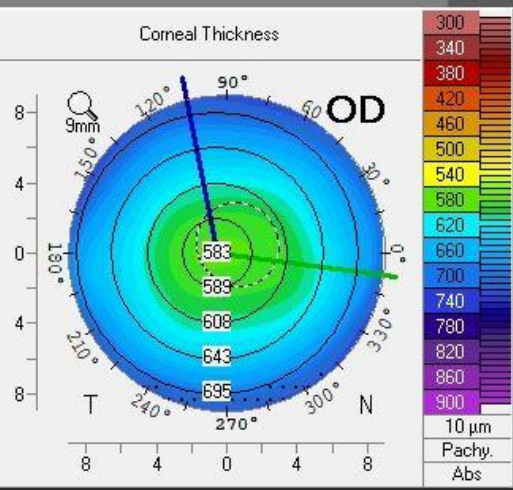


Last Name: _____
 First Name: _____
 ID: _____
 Date of Birth: _____
 Exam Date: _____
 Exam Info: _____

Right
12:45:47

K1:	42.0D	Axis:	8.7°
K2:	43.6D	Q-val:	-0.30
KMax:	44.0D	(8mm)	OK
Pachy Thin. Locat.:		○	583μm
Dist. Vertex N.-Thin.Loc.:		IT	0.26mm
F.Ele.Th:	1μm	B.Ele.Th:	1μm

Progression Index:
 Min: 0.29 Max: 0.81
 Avg: 0.61 ARTmax: 717



Reference Database: Myopic/Normal Hyperopic/Mixed Cyl. Literature

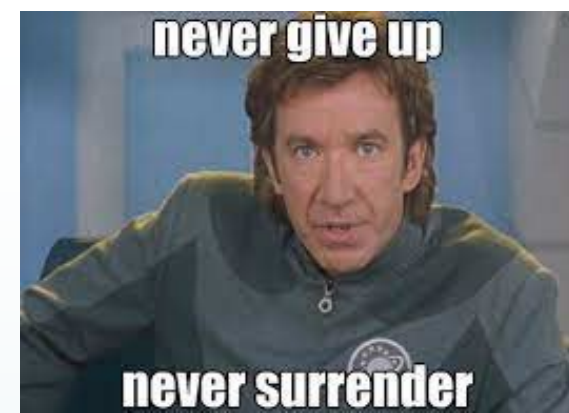
Df:	-0.55	Db:	-1.09	Dp:	-2.00	Dt:	-1.20	Da:	-2.09	D:	-1.05
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Case 7

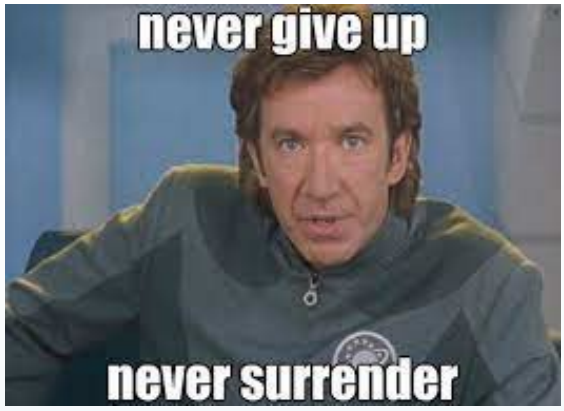
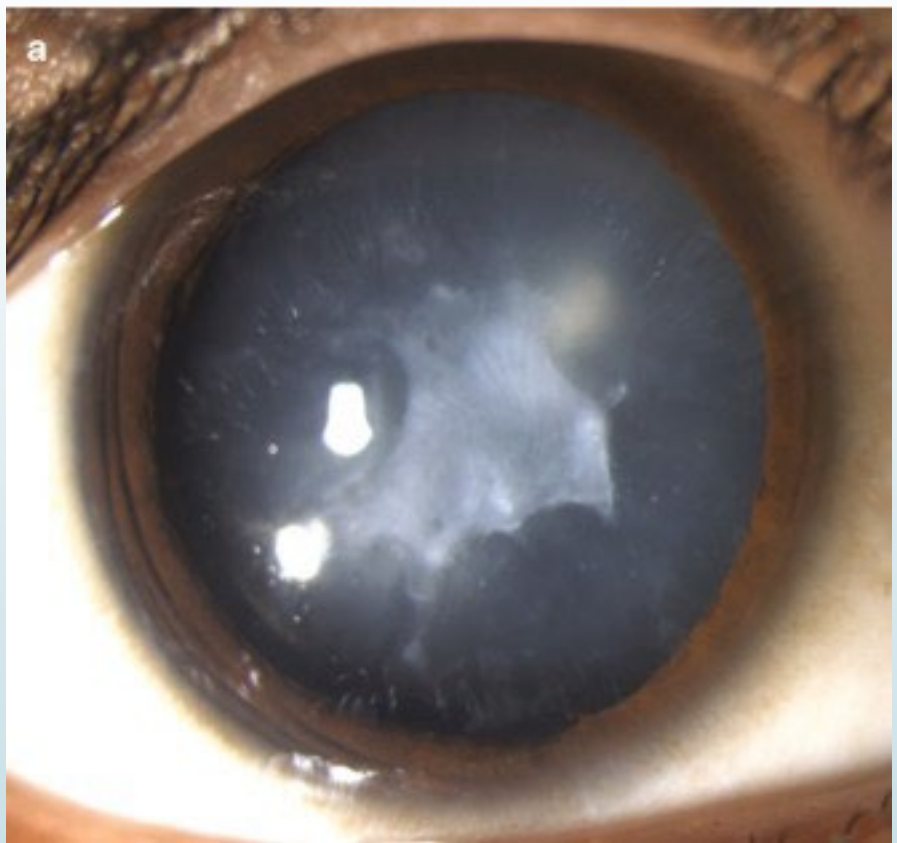
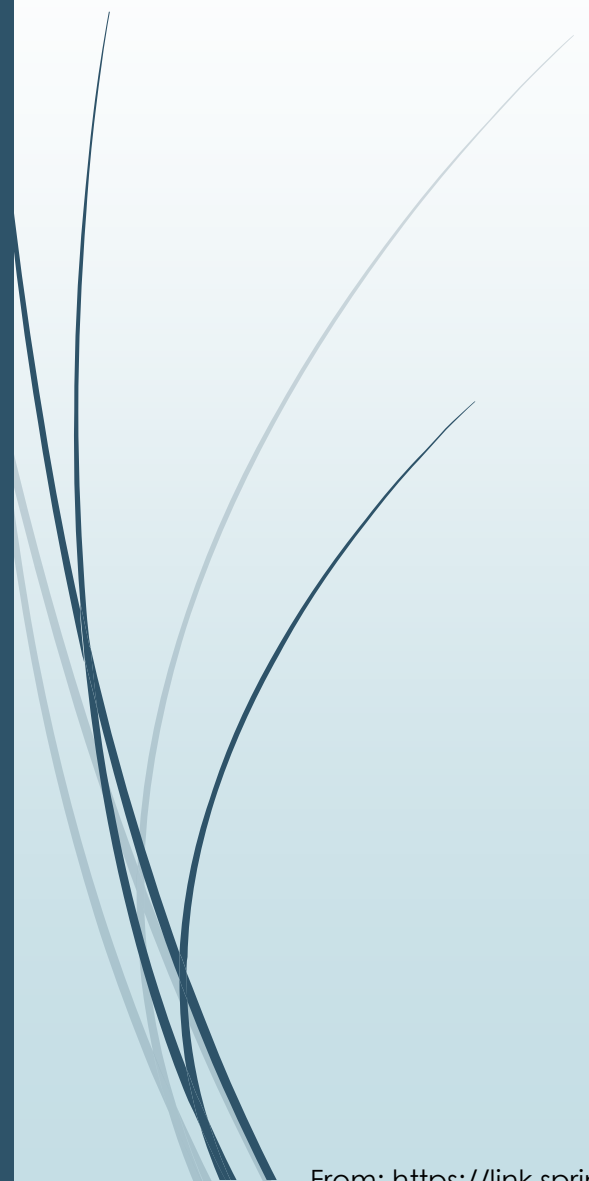
- ▶ POD 1
 - ▶ VAsc
 - ▶ OD: 20/20
 - ▶ OS: 20/15⁻¹
 - ▶ Vault 50% CCT OU
 - ▶ IOP
 - ▶ OD: 8mmHg
 - ▶ OS: 7mmHg
 - ▶ Pt is extremely happy



Case 7



- ▶ POD 366
 - ▶ Pt reports decreased VA OD that began about 4 months s/p ICL
 - ▶ Seems stable
 - ▶ Unable to RTC due to COVID and was deployed
 - ▶ VAsc
 - ▶ OD → 20/40 ph 20/25
 - ▶ OS → 20/20
 - ▶ SLE:



Name:

ID:

DOB:

Gender: Male

Technician: Operator, Cirrus

Exam Date: 3/29/2021

Exam Time: 8:36 AM

Serial Number: 500-34010

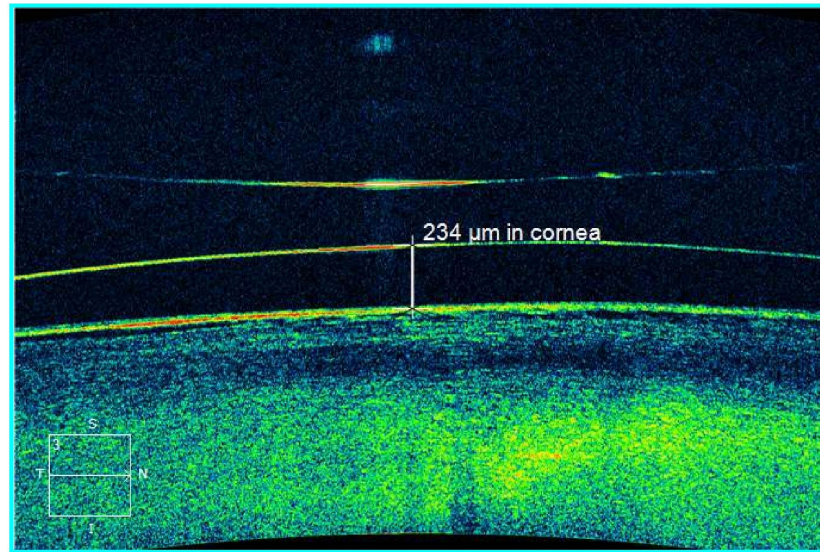
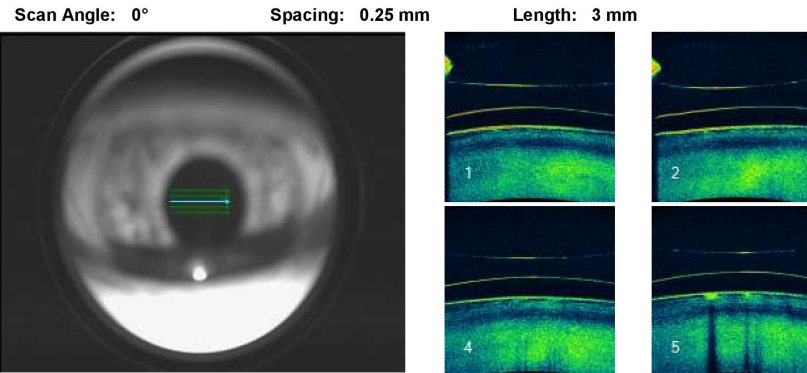
Signal Strength: N/A

CZMI



High Definition Images: Anterior Segment 5 Line Raster

OD | OS



Comments

Analysis Edited: 3/29/2021 8:37 AM

Doctor's Signature _____





You make the call.

N

Case 7



► 13 months post op ICL

 ■ Wears Spectacle:	OD: +1.25 -1.00 x 001 ADD +1.75
 ■ AR Dry:	OD: +2.25 -1.25 x 180

► Plan: ICL extraction, CE with LensAR – Synergy

Case 7



- ▶ 1 mo po CE OD
 - ▶ VA is not sharp at distance OD. Near/intermediate are great!

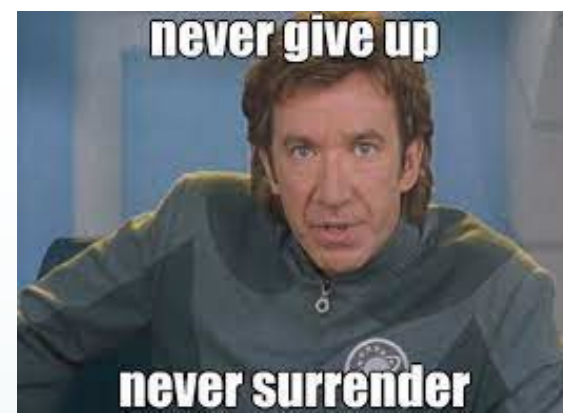
Visual Acuity: OD: (Dsc: 20/40-1) (Isc: 20/20) (Nsc: J1) (PH: 20/25+1)



• MR Dry:

OD: +1.00 -1.25 x 180 = D 20/20.

Case 7



- ▶ 4mo s/p CE
 - ▶ VA seems stable OD, but still not sharp at distance
 - ▶ Today
- ▶ 1 mo po

• MR Dry: OD: +1.00 -1.25 x 002 = D 20/15. AG

• MR Dry: OD: +1.00 -1.25 x 180 = D 20/20.



You Make the Call

Case 7



- ▶ 1 mo s/p LASIK OD
 - ▶ VA is excellent at all distances
 - ▶ Visual Acuity: OD: (Dsc: 20/20) (Isc: 20/20) (Nsc: J1) OS: (Dsc: 20/20-1)
 - ▶ AR: -0.25DS

If you were having cataract surgery tomorrow, which lens would you choose?

Monofocal

Monofocal near target

Panoptix

Synergy

Vivity/Eyhance - EDOF

LAL

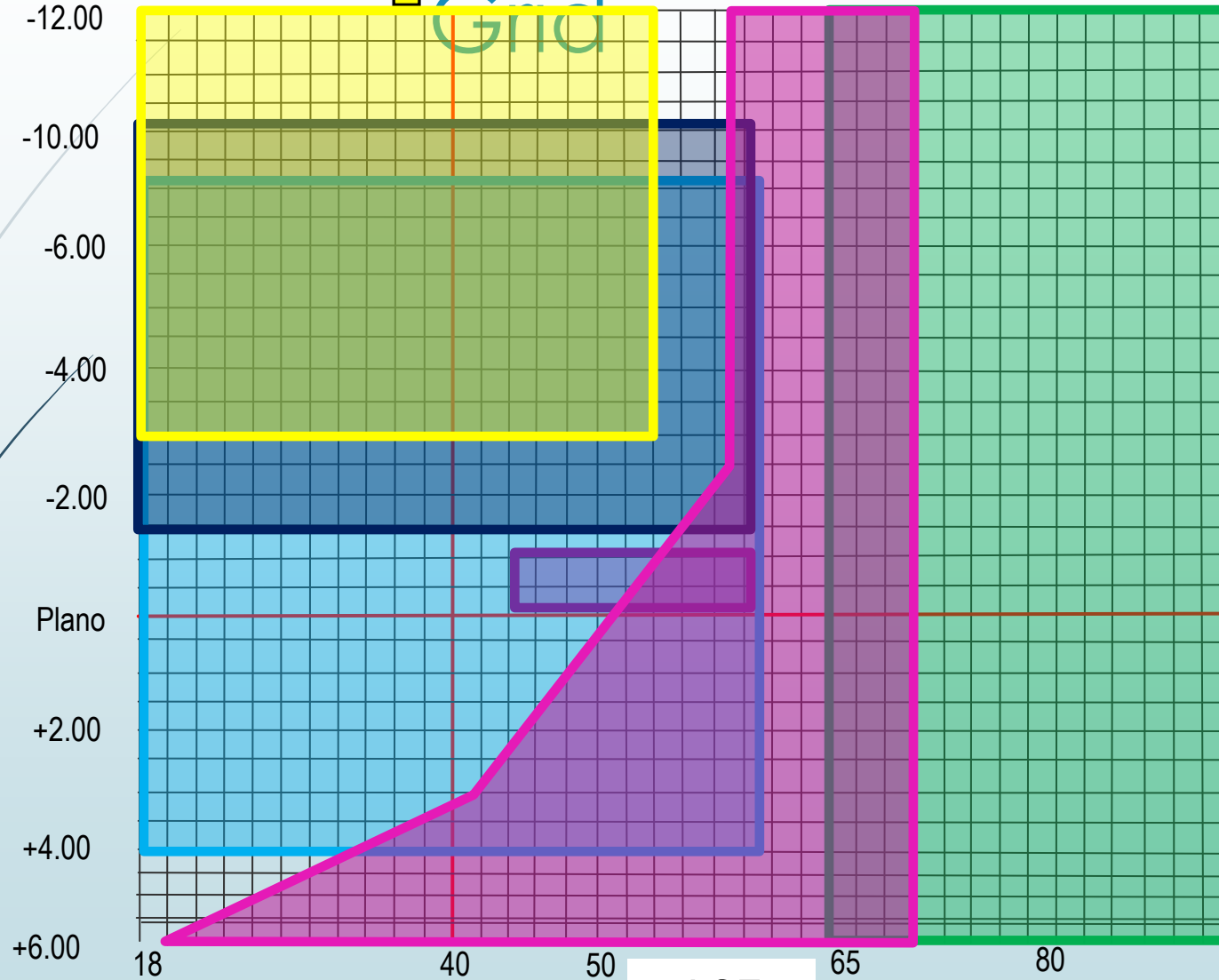
Blended Vision

SBL-3

Refractive Surgery Grid



REFRACTIVE ERROR



Astigmatism Ranges

- LASIK Up to 6 D Refractive Cyl
- ICL Up to 4 D Refractive Cyl
- SMILE 3 D Refractive Cyl
- RLE Up to ~ 5 D Corneal Cyl
(combine with LASIK for Cyl > 5 D)
- CAT Sx Up to ~ 5 D Corneal Cyl
(combine with LASIK for Cyl > 5 D)
- KAMRA ≤ 0.50 D Refractive Cyl
(combine with LASIK for Cyl ≥ 0.75 D)



Questions?





THANK YOU

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 - ▶ ksandber@uiwtx.edu