

**STATE BOARD OF OPTOMETRY**

2450 DEL PASO ROAD, SUITE 105, SACRAMENTO, CA 95834

P (916) 575-7170 F (916) 575-7292 www.optometry .ca.gov

**Continuing Education Course
Approval Checklist**

Title:

Provider Name:

☒ Completed ApplicationOpen to all Optometrists? ☒ Yes ☐ NoMaintain Record Agreement? ☒ Yes ☐ No☒ Correct Application Fee☒ Detailed Course Summary☒ Detailed Course Outline☒ PowerPoint and/or other Presentation Materials☒ Advertising (optional)☒ CV for EACH Course Instructor☒ License Verification for Each Course InstructorDisciplinary History? ☐ Yes ☒ No



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CONTINUING EDUCATION COURSE APPROVAL APPLICATION

\$50 Mandatory

\$50 Paid

Pursuant to California Code of Regulations (CCR) § 1536, the Board will approve continuing education (CE) courses after receiving the applicable fee, the requested information below and it has been determined that the course meets criteria specified in CCR § 1536(g).

In addition to the information requested below, please attach a copy of the course schedule and topical outline of the subject matter. Applications must be submitted 45 days prior to the course presentation date.

Please type or print clearly.

Course Title New Technologies Yielding Top Box Satisfaction and Long Term Stable Vision	Course Presentation Date <div style="border: 1px solid black; padding: 5px; text-align: center;"> 0 3 / 2 3 / 2 0 1 7 </div>
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Course Provider Contact Information

Provider Name <div style="border-bottom: 1px solid black; padding-bottom: 5px;">Khristine</div> <div style="text-align: center; font-size: small;">(First)</div>	<div style="border-bottom: 1px solid black; padding-bottom: 5px;">Mays</div> <div style="text-align: center; font-size: small;">(Last)</div>	<div style="border-bottom: 1px solid black; padding-bottom: 5px;"></div> <div style="text-align: center; font-size: small;">(Middle)</div>
--	--	--

Provider Mailing Address <div style="border-bottom: 1px solid black; padding-bottom: 5px;">24401 Calle de la Louisa, Suite 300</div>	<div style="border-bottom: 1px solid black; padding-bottom: 5px;">Laguna Hills</div>	<div style="border-bottom: 1px solid black; padding-bottom: 5px;">CA</div>	<div style="border-bottom: 1px solid black; padding-bottom: 5px;">92653</div>
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Provider Email Address <u>khristinem@harvardeye.com</u>	
--	--

Will the proposed course be open to all California licensed optometrists?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Do you agree to maintain and furnish to the Board and/or attending licensee such records of course content and attendance as the Board requires, for a period of at least three years from the date of course presentation?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

Course Instructor Information

Please provide the information below and attach the curriculum vitae for each instructor or lecturer involved in the course. If there are more instructors in the course, please provide the requested information on a separate sheet of paper.

Instructor Name <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="border-bottom: 1px solid black; width: 25%; text-align: center;">John</div> <div style="border-bottom: 1px solid black; width: 25%; text-align: center;">Hovanesian</div> <div style="border-bottom: 1px solid black; width: 25%; text-align: center;">A</div> <div style="border-bottom: 1px solid black; width: 25%;"></div> </div> <div style="display: flex; justify-content: space-between; font-size: small; margin-top: 5px;"> (First) (Last) (Middle) </div>			
License Number <u>G83665</u>	License Type <u>Medical Doctor</u>		
Phone Number <u>(949) 951-2020</u>	Email Address <u>jhovanesian@harvardeye.com</u>		

I declare under penalty of perjury under the laws of the State of California that all the information submitted on this form and on any accompanying attachments submitted is true and correct.

Signature of Course Provider

2.13.17
 Date

Course Instructor Information – Additional

Instructor Name

Duna Raoof _____
(First) (Last) (Middle)

License Number A136157 **License Type** Medical Doctor

Phone Number (949) 951-2020 **Email Address** draoof@harvardeye.com

Save the Date!

Harvard Eye Associates
TLC at Harvard Eye
Laguna Hills – San Clemente
949.951.2020
www.harvardeye.com

To: Doctor of Optometry

Continuing Education Seminar

"New Technologies Yielding Top Box Satisfaction and Long Term Stable Vision"

Topics to be discussed include:

- What Gives Patients Top-Box Satisfaction in Cataract Surgery – presented by John Hovanesian, MD
- Spotlight on Corneal Collagen Crosslinking – presented by Duna Raoof, MD

When: Thursday, March 23, 2017

Where: J.T. Schmid's Restaurant and Brewery
2415 Park Ave
Tustin, CA 92782

Time: 6:30pm – 9:00pm: Dinner and CE Program

2 Hours of California Board of Optometry Continuing Education Pending

Please submit your RSVP to Dr. Isabell Choi or Khristine Mays by March 16, 2017.

- Dr. Isabell Choi 949.916.4477 or via email at isabell.choi@tlcvision.com
- Khristine Mays 949.900.5267 or via email at khristinem@harvardeye.com

We look forward to seeing you there!



What Gives Patients Top-Box Satisfaction in Cataract Surgery

John Hovanesian, MD
Cataract, Cornea, and Refractive Surgery Specialist

Harvard Eye Associates
CE Seminar
Thursday March 23, 2017

Summary: The most important outcome measure in refractive cataract surgery is patient satisfaction because this one parameter ties together refractive accuracy and all other elements of the surgical outcome. We have employed a research tool to collect patient satisfaction data routinely on patients undergoing refractive cataract surgery. We have performed an analysis of preoperative and postoperative factors that correlate with the highest levels of satisfaction, so-called "top box" satisfaction. In this talk, we will examine in-depth two separate studies that have looked at patients who underwent surgery two months prior to the questionnaire and five years prior to the questionnaire. We will explore how preoperative biometric factors and postoperative spectacle independence and other visual parameters are correlated with satisfaction and suggest how this may guide counseling for future patients to achieve expected results.

Outline:


Study 1: correlation of satisfaction to visual performance and measured parameters post cataract surgery

- a. Visual acuity
- b. Refraction
- c. Pre-op data

Study 2: comparison of two lens implant designs for postop satisfaction 5 years out

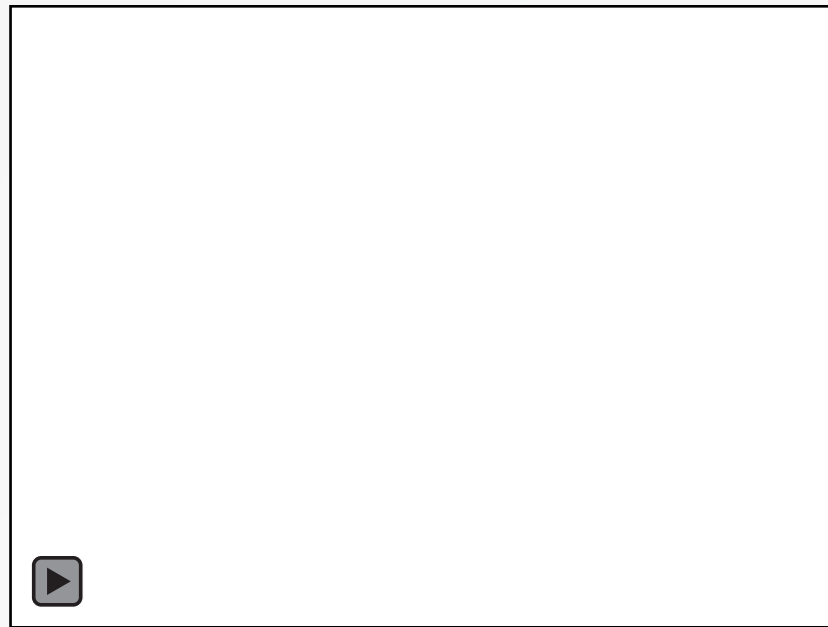
- a. Visual acuity
- b. Spectacle independence
- c. Patient satisfaction

Conclusions and Summary



John A. Hovanesian, MD
Harvard Eye Associates
Laguna Hills, California

Ooooooooooh, satisfaction!



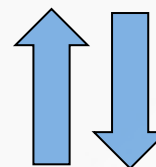
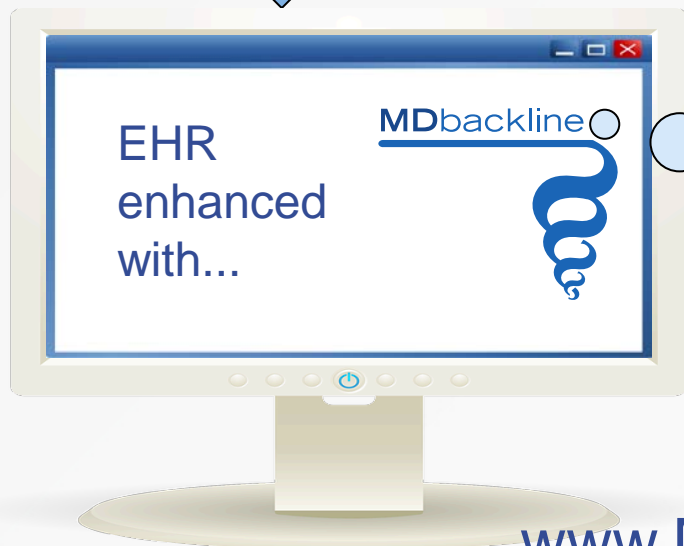
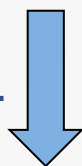


Glad your surgery went well!

Me too!



Later...



MDbaciline
contacts patient by
email with
customizable delay &
reminders

www.MDbaciline.com



Patients Answer Simple Questions

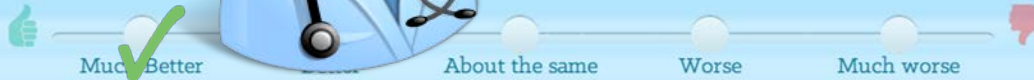


Linda Benson, MD

Sign Out

Welcome Back, Mr. Bouchard!

OVERALL, how have your eyes changed since your visit in our office?

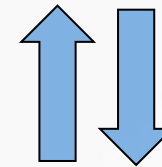


OVERALL, how satisfied are you with the way your treatment is going?



Next >

You are using an automated system. If you are having an urgent problem, you should call the office or go to your nearest emergency room.



phone, tablet,
computer

MDbackline

contacts patient by
email with
customizable delay &
reminders



Two Studies of “Top Box” Satisfaction:

STUDY 1: Satisfaction 2 months postop bilateral multifocal IOLs (Tecnis MF 3.0)

STUDY 2: Satisfaction ~5 years postop with multifocal (mixed) vs accommodating IOLs

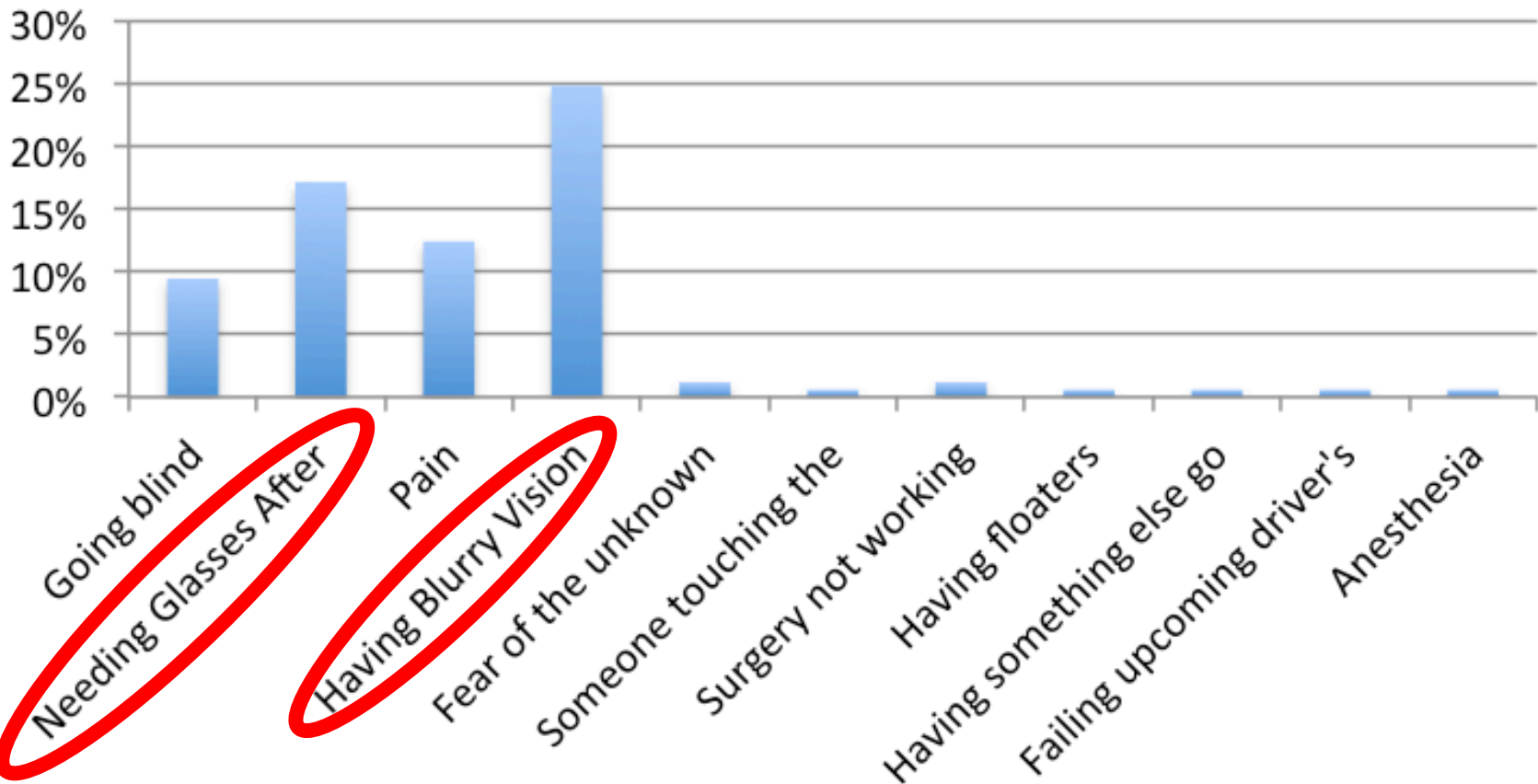


Study Participants

- Of 220 patients recruited, 169 patients had analyzable data.

	Men	Women	Combined
N	75 (44%)	94 (56%)	169
Mean \pm SD age (years)	74.1 \pm 6.7	74.8 \pm 6.9	74.5 \pm 6.6
Age range	58 – 89	56 – 105	56 – 105

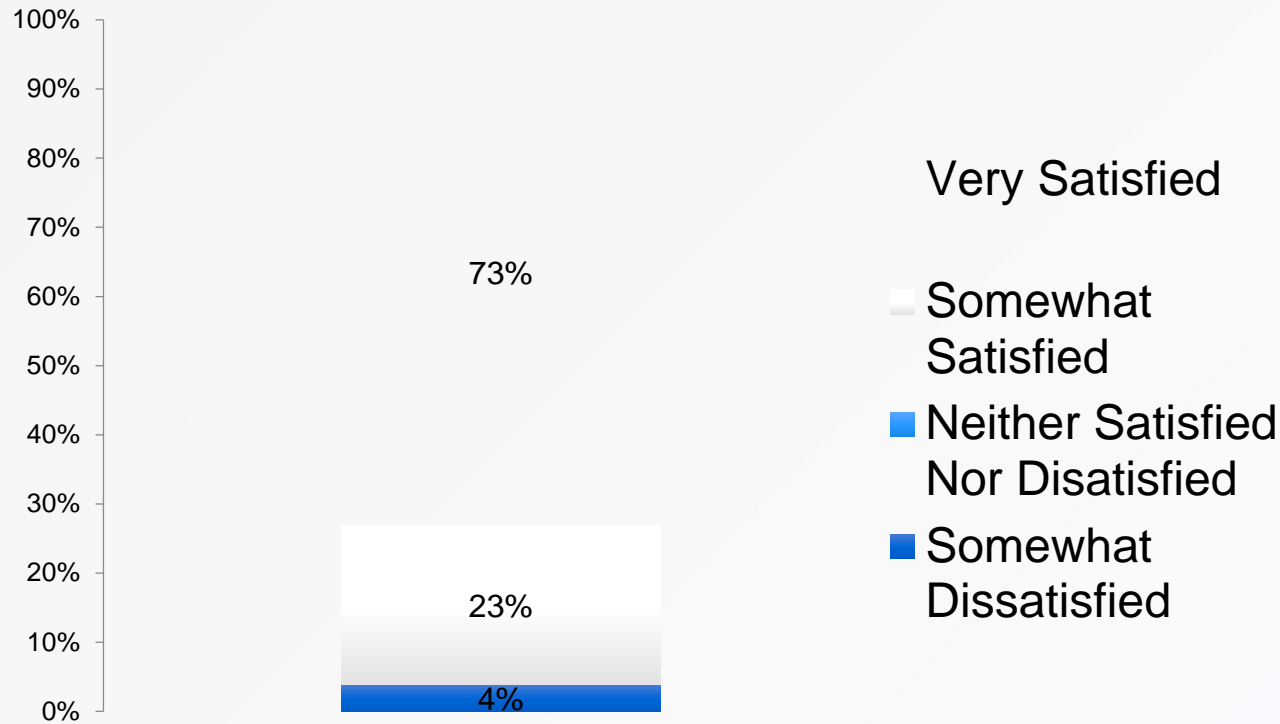
Fears Before Surgery



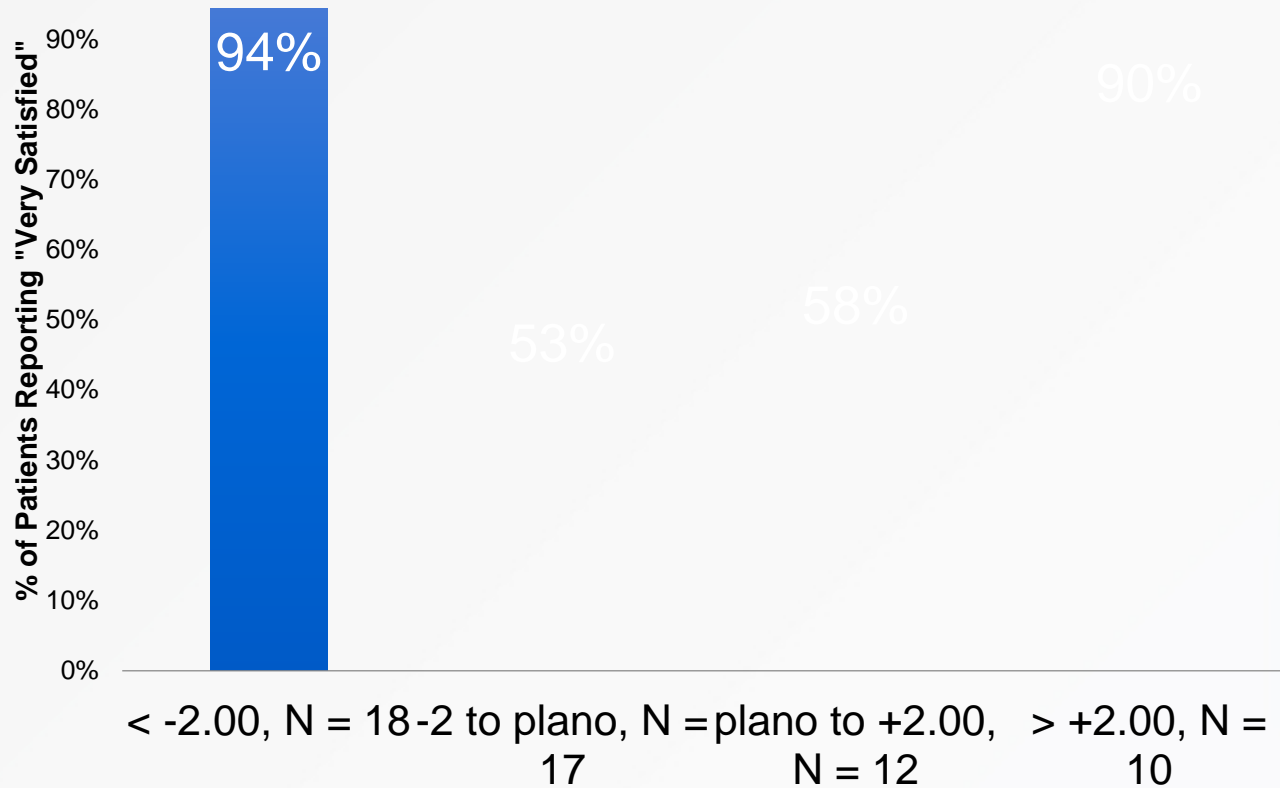
Fears of needing glasses or blurry vision were most prominent, occurring in 34% of all patients.



Patient Satisfaction (N=169)



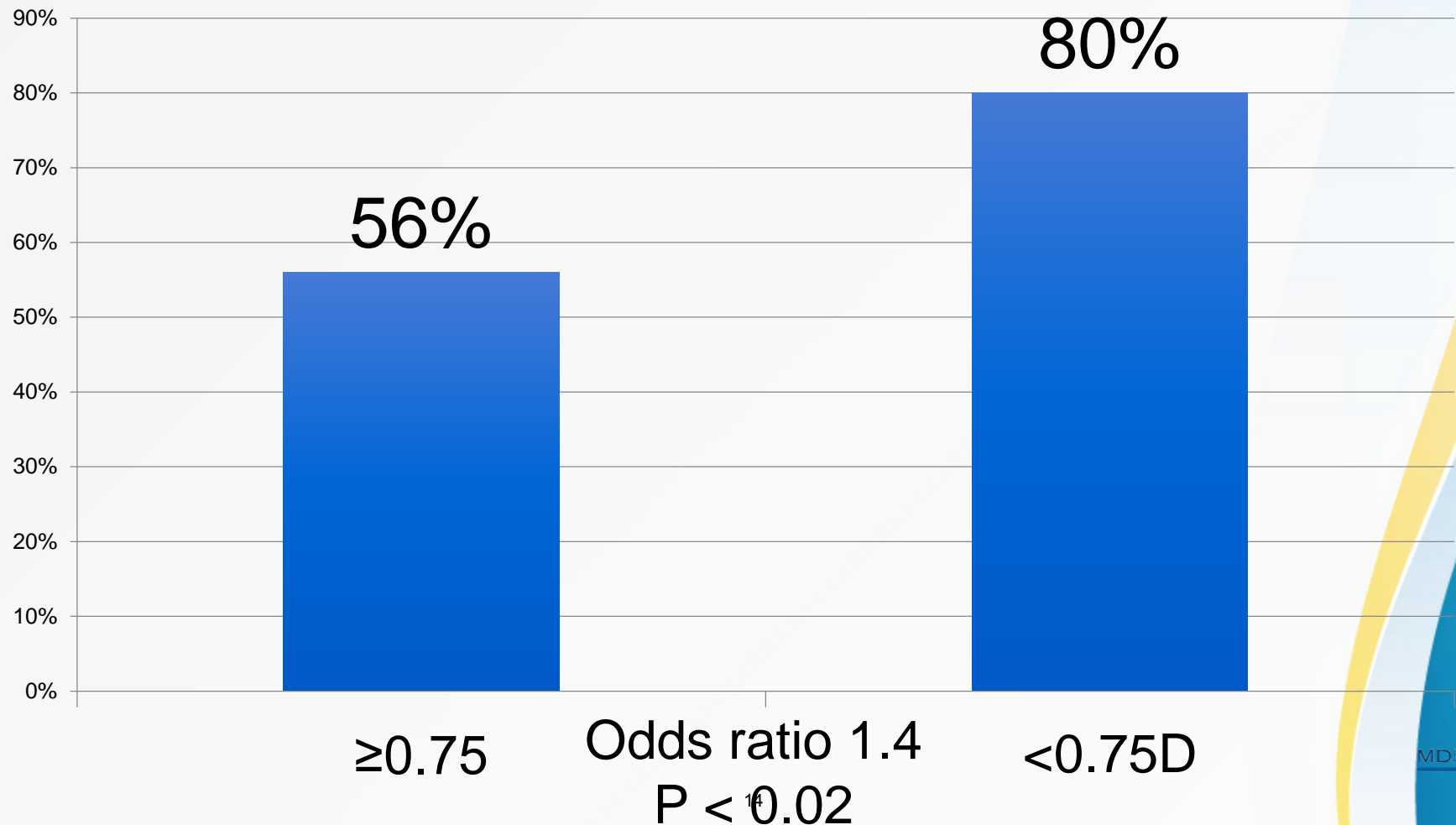
- 96% of patients were “Somewhat” or “Very Satisfied”



Half as many near-emmetropes report "top box" satisfaction ($P < 0.0001$) .

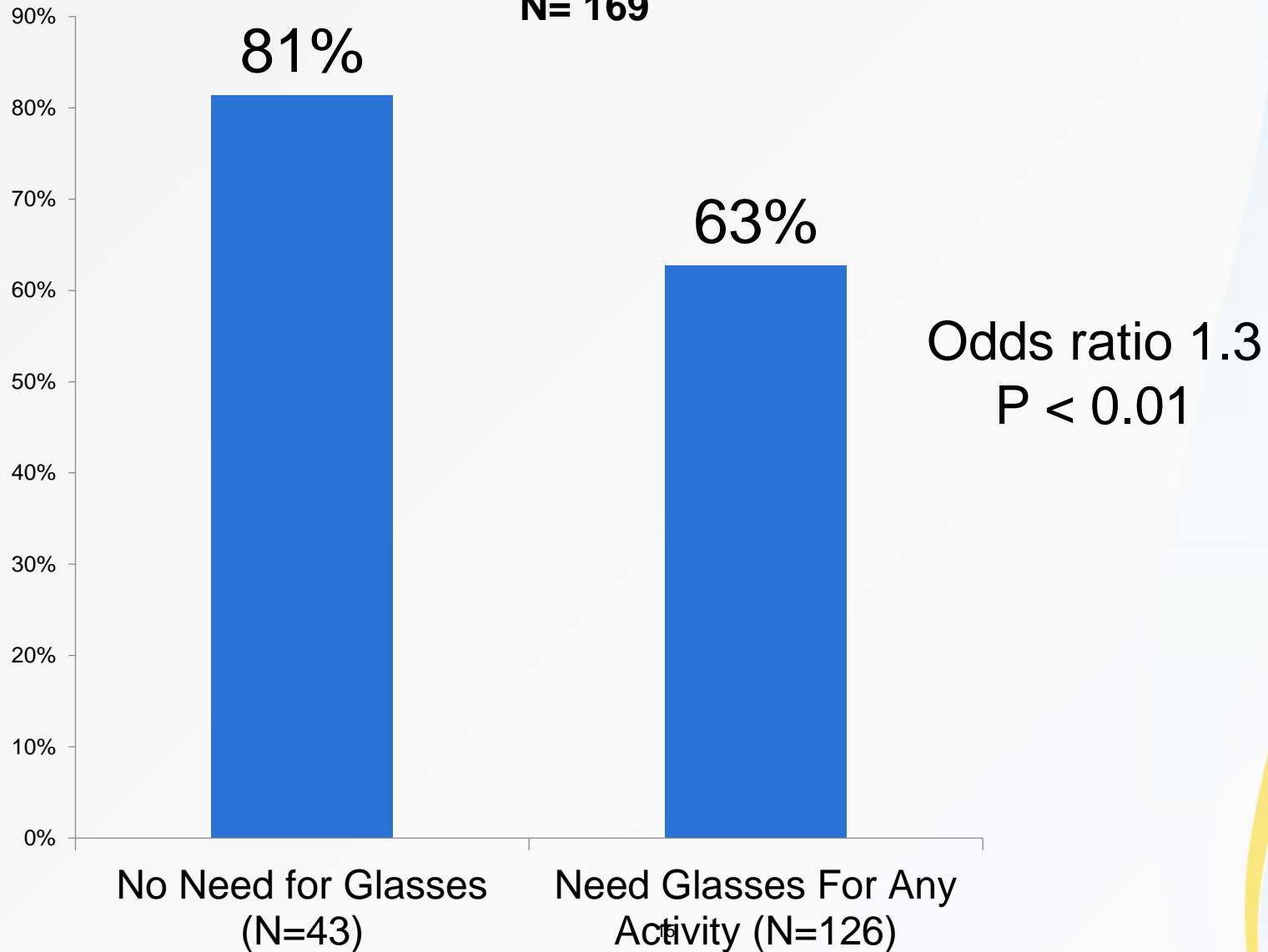
Satisfaction vs Residual Cylinder (N= 50)

% Extremely Satisfied vs Postop Cylinder



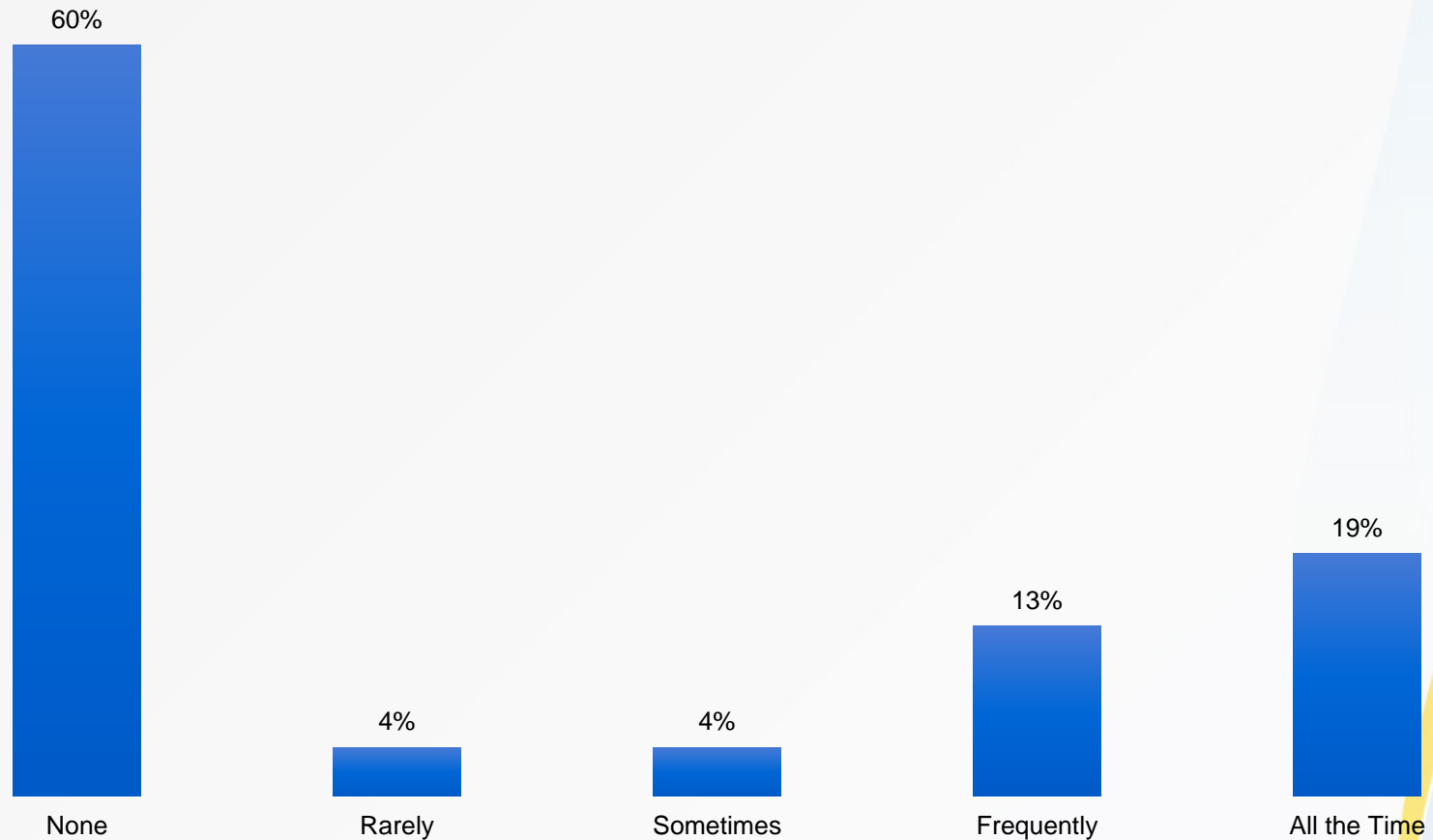
Satisfaction vs Spectacle Independence

Percentage of Patients "Very Satisfied",
N= 169



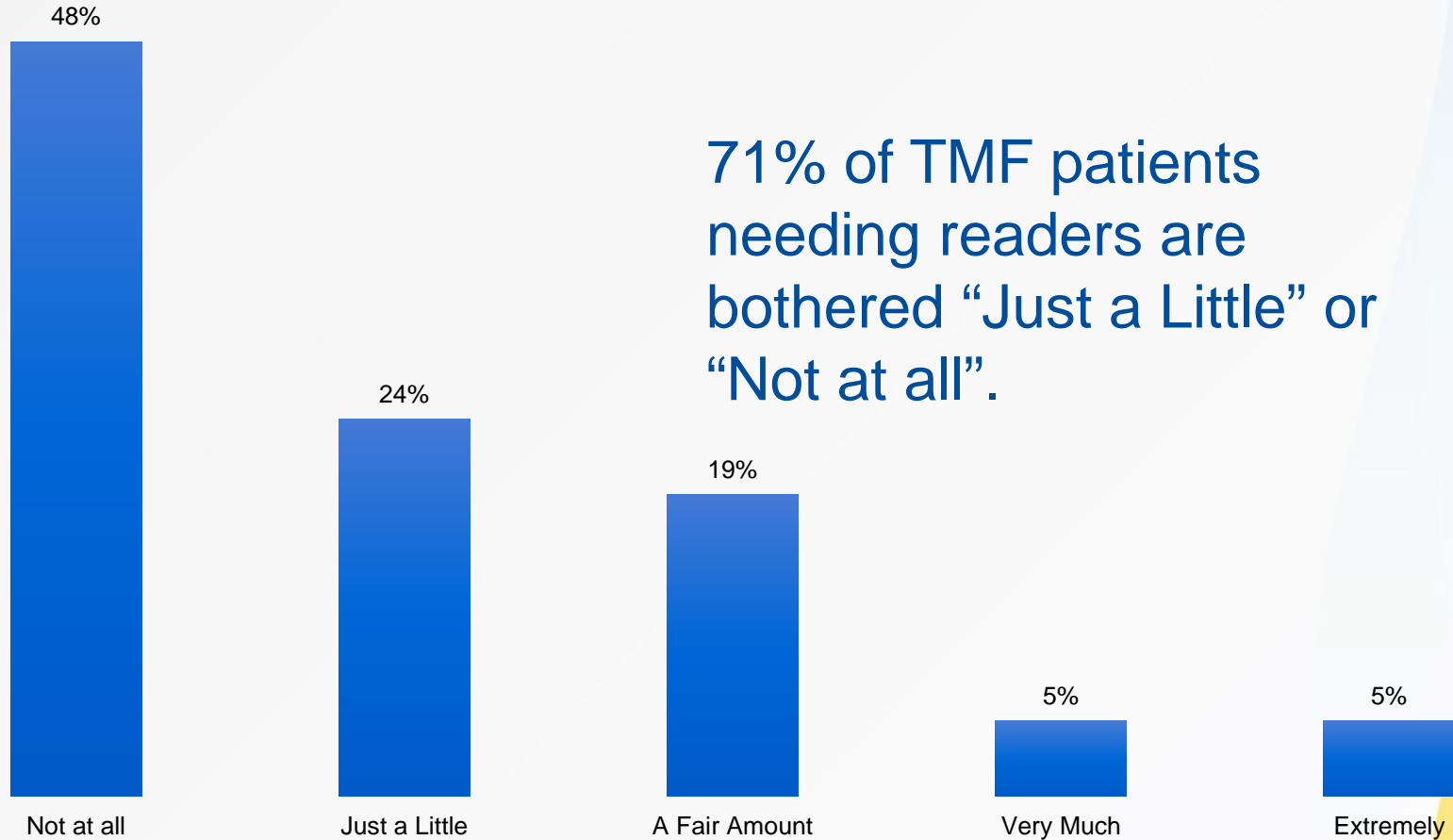
Need for Reading Glasses

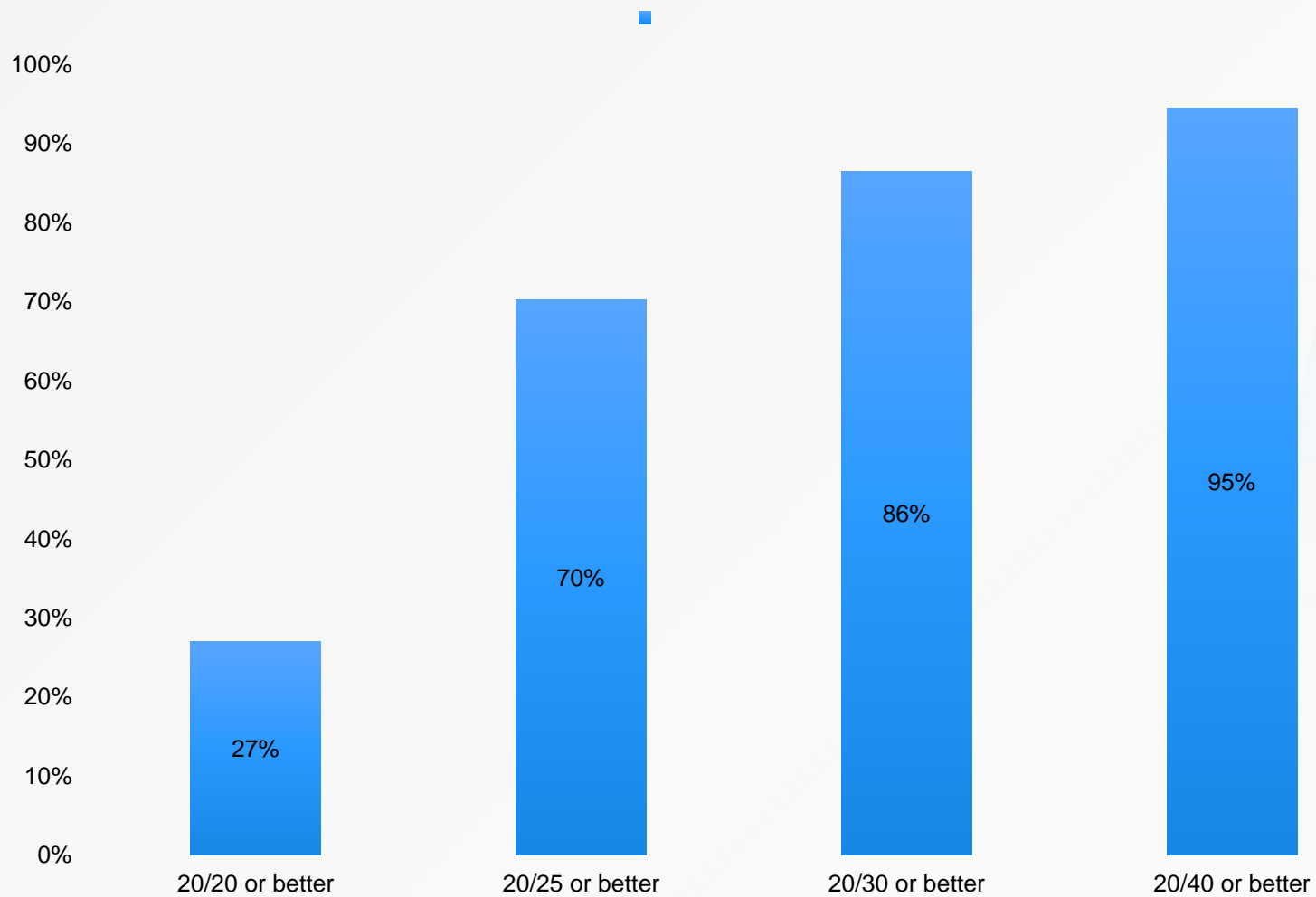
**Need for Any Reading Glasses
(N=52)**



How Bothered by Need for Reading Glasses

How Bothered by Need for Reading Glasses
TMF (N=21) vs Non PC-IOL (N=78)





Conclusions

- Satisfaction is high among cataract surgery patients, regardless of the specific procedure they undergo.
- Satisfaction tends to be higher among patient with higher pre-op refractive error, whether myopic or hyperopic.
- More patients fear needing glasses after surgery than going blind from surgical complications.
- Among patients who need glasses after surgery, reading is the primary activity that requires them.
- Limbal relaxing incisions provide very acceptable reduction of astigmatism.

STUDY 2:

Satisfaction with multifocal vs accommodating IOLs 5 years postop



Purpose:

- To determine satisfaction levels of patients at least two years after cataract surgery with bilateral accommodating or multifocal lens implants
- To determine dependence on glasses and adverse symptoms and the impact of these symptoms

Methods:

- A questionnaire was administered to patients who had undergone uncomplicated cataract surgery with an accommodating vs a multifocal lens implants (PC-IOLs) at least 2 years after having had the surgery.
- Patients selected for PC-IOLs had healthy eyes and potential VA at least 20/25.
- Patients with visually significant non-IOL related morbidity in the post-op period were eliminated.

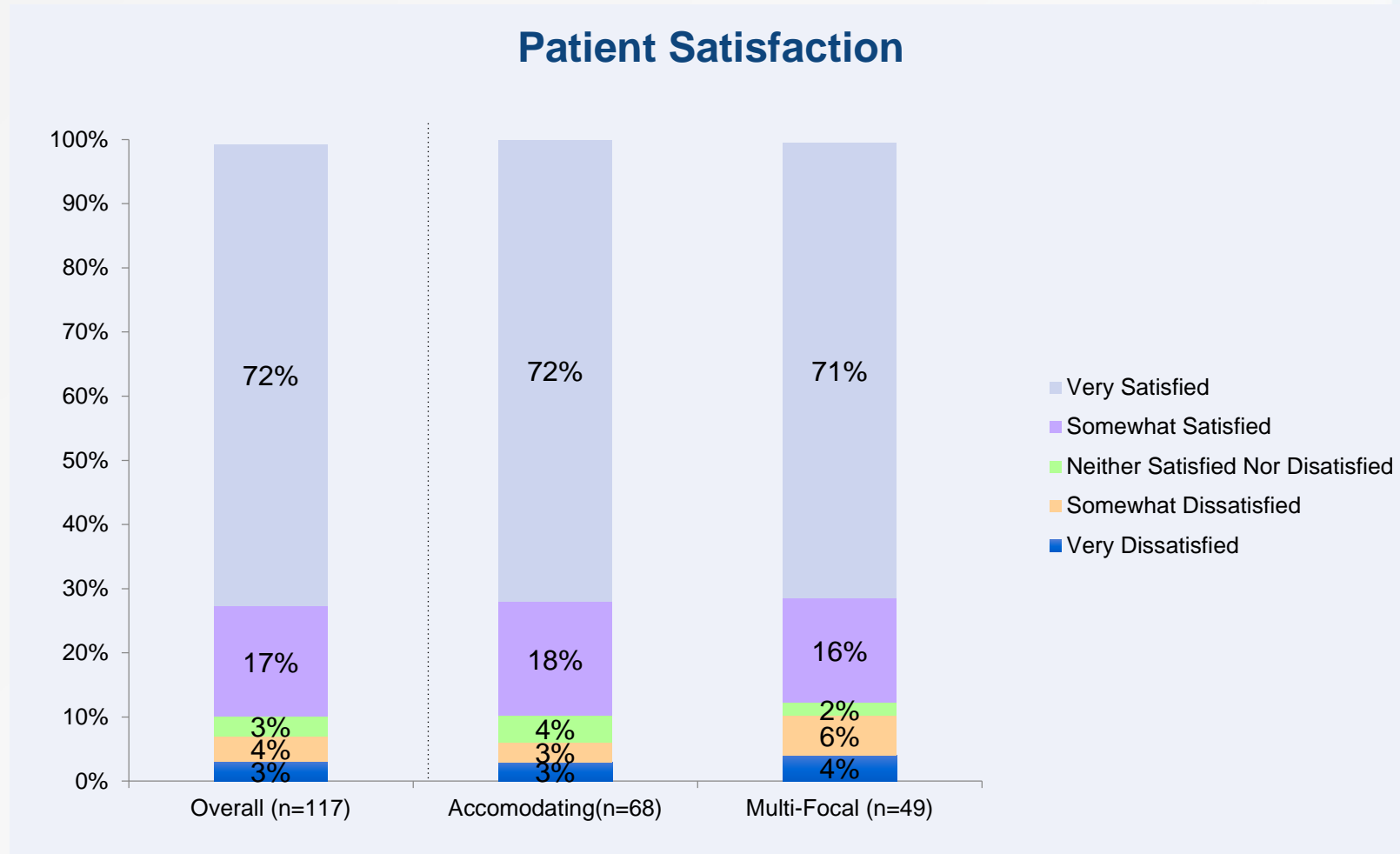
Study 2 Participants

- Of 224 patients recruited, 117 patients had analyzable data.
- Patients analyzed had no other significant ocular morbidity to reduce vision.

	Accommodating	Multi-Focal	Combined
N	68	49	117
Mean \pm SD age (years)	75.8	75.6	75.7
Mean Years from Surgery Date	6.1	4.4	5.4



About 90% of patients are satisfied with their vision 5.4 years after surgery. There are no significant differences between lens types.



- About 90% in both groups were “Somewhat” or “Very Satisfied”



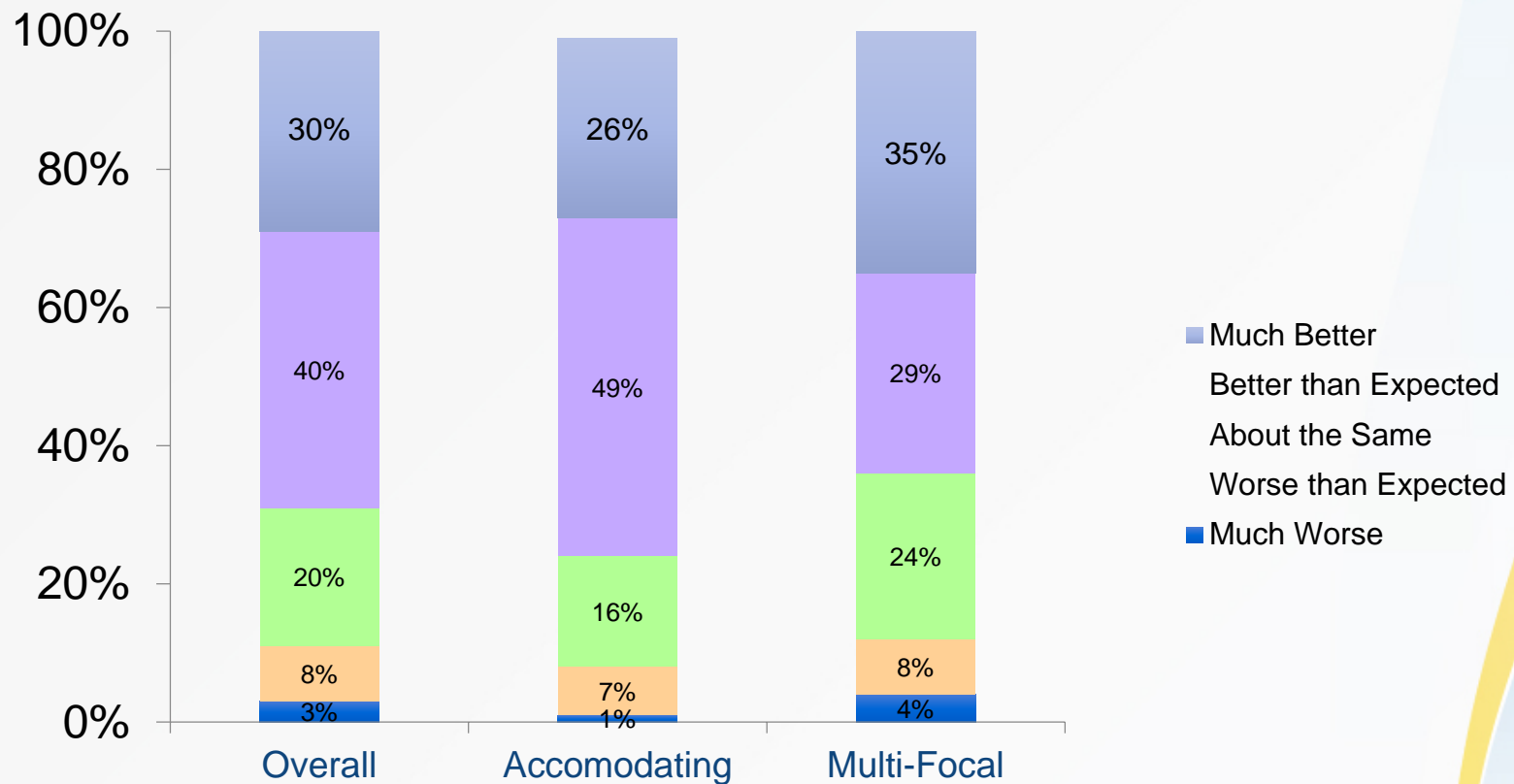
- Very Likely
- Somewhat Likely
- Neither likely nor unlikely
- Somewhat Unlikely
- Very Unlikely

Accommodating

Multi-Focal

Only 1 in 11 patients found their vision to be worse then expected

Current Vision Vs. Expectations

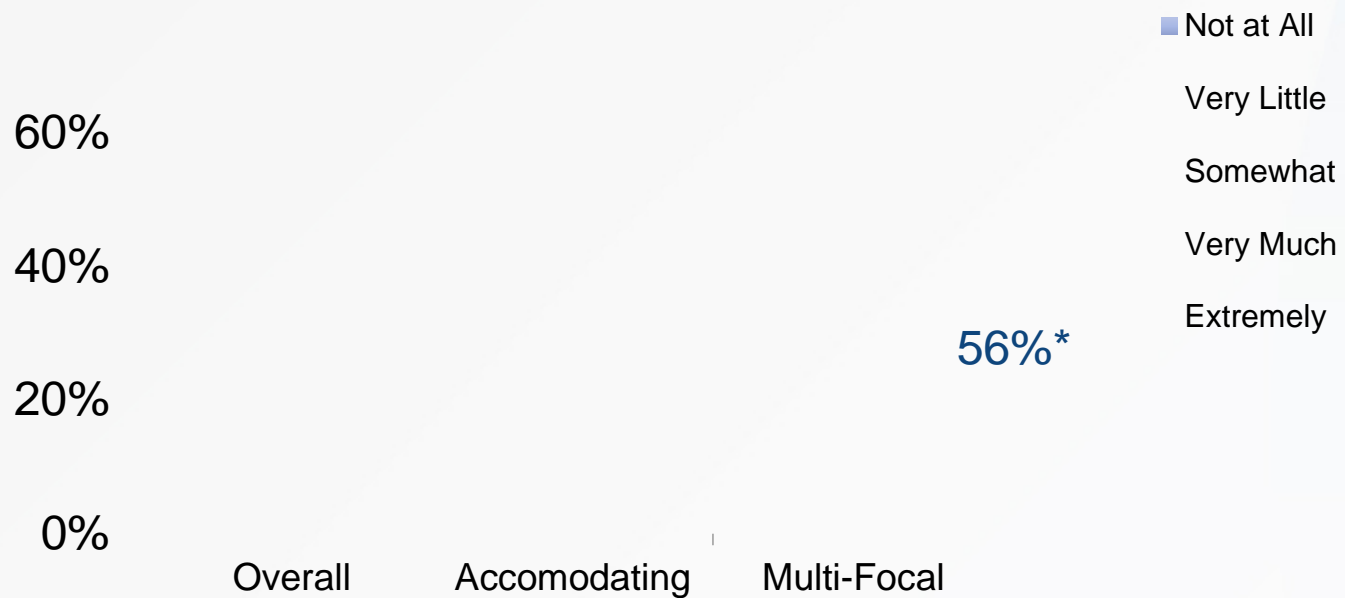


How Worse Than Expected?

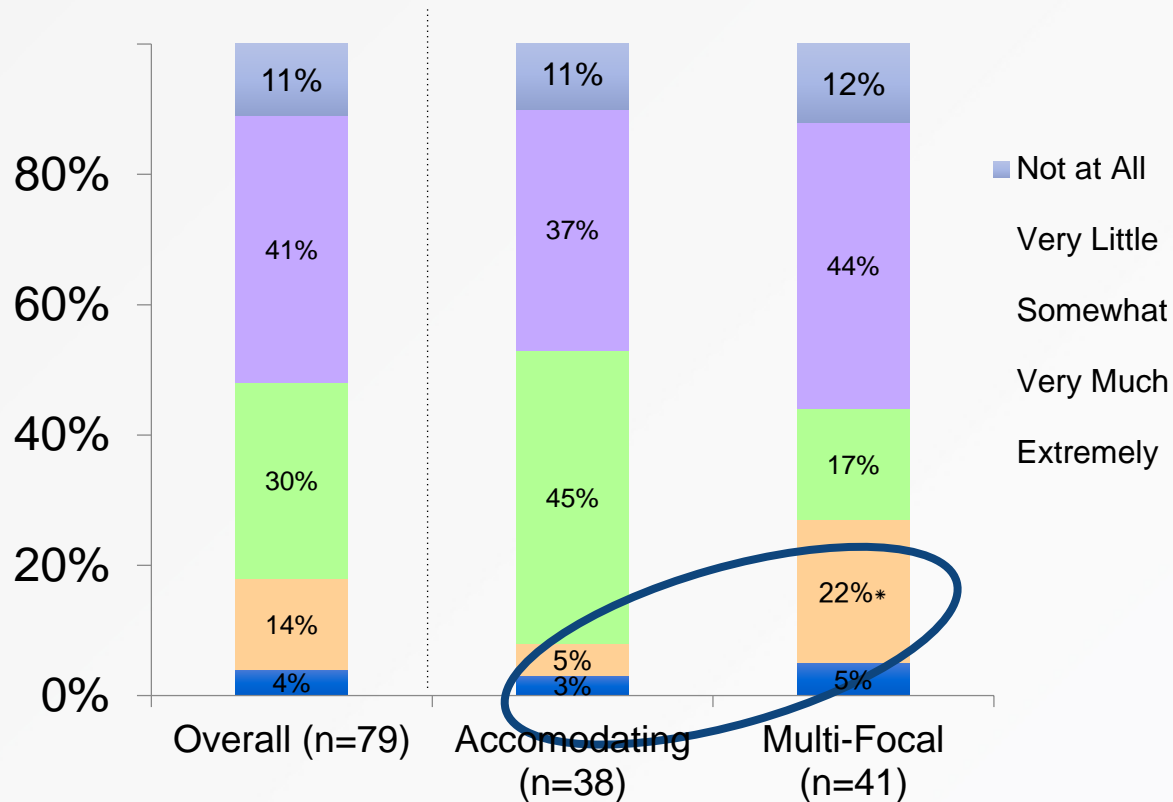
Among those whose vision was worse than expected, more Multifocal patients complained of glare, whereas more accommodating lens patients complained of difficulty reading w/o glasses.

Complaint	Accommodating (6/68, 8%)	Multifocal (6/49, 12%)
#1	Reading fine print more difficult than expected (5/6)	Bothered by glare/haloes around bright lights (3/6)
#2	Need to wear glasses more than expected (4/6)	Reading fine print more difficult than expected (3/6)
#3	Driving after dark is more difficult than I expected (3/6)	Need to wear glasses more than expected (2/6)
#4	Even with glasses everything is not as clear as I expected (2/6)	Even with glasses everything is not as clear as I expected (1/6)
#5	Bothered by glare/haloes around bright lights (2/6)	Driving after dark is more difficult than I expected (1/6)



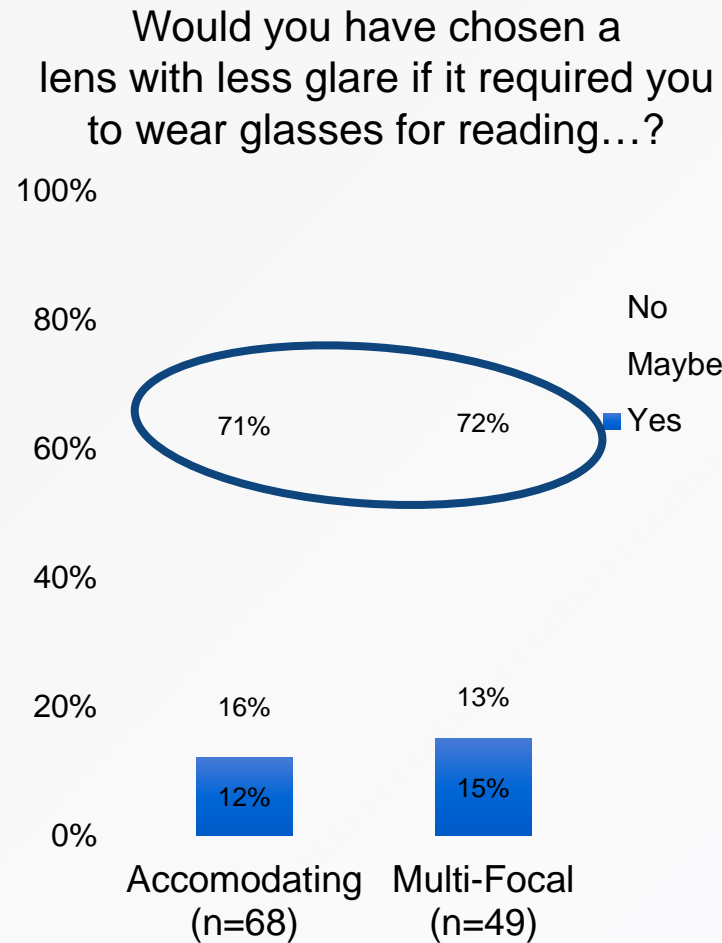


* Difference is statistically significant



* Difference is statistically significant

But patients would rather not choose a different lens with less glare if it meant more need for reading glasses, regardless of lens type.



What patients are saying.....



I haven't noticed that any glare is present, and am happy with the implant I chose -- Accommodating Patient

My vision is so improved that I do not mind the few times I have haloes or glare. -- MultiFocal Patient

While I'm disappointed that the haloes did not go away, I'm so thrilled with the excellent results that I would do it again, even knowing I would have haloes. I love not wearing glasses and I especially love reading without glasses.

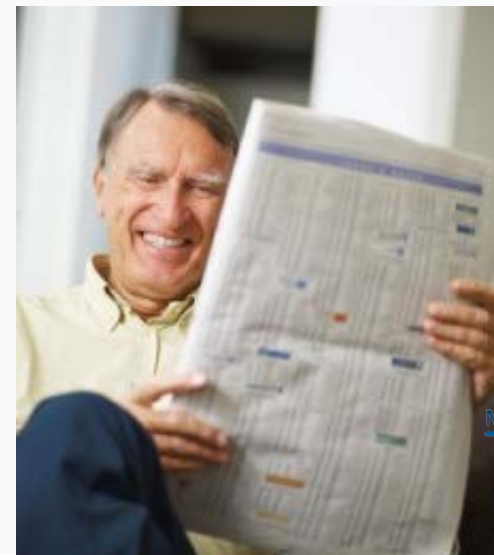
-- MultiFocal Patient

I am very satisfied with my cataract surgery and my lens implants. I love my crystal lens.

-- Accommodating Patient

I love not wearing glasses and having clear vision. It is like a miracle! -- Accommodating Patient

I enjoy the vision I have. My goal in the implant I chose was not to have to wear glasses. I can deal with the slight glare and halos. -- MultiFocal Patient



■ Accomodating
Multi-Focal

0% 20% 40% 60% 80%

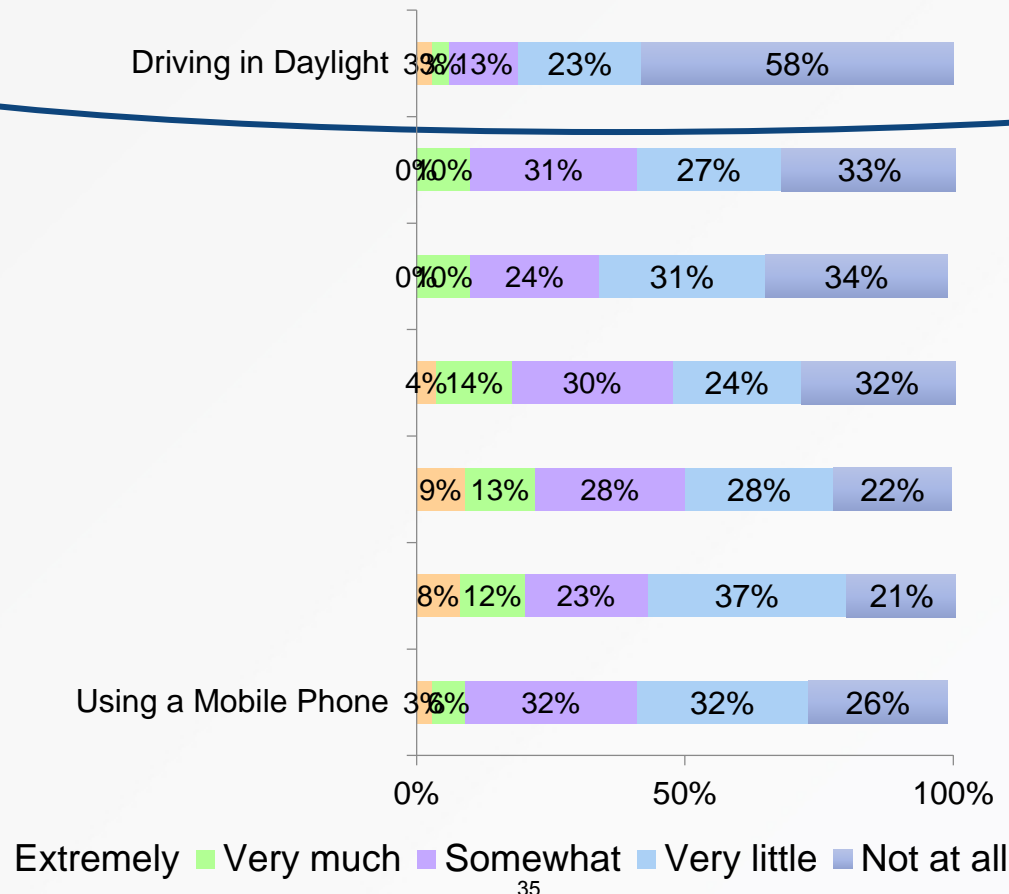
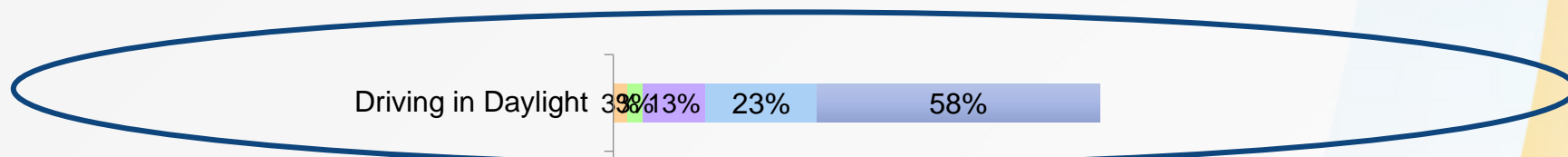
**Among those who do activity

All the time

Frequently

Occasionally


Never



*Among those who wear glasses for activity. Accommodating and MultiFocal combined

Conclusions:

- Satisfaction is high overall among refractive cataract surgery patients.
- Give special counseling to near-emmetropes
- Leaving 0.75 D of cylinder cuts satisfaction rate in half—do LRIs or use torics
- True spec independence greatly increases satisfaction
- At 5 years, accommodating IOLs matches satisfaction with multifocals—match the IOL type to the patient



John A. Hovanesian, MD
Harvard Eye Associates
www.harvardeye.com
jhovanesian@harvardeye.com

CURRICULUM VITAE
John A. Hovanesian, M.D.

Personal

Address/phone: Harvard Eye Associates
24401 Calle De La Louisa, Suite 300
Laguna Hills, California USA
+1 (949) 951-2020
Voice: +1 (949) 951-2020

Medical Licenses: California: G83665
Michigan: 4301059581
DEA: BH4893980

Board Certification: American Board of Ophthalmology, 1997
Recertified in 2007 and 2016

Education/Employment

Undergraduate: Bachelor of Science in Honors Chemistry
Summa Cum Laude, graduated in three years
University of Michigan, Ann Arbor, Michigan
1985-1988

Medical School: Doctor of Medicine
University of Michigan, Ann Arbor, Michigan
1988-1992

Internship: Department of Medicine, Transitional Internship
William Beaumont Hospital, Royal Oak, Michigan
1992-1993

Residency: Department of Ophthalmology
Henry Ford Hospital, Detroit, Michigan
1993-1996

Chief Resident: Department of Ophthalmology
Henry Ford Hospital, Detroit, Michigan
1996-1997

Fellowship: Refractive Surgery, Cornea, and External Disease
Jules Stein Eye Institute, University of California Los Angeles
1997-1999

Practice/Teaching	<u>Private Practice</u> Harvard Eye Associates Laguna Hills, California	<u>Academic Affiliation</u> Clinical Instructor UCLA Jules Stein Eye Institute
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1999-present

1999-present

Consulting & Scientific/Medical Advisory Boards (SAB denoted by *)

1-800-DOCTORS, 2012-present*
Alcon, 2014-present
Allergan, Inc., 2007-2014
Bausch & Lomb, 2006-present*
Baxter Bioscience, 2004-2006
BlephEx, 2014-present*
Diopter, 2008-present*
Dupont, Inc., 2006
EssexBio, 2013-2014
Glaukos, 2012-present
Guardion Health Sciences, 2013-present*
Halozyne, 2013-2014
Innovative Ophthalmic Products, Inc., 2005-2014*
Inspire Pharmaceuticals, 2007-2013
Ista Pharmaceuticals, 2005-2012*
Ivantis, Inc. 2008-present*
Katena, 2014-present*
Kurtis Eyewear, 2006-2010
Mylan Pharmaceuticals, 2012*
Ocular Therapeutix, 2008-present*
Omeros, 2012-present*
Optos, 2014
Revision Optics, 2008-present
SARcode, Inc., 2012
Sarentis Therapeutics, 2012-present*
Shire, 2014-present*
Sight Sciences, 2012-present*
Sirion Therapeutics, 2007-2010*
Tear Science, 2011-2014*
Visiogen, Inc., 2007-2010
Vistakon, Inc., 2007-2009

Honors and Awards

James B. Angell Scholar, University of Michigan, 1985-1988
Phi Beta Kappa as college junior, University of Michigan, 1987
CIBA/Geigy Award for Outstanding Community Service, University of Michigan
Medical School, 1990
Silver Beaver Award, highest volunteer honor given by the National Court of Honor, Boy
Scouts of America, 1994
Resident of the Year, Henry Ford Hospital, 1996

David May II Fellowship, Jules Stein Eye Institute, Los Angeles, California, 1997
David May II Fellowship, Jules Stein Eye Institute, Los Angeles, California, 1998
Best Paper of Session, International Society of Refractive Surgery Symposium, New Orleans, Louisiana, 1998
National Telly Award for PBS Television “American Health Journal” program on new technology intraocular implants, 2004
Best Paper of Session, American Society of Cataract and Refractive Surgery Symposium, San Francisco, 2009
Achievement Award, American Academy of Ophthalmology, 2009
Speaker of the Day, Royal Hawaiian Eye Meeting, 2011
Film Festival Runner-up, “Best Teaching” for “Four Steps to Astigmatism Correction During Cataract Surgery, American Society of Cataract and Refractive Surgery Symposium. San Diego, California, 2011.
Speaker of the Day, Royal Hawaiian Eye Meeting, 2012
Gold Medal, Intraocular Implant and Refractive Society, India, 2012
Man of Character, Boy Scouts of America Orange County Council, 2013

Patents

US Patent 7780653 “Method for Astigmatism Correction” issued August, 2010

Professional Societies

American Academy of Ophthalmology
American Society of Cataract and Refractive Surgery
International Society of Refractive Surgery
Orange County Ophthalmology Society

Textbooks

Hovanesian, JA (editor), *Pterygium, Techniques and Technologies for Surgical Success*, Slack, Inc., 2012
Hovanesian, JA (editor), *Refractive Cataract Surgery, an Introduction and Step-by-Step Guide*, Slack, Inc., 2012

Journal & Other Professional Activities

House Staff Council, Henry Ford Hospital, Detroit, Michigan, 1995-1996
Reviewer, *Ophthalmology* journal, 1997-present
Column Editor, “Ophthalmic Outreach”, *Ocular Surgery News* recurring column sharing information and inspiring volunteerism among ophthalmologists, 2006-present
Column Editor, “State of the Art”, *Ocular Surgery News* recurring column evaluating new ophthalmic technologies, 2007-2011
Continuing Medical Education Reviewer, Vindico Medical Education, 2007-present

Editorial Board, *Ocular Surgery News*, 2007-present
Editorial Board, *Cataract & Refractive Surgery Today*, 2009-present
Section Editor, Cataract, *Ocular Surgery News*, 2011-present
Chairman, American Academy of Ophthalmology Cataract/Anterior Segment
Committee, Ophthalmic News & Education Network, 2010-present
Committee Member, American Society of Cataract and Refractive Surgery, Cornea
Clinical Committee, 2011-present

Charitable Activities

Vice President-Program, Armenian Eye Care Project, international organization raising \$11 million for eye care in developing Republic of Armenia, 1997-2009.

Medical Missions to Armenia every six months providing training programs for Armenian surgeons, 1998-present.

Chairman, St. Mary Church “Mr. and Mrs. Club”, 2006-2008.

Teacher, St. Mary Church Sunday School, 2008-2010

Chairman, Orange County Armenian Young Professionals organization, 2001-2004.

Boy Scouts of America volunteer at regional and national levels, 1985-present.
District Commissioner, Scouting for the Handicapped, 1993-1996
Author of two nationally distributed publications, 1988-1989
National Scout Jamboree Health and Safety Committee, 1989, 1993
Den Leader, Cub Scout Pack 35, Laguna Beach, California, 2009-present
Cubmaster, Cub Scout Pack 35, Laguna Beach, California, 2012-2014
Council Commissioner, Orange County Council, 2013-2015
Executive Vice Chair of the Board, Orange County Council, 2015-2016
Chairman of the Board, Orange County Council, 2016

FDA Studies

Principal Investigator, Phase III Study of an Eye Drop to Treat Meibomian Gland Disease, 2005
Subinvestigator, A Study of a Trabecular Bypass Micro Stent in Combination with Cataract Surgery in Subjects with Open-Angle Glaucoma, 2005-2008
Subinvestigator, Phase III Study of the Visiogen Synchrony Accommodating Intraocular Lens, 2007-2008
Principal Investigator, Phase III Study of the Crystalens HD-100 Accommodating Intraocular Lens, 2007-2008
Principal Investigator, Phase III Study of the I-Zip Ocular Bandage, 2008-2009.
Principal Investigator, Phase III Study of the Toric Crystalens, 2010.
Principal Investigator, Phase IIIb Study of the LipiFlow Thermal Pulsation System, 2012

Principal Investigator, Phase III Study of the Resure Ocular Sealant, 2011-2012
Principal Investigator, Phase III Study of the Light Adjustable Lens, 2012
Principal Investigator, Collagen Crosslinking (CXLUSA) Study, 2012
Principal Investigator, Phase III Study of a New Topical Drug for Dry Eye, 2012
Principal Investigator, Phase IIIa Study of the Revision Optics Corneal Inlay, 2012

Abstracts/Scientific Presentations

Hovanesian JA, Higginbotham EJ, Lichter PR. Long Term Visual Outcome of Ocular Hypotension After Thermosclerostomy. Poster at Association for Research in Vision and Ophthalmology, Sarasota, Florida, 1991.

Hovanesian JA, Hovanesian JD, Byrd TJ. Change in Corneal Stress Birefringence after Radial Keratotomy. Poster at American Society of Cataract and Refractive Surgery Symposium, Seattle, Washington, 1996.

Hovanesian JA, Shah SS, Maloney RK. Effect of Anti-island Treatment on Visual Acuity and Corneal Topography. Paper at American Society of Cataract and Refractive Surgery Symposium, San Diego, California, 1998.

Shah SS, **Hovanesian JA**, Maloney RK. Effect of Laser Tuning on the Outcome of Refractive Surgery. Paper at American Society of Cataract and Refractive Surgery Symposium, San Diego, California, 1998.

Shah SS, **Hovanesian JA**, Maloney RK. Effect of Astigmatic Keratotomy on Visual Outcome after Myopic Photorefractive Keratectomy. Paper at American Society of Cataract and Refractive Surgery Symposium, San Diego, California, 1998.

Hovanesian JA, Shah SS, Maloney RK. Effect of Mild Central Islands on Visual Performance. Paper at Association for Research in Vision and Ophthalmology, Fort Lauderdale, Florida, 1998.

Hovanesian JA, Shah SS, Maloney RK. Quantitative Topographic Irregularity and its Correlation with Best Corrected Visual Acuity after Refractive Surgery, Paper at International Society of Refractive Surgery, Orlando, Florida, 1998.

Hovanesian JA, Eghbali F, Shah SS, Maloney RK. Treating Astigmatism After a Free Lasik Cap by Rotating the Cap. Paper at International Society of Refractive Surgery, New Orleans, Louisiana, 1998.

Hovanesian JA, Faktorovich EG, Shah SS, Maloney RK. Bilateral Bacterial Keratitis after Lasik in a Patient with HIV Infection. Paper at International Society of Refractive Surgery, New Orleans, Louisiana, 1998—voted best paper of session.

Van Horn S, **Hovanesian JA**, Shah SS, Maloney RK. Effect of Volatile Substances on Excimer Laser Energy Delivery. Paper at International Society of Refractive

Surgery, New Orleans, Louisiana, 1998.

Hovanesian JA, Shah SS, Maloney RK. Quantitative Topographic Irregularity as a Predictor of Best Corrected Visual Acuity after Refractive Surgery. Poster at American Academy of Ophthalmology, New Orleans, Louisiana, 1998.

Najman J, **Hovanesian JA**, Maloney RK. Effect of Lifting and Repositioning LASIK Flaps to Treat Folds. Poster at Association for Research in Vision and Ophthalmology, Fort Lauderdale, Florida, 1999.

Hovanesian JA, Hovanesian JD, Maloney RK. Detection of Microkeratome Flap Abnormalities with Corneal Birefringence. Paper at International Society of Refractive Surgery, Orlando, Florida, 1999.

Hovanesian JA, Shah SS, Maloney RK. Recurrent corneal erosion syndrome after PRK and LASIK. Paper at International Society of Refractive Surgery, Orlando, Florida, 1999.

Shamie N, **Hovanesian JA**, Chuck RA, Ohanesian RV. Keratopigmentation: A Surgical Technique with Improved Cosmetic Results for the Removal of Limbal Dermoids. Paper at American Society of Cataract and Refractive Surgery Symposium, San Francisco, California, 2003.

Hovanesian JA. Comparison of Outcomes using Fibrin Tissue Adhesive vs Suture to Secure Conjunctival Limbal Autografts in Pterygium Surgery. Paper at American Society of Cataract and Refractive Surgery Symposium, San Diego, California, 2004.

Hovanesian JA. Follow-up of 98 Cases of Pterygium Surgery with Conjunctival Limbal Autograft Using Fibrin Tissue Adhesive Instead of Suture. Paper at American Society of Cataract and Refractive Surgery Symposium. Washington, DC, 2005

Hovanesian JA, Maloney RK. Treating Astigmatism After a Free Lasik Cap by Rotating the Cap. Paper at American Society of Cataract and Refractive Surgery Symposium. Washington, DC, 2005.

Hovanesian JA. Follow-up of 98 Cases of Pterygium Surgery with Conjunctival Limbal Autograft Using Fibrin Tissue Adhesive Instead of Suture. Paper at World Cornea Congress V. Washington, DC, 2005

Hovanesian JA. Karageozian VH. Simple Method for Watertight Cataract Wound Closure Using Fibrin Tissue Adhesive. Poster at American Academy of Ophthalmology Symposium. Las Vegas, Nevada, 2006.

Hovanesian JA. Fibrin Tissue Adhesive: It's Not Just For Breakfast Anymore! Research Symposium, University of California-Irvine, Irvine, California 2006.

Hovanesian JA. Does “Slow Set” Dilution of Fibrin Tissue Adhesive Reduce Its Strength in Ocular Surgery? Poster at American Academy of Ophthalmology Symposium. Las Vegas, Nevada, 2006.

Hovanesian JA. Karageozian VH. Simple Method for Watertight Cataract Wound Closure Using Fibrin Tissue Adhesive. Paper at Cornea Society Symposium. Las Vegas, Nevada, 2006.

Hovanesian JA. Does “Slow Set” Dilution of Fibrin Tissue Adhesive Reduce Its Strength in Ocular Surgery? Paper at American Society of Cataract and Refractive Surgery Symposium, San Diego, California, 2007.

Hovanesian JA. FDA Multicenter Study of the Fourth-Generation Eyeonics HD-100 Accommodating IOL. Paper at American Academy of Ophthalmology Symposium. New Orleans, Louisiana, 2008.

Hovanesian JA. Conjunctival Chalasis: Diagnosis and Surgical Treatment of Ocular Pain Masquerading as Dry Eye. Film at American Society of Cataract and Refractive Surgery Symposium, Chicago, Illinois, 2008.

Hovanesian JA. FDA Multicenter Study of the Fourth-Generation Eyeonics HD-100 Accommodating IOL. Paper at American Society of Cataract and Refractive Surgery Symposium, Chicago, Illinois, 2008.

Hovanesian JA. Results of Pterygium Excision Using Amnionic Membrane Beneath the Healthy Conjunctiva Surrounding a Conjunctival Autograft. Poster at American Society of Cataract and Refractive Surgery Symposium, Chicago, Illinois, 2008.

Hovanesian JA. Small Wound Leaks Are Associated With Myopic Surprises in Cataract Surgery. Poster at American Academy of Ophthalmology Meeting, Atlanta, Georgia, 2008.

Hovanesian JA. Amnionic Membrane as an Antifibrotic Implant in the Subconjunctival Space Surrounding a Conjunctival Autograft in Pterygium Surgery. Poster at American Academy of Ophthalmology Meeting, Atlanta, Georgia, 2008.

Hovanesian JA. Surgical Adhesive Techniques in Conjunctival, Corneal, and Cataract Surgery. Film at American Society of Cataract and Refractive Surgery Symposium, San Francisco, California, 2009.

Hovanesian JA. Cataract Wound Closure with a Hydrogel Adherent Ocular Bandage. Paper at American Society of Cataract and Refractive Surgery Symposium, San Francisco, California, 2009.

Hovanesian JA. FDA Study Results of the Crystalens HD IOL: Contrast Sensitivity and Near Vision Compared to the Predecessor Lens. Paper at the International Society of Refractive Surgery Meeting, San Francisco, California, 2009.

Hovanesian JA. FDA Study Results of the Crystalens HD IOL: Contrast Sensitivity and Near Vision Compared to the Predecessor Lens. Paper at the American Academy of Ophthalmology Meeting, San Francisco, California, 2009.

Hovanesian JA. FDA Study Results of the Crystalens HD IOL: Small Wound Leaks are Associated with Myopic Surprises in Cataract Surgery. Paper at the European Society of Cataract and Refractive Surgery Meeting, Barcelona, Spain, 2009.

Hovanesian JA. Cataract Wound Closure with a Hydrogel Adherent Ocular Bandage. Max Fine Cornea Society, Irvine, California, 2009.

Hovanesian JA. Conjunctival Chalasis: A Treatable Condition Masquerading as Dry Eye. Royal Hawaiian Eye Meeting, Kauai, Hawaii, 2010.

Hovanesian JA. Techniques and Technologies for Success in Pterygium Surgery. Film at American Society of Cataract and Refractive Surgery Meeting. Boston, Massachusetts, 2010.

Hovanesian JA. Effect of Astigmatism on Visual Acuity Outcomes in Eyes Implanted with a Presbyopia-Correcting IOL. American Society of Cataract and Refractive Surgery Meeting. Boston, Massachusetts, 2010.

Hovanesian JA. Amnionic Membrane as an Anti-fibrotic Implant in the Subconjunctival Space Surrounding a Conjunctival Autograft in Pterygium Surgery. Poster at World Cornea Congress. Boston, Massachusetts, 2010.

Hovanesian JA. Three-Month Clinical Results on a New Aspheric, Accommodative Intraocular Lens. European Society of Cataract and Refractive Surgery Meeting. Paris, France, 2010.

Hovanesian JA. Prospective Randomized Controlled Multicenter Study of a Hydrogel Bandage: 24 Hour Post-Cataract Outcomes. Poster at the American Academy of Ophthalmology Meeting. Chicago, Illinois, 2010.

Hovanesian JA. 4 Steps to Astigmatism Correction During Cataract Surgery. Film at American Society of Cataract and Refractive Surgery Meeting. San Diego, California, 2011. Winner of film festival runner-up in “best teaching” category.

Hovanesian JA. Outcomes Update for Aspheric Accommodating IOL. Poster at American Society of Cataract and Refractive Surgery Meeting. San Diego, California, 2011.

Hovanesian JA. Food and Drug Administration Study of Hydrogel Ocular Bandage Following Cataract Surgery: 24-Hour Results. Paper at American Society of Cataract and Refractive Surgery Meeting. San Diego, California, 2011.

Hovanesian JA. Feinermann G. Colvard DM. Pepose J. A Prospective, Multi-center Clinical Study to Evaluate the Effectiveness of a Toric, Accommodative IOL. Paper at the European Society of Cataract and Refractive Surgery Symposium. Vienna, Austria, 2011.

Hovanesian JA. Masket S. Raizman MB. Wee D. Assessing clear corneal cataract incisions for leakage in the immediate post-operative period. Paper at the European Society of Cataract and Refractive Surgery Symposium. Vienna, Austria, 2011.

Hovanesian JA. Masket S. A Hydrogel Ocular Bandage Following Cataract Surgery: 24 Hour Results. Paper at the European Society of Cataract and Refractive Surgery Symposium. Vienna, Austria, 2011.

Hovanesian JA. Four Steps to Astigmatism Correction. Film at American Academy of Ophthalmology Meeting. Orlando, Florida, 2011.

Hovanesian JA. Prospective, Randomized Clinical Trial of a Toric, Accommodating, Intraocular Lens. Paper at the International Society of Refractive Surgery meeting. Orlando, Florida, 2011.

Hovanesian JA. A Prospective, Multi-center Clinical Study to Evaluate the Effectiveness of a Toric, Accommodative IOL. Poster at the American Academy of Ophthalmology Meeting. Orlando, Florida, 2011.

Hovanesian JA. Five Steps to More Consistent Results with Cataract Surgery. Film at American Society of Refractive and Cataract Surgery Society Meeting. Chicago, Illinois, 2012.

Hovanesian JA. Improvement in Refractive Outcomes with Capsulorhexis Marking and Meticulous Capsule Polishing. Paper at American Society of Refractive and Cataract Surgery Society Meeting. Chicago, Illinois, 2012.

Hovanesian JA. A Novel Approach to Assess the Propensity of Clear Corneal Incision Leaks Due to Patient Manipulation in the Immediate Post-operative Period. Paper at American Society of Refractive and Cataract Surgery Society Meeting. Chicago, Illinois, 2012.

Ongoing Instruction Courses at American Academy of Ophthalmology and American Society of Cataract and Refractive Surgery Symposia

Hovanesian JA, Agarwal A, Hardten DA, Kaufman SC. Use of Fibrin Tissue Adhesive in Conjunctival, Corneal, and Refractive Surgery. 2007-present.

Hovanesian JA, Tseng SC, Hardten DA, Kaufman SC. Use of Fibrin Tissue Adhesive in Conjunctival, Corneal, and Refractive Surgery. American Society of Cataract and

Refractive Surgery Annual Symposium. 2005-2007.

Hovanesian JA, Hardten DH, Corcoran KJ. Secrets to Growing the Use of Multifocal/Accommodative Lens Implants in Your Cataract Practice. American Society of Cataract and Refractive Surgery Annual Meeting, 2007-present.

Named Lectures

11th Annual David S. Hull Lecture. “The Transition of Ophthalmology Residents to Permanent Practice—Predictions, Pearls, and Pitfalls.” Georgia Health Sciences University. Augusta, Georgia, June 23, 2012.

Invited Lectures

Hovanesian JA. Physiologic Optics. National Science Foundation Short Course in Applied Optics, Oakland University, Rochester, Michigan, 1994.

Hovanesian JA. Optics of Keratorefractive Surgery. National Science Foundation Short Course in Applied Optics, Oakland University, Rochester, Michigan, 1996.

Shah SS, **Hovanesian JA**, Maloney RK. Phakic Intraocular Lenses-Options for Extreme Myopia. Eye Advance 98, Bombay, India, September, 1998.

Shah SS, **Hovanesian JA**, Maloney RK. Visual Performance after Refractive Surgery. Eye Advance 98, Bombay, India, September, 1998.

Shah SS, **Hovanesian JA**, Maloney RK. Phakic Intraocular Lenses-Options for Extreme Myopia. South Asian Association of Regional Countries Ophthalmological Society, Ahmedabad, September, 1998.

Shah SS, **Hovanesian JA**, Maloney RK. Visual Performance after Refractive Surgery. South Asian Association of Regional Countries Ophthalmological Society, Ahmedabad, September, 1998.

Hovanesian JA. Optics of Keratorefractive Surgery. National Science Foundation Short Course in Applied Optics, Oakland University, Rochester, Michigan, 1998.

Hovanesian JA. Episcleritis and Scleritis, Concepts and Advances. University of California Berkeley Continuing Education Meeting. Pomona, California, 1999.

Hovanesian JA. Moderate and Severe Ocular Allergy. University of California Berkeley Continuing Education Meeting. Pomona, California, 1999.

Hovanesian JA. Use of Fibrin Tissue Adhesive and Amnionic Membrane in Anterior Segment Surgery. Royal Hawaiian Eye Meeting. Maui, Hawaii, 2006.

- Hovanesian JA.** Use of Fibrin Tissue Adhesive and Amnionic Membrane in Anterior Segment Surgery. Royal Hawaiian Eye Meeting. Kauai, Hawaii, 2007.
- Hovanesian JA.** Medical Education From Cyberspace. Tenth International Armenian American Ophthalmology Conference. Yerevan, Armenia, 2007.
- Hovanesian JA.** Intraoperative Clinical Pearls for Presbyopia-Correcting IOLs. Royal Hawaiian Eye Meeting. Kona, Hawaii, 2008.
- Hovanesian JA.** What's New in Corneal Transplantation. Royal Hawaiian Eye Meeting. Kona, Hawaii, 2008.
- Hovanesian JA.** Keratoprosthesis: Current Results and Techniques for High-Risk Corneal Transplants. Royal Hawaiian Eye Meeting. Kona, Hawaii, 2008.
- Hovanesian JA.** Use of Amnionic Membrane in Ocular Surgery. Hellenic Society of Intraocular Implant and Refractive Surgery Meeting, Athens, Greece, 2008.
- Hovanesian JA.** Achieving Success with Modern Pterygium Surgery Using Fibrin Tissue Adhesive and Amnionic Membrane. Paper at 13th Annual International Joint Meeting of Ocular Surgery News, Italian Society of Ophthalmology and the Italian Association of Cataract and Refractive Surgery. Naples, Italy, 2008.
- Hovanesian JA.** Evolution of Accommodative Lens Design: The Fourth Generation Crystalens and Visiogen Synchrony. Thirteenth Annual International Joint Meeting of Ocular Surgery News, Italian Society of Ophthalmology and the Italian Association of Cataract and Refractive Surgery. Naples, Italy, 2008.
- Hovanesian JA.** Presbyopic Lens Implants in Patients with Suboptimal Macular Function: Do We Dare? OSN New York Symposium, New York, 2008
- Hovanesian JA.** The Zero Constant Aspheric Lens. Advances in Ophthalmology meeting. University of Toronto, Canada, 2008.
- Hovanesian JA.** Excimer Laser and Intracorneal Inlay Treatment of Presbyopia. Advances in Ophthalmology meeting. University of Toronto, Canada, 2008.
- Hovanesian JA.** What's New in Corneal Transplantation? Royal Hawaiian Eye Meeting, Maui, Hawaii, 2009.
- Hovanesian JA.** Successful Pterygium Surgery Using Fibrin Adhesive and Amnionic Membrane. Royal Hawaiian Eye Meeting, Maui, Hawaii, 2009.

Hovanesian JA. The Next Frontier in Microsurgery. Royal Hawaiian Eye Meeting, Maui, Hawaii, 2009.

Hovanesian JA. Surgical Innovations: Presbyopia Correction and Beyond. System Wide Grand Rounds, Henry Ford Health Systems, Detroit, Michigan 2009.

Hovanesian JA. Management of Pterygium. Meeting of Joint Commission on Allied Health Personnel in Ophthalmology, San Francisco, California, 2009.

Hovanesian JA. Secrets to Growing the Use of Multifocal and Accommodative Lens Implants in Your Cataract Practice. Kiawah Eye Meeting, Kiawah Island, South Carolina, 2009.

Hovanesian, JA. What are the Patient Demographics for High Technology IOLs? Spotlight on IOLs Session at the American Academy of Ophthalmology Meeting, San Francisco, California, 2009.

Hovanesian, JA. Lessons Learned from Six Years Experience with the Crystalens Accommodating IOL. Annual Research Conference, Fyodorov Ophthalmological Institute, Moscow, Russia, 2009.

Hovanesian JA. Successful Pterygium Surgery Using Fibrin Adhesive and Amniotic Membrane. Royal Hawaiian Eye Meeting, Maui, Hawaii, 2009.

Hovanesian JA. Surgical Innovations: Presbyopia Correction and Beyond. System Wide Grand Rounds, Henry Ford Health Centers, Detroit, Michigan, 2009.

Hovanesian JA. Secrets to Growing the Use of Multifocal and Accommodating Lenses in Your Cataract Practice. Kiawah Eye Meeting, Kiawah Island, South Carolina, 2009.

Hovanesian JA. Surgical Innovations: Presbyopia Correction and Beyond. Orange County Optometry Society. Irvine, California, 2009.

Hovanesian JA. Maneuvers for the Rock Hard Cataract. Ocular Surgery News New York Meeting, New York, 2009.

Hovanesian JA. Surgical Innovations: Presbyopia Correction and Beyond. Orange County Optometry Society. Irvine, California, 2009

Hovanesian JA. Lessons Learned from Six Years Experience with the Crystalens Accommodating IOL. United Kingdom and Ireland Society of Cataract and Refractive Surgery Meeting, Leeds, UK, 2009.

Hovanesian JA. Four Steps to Astigmatism Correction During Cataract Surgery. Royal

Hawaiian Eye Meeting Special Symposium. Kauai, Hawaii, 2010.

Hovanesian JA. Role of Anti-Inflammatory Agents in Cataract Surgery. CME Symposium at Royal Hawaiian Eye Meeting. Kauai, Hawaii, 2010.

Hovanesian JA. The Final Frontier: Presbyopia-Correcting Lenses of Today and Tomorrow. Ocular Drug and Surgical Therapy Update. Dana Point, California, 2010.

Hovanesian JA. New Eye Technologies. Orange County Optometry Society Continuing Education Meeting. Irvine, California, 2010.

Hovanesian JA. The Next Frontier in Accommodating IOLs: Crystalens HD and AO. Aspen Invitational Refractive Surgery Meeting. Aspen Colorado, 2010.

Hovanesian JA. The Final Frontier: Presbyopia-Correcting Lenses of Today and Tomorrow. Ocular Drug and Surgical Therapy Update. Dana Point, California, 2010.

Hovanesian JA. Advances in Corneal Surgery. 9th Annual San Francisco Cornea Cataract and Refractive Surgery Symposium. San Francisco, California, 2010.

Hovanesian JA. Management of Aniridia and Subluxated Cataract. Video in Ophthalmic Premier League Video Symposium. World Ophthalmology Congress. Berlin, Germany, 2010.

Hovanesian JA. The Evolution of Accommodating IOLs—The Final Frontier in Refractive Cataract Surgery. UK Hull Eye Meeting. Hull, United Kingdom, 2010.

Hovanesian JA. Use of Fibrin Tissue Adhesive and Amnionic Membrane in Conjunctival, Corneal and Refractive Surgery. UK Hull Eye Meeting. Hull, United Kingdom, 2010.

Hovanesian JA. Succeeding with Accommodating IOLs—The Final Frontier in Refractive Cataract Surgery. XIX Brazilian Congress for Blindness Prevention and Visual Rehabilitation. Salvador, Brasil, 2010.

Hovanesian JA. Fibrin Glue in Complicated Refractive Cases. Refractive Subspecialty Day at American Academy of Ophthalmology. Chicago, Illinois, 2010.

Hovanesian JA. The Final Frontier: Patient Present and Future Designs of Accommodating IOLs. Royal Hawaiian Eye Meeting, Kauai, Hawaii, 2011

Hovanesian JA. Aminotic Membrane: A Useful Tool for the Comprehensive

Ophthalmologist. Royal Hawaiian Eye Meeting, Kauai, Hawaii, 2011

Hovanesian JA. A New Toric Accommodating IOL. Aspen Invitational Refractive Surgery Meeting. Aspen, Colorado, 2011

Hovanesian JA. New Techniques in Pterygium, Conjunctival Chalasis, and Anterior Segment Surgery. Technicians and Nurses Program, American Society of Cataract and Refractive Surgery Symposium. San Diego, California, 2011.

Hovanesian JA. Current and Future Accommodating IOLs. Ocular Surgery News and the Italian Society of Ophthalmology. Rome, Italy, 2011.

Hovanesian JA. Premium Cataract Surgery, What are We Doing in the US? Ocular Surgery News and the Italian Society of Ophthalmology. Rome, Italy, 2011.

Hovanesian JA. New Accommodating Implants will Grow Future Options for Presbyopia Correction. Kiawah Eye Meeting. Kiawah Island, South Carolina, 2011.

Hovanesian JA. Succeeding with Accommodating IOLs—The Final Frontier in Refractive Cataract Surgery. Visiting professor rounds at the University of Manitoba Department of Ophthalmology. Manitoba, Canada, 2011.

Hovanesian JA. Pterygium Surgery and Ocular Surface Disease—What Really Works? Visiting professor rounds at the University of Manitoba Department of Ophthalmology. Manitoba, Canada, 2011.

Hovanesian JA. Fibrin Tissue Adhesive in Addressing Epithelial Ingrowth After LASIK. International Society of Refractive Surgery Meeting. Orlando, Florida, 2011.

Hovanesian JA. New Techniques in Ocular Surface Surgery. JCAHPO Annual Continuing Education Program. Orlando, Florida, 2011.

Hovanesian JA. New Techniques and Technologies in Cataract Surgery. Orang County Optometry Society Continuing Education Meeting. Irvine, California, 2011.

Hovanesian JA. How to Build Your Premium IOL Practice with Presbyopia-correcting IOLs. Royal Hawaiian Eye Meeting. Maui, Hawaii, 2012.

Hovanesian JA. Ocular Surface Surgery: Amniotic Membrane and Tissue Adhesives. Royal Hawaiian Eye Meeting. Maui, Hawaii, 2012.

Hovanesian JA. What's New In Corneal Transplantation. Technicians and Nurses Program, Royal Hawaiian Eye Meeting. Maui, Hawaii, 2012.

Hovanesian JA. New Accommodating IOL Designs and Results. Royal Hawaiian Eye Meeting. Maui, Hawaii, 2012.

Hovanesian JA. Pterygium, Strategies for Success. JCAHPO Annual Continuing Education Meeting. Chicago, Illinois, 2012.

Hovanesian JA. Amniotic Membrane in the Treatment of Pterygium. Cornea Subspecialty Day at the ASCRS Meeting. Chicago, Illinois, 2012.

Hovanesian JA. Keratorefractive Approaches to Correction of Refractive Surprises in Cataract Surgery. Refractive Surgery Subspecialty Symposium at the ASCRS Meeting.. Chicago, Illinois, 2012.

Hovanesian JA. Dry Eye Treatment: From Evidence Based Medicine to Practical Treatment Protocols. CME Eye World Symposium at the American Society of Cataract and Refractive Surgery Meeting. Chicago, Illinois, 2012.

Hovanesian JA. Capsulorhexis. Invited Talk at Kiawah Eye Meeting. Kiawah Island, South Carolina, 2012.

Hovanesian JA, Devgn U. Reality Ophthalmology. Patient Communication in the Exam Lane. Created and Moderated Symposium at Kiawah Eye Meeting. Kiawah Island, South Carolina, 2012.

Hovanesian JA. The Final Frontier: Lens Implants of Today and Tomorrow. Visiting Professor Grand Rounds at the Georgia Health Sciences University. Augusta, Georgia, 2012.

Hovanesian JA. Pterygium: Strategies for Success. Visiting Professor Grand Rounds at the Georgia Health Sciences University. Augusta, Georgia, 2012.

Hovanesian JA. The Future of Lens Based Vision Correction. India Intraocular Implant and Refractive Society Meeting. Chennai, India, 2012.

Hovanesian JA. The Final Frontier: Lens Implants of Today and Tomorrow. Annual Continuing Education Meeting of the Orange County Optometry Society. Irvine, California, 2012.

Hovanesian JA. The Final Frontier: Lens Implants of Today and Tomorrow. Distinguished Visiting Professor Grand Rounds, University of Rochester Department of Ophthalmology. Rochester, New York, 2012.

Hovanesian JA. Pterygium and Ocular Surface Surgery: What Really Works. Distinguished Visiting Professor Grand Rounds, University of Rochester Department of Ophthalmology. Rochester, New York, 2012.

Peer-reviewed Publications

- Hovanesian JA**, Higginbotham EJ, Lichter PR. Long Term Visual Outcome of Ocular Hypotension after Thermosclerostomy. *Am J Ophth*, 115: 603-7, May, 1993.
- Witte MM, Hovanesian JD, **Hovanesian JA**. A Tomographic Technique for Determining Contact Stress. *Exp Technique*, July/August, 1995.
- Hovanesian JA**, Faktorovich EG, Hoffbauer JD, Shah SS, Maloney RK. Bilateral Bacterial Keratitis After Laser In Situ Keratomileusis in a Patient With Human Immunodeficiency Virus Infection. *Arch Ophth* 1999; 117: 968-70.
- Mondino BJ, **Hovanesian JA**, Pleyer U. Bullous Diseases of the Skin and Mucous Membranes. *Duane's Clinical Ophthalmology*, External Disease Section, 1999.
- Hovanesian JA**, Shah SS, Onclinx T, Maloney RK. Quantitative Topographic Irregularity as a Predictor of Spectacle Corrected Visual Acuity after Refractive Surgery. *Am J Ophthalmol* 2000; 129(6): 752-8.
- Hovanesian JA**, Shah SS, Maloney RK. Symptoms of Dry Eye and Recurrent Erosion Syndrome After Refractive Surgery. *J Cataract Refract Surg* 2001; 27: 577-84.
- Van Horn SD, **Hovanesian JA**, Maloney RK. Effect of volatile compounds on excimer laser power delivery. *J Refract Surg (United States)* Sep-Oct 2002, 18(5) p524-8.
- Hovanesian JA**. New Technology: The Next Wave in Vision Correction. *Ophth Mgmt Suppl*. 2001.
- Hovanesian JA**. Wavefront Technology for Lasik: A Good Thing is Getting Better. *Ophth Mgmt Suppl*. 2002.
- Hovanesian, JA**. Maloney RK. Treating Astigmatism after a Free Lasik Cap by Rotating the Cap. *J Cataract Refract Surg* 2005; 31:1870-6.
- Hovanesian, JA**. Karageozian VH. Watertight Cataract Incision Closure Using Fibrin Tissue Adhesive. *J Cataract Refract Surg* 2007; 33:1461-3.
- Hovanesian, JA**. Cataract Wound Closure with a Polymerizing Liquid Hydrogel Ocular Bandage. *J Cataract Refract Surg* 2009; 35:912-6.
- Masket S, **Hovanesian JA**, Raizman MB, Wee D, Fram N. Use of a calibrated force gauge in clear corneal cataract surgery to quantify point-pressure manipulation. *J Cataract Refract Surg*; 2013 39:511-8.
- Dell S, **Hovanesian JA**, Raizman, MB, *et al*. Randomized comparison of postoperative

use of hydrogel ocular bandage and collagen corneal shield for wound protection and patient tolerability after cataract surgery. *J Cataract Refract Surg*; 2011 37:113-21.

Mah, FS, Davidson R, Holland EJ, **Hovanesian JA**, *et al.* Current knowledge about and recommendations for ocular methicillin-resistant *Staphylococcus aureus*. *J Cataract Refract Surg*; 2014; 40:1894-908.

Sheppard JD, Mansur A, Comstock TL, **Hovanesian JA**. An update on the surgical management of pterygium and the role of loteprednol etabonate ointment. *Clin Ophthalmol*; 2014; 8:1105-18

Masket S, **Hovanesian JA**, *et al.* Hydrogel sealant versus sutures to prevent fluid egress after cataract surgery. *J Cataract Refract Surg*; 2014; 40:2057-66.

Pepose JS, Hayashida J, **Hovanesian JA**, *et al.* Safety and effectiveness of a new toric presbyopia-correcting posterior chamber silicone intraocular lens. *J Cataract Refract Surg*; 2015; 41:295-305.

Hovanesian JA, *et al.* Intracameral phenylephrine and ketorolac during cataract surgery to maintain intraoperative mydriasis and reduce postoperative ocular pain: Integrated results from 2 pivotal phase 3 studies. *J Cataract Refract Surg*; 2015; 41:2060-8.

Personal

Eagle Scout

Can speak and read Armenian

Hobbies include food, swimming, magic, computers, piano

Spotlight on Collagen Crosslinking

Duna Raoof MD

Cornea, Cataract, and Refractive Surgery Specialist

Harvard Eye Associates

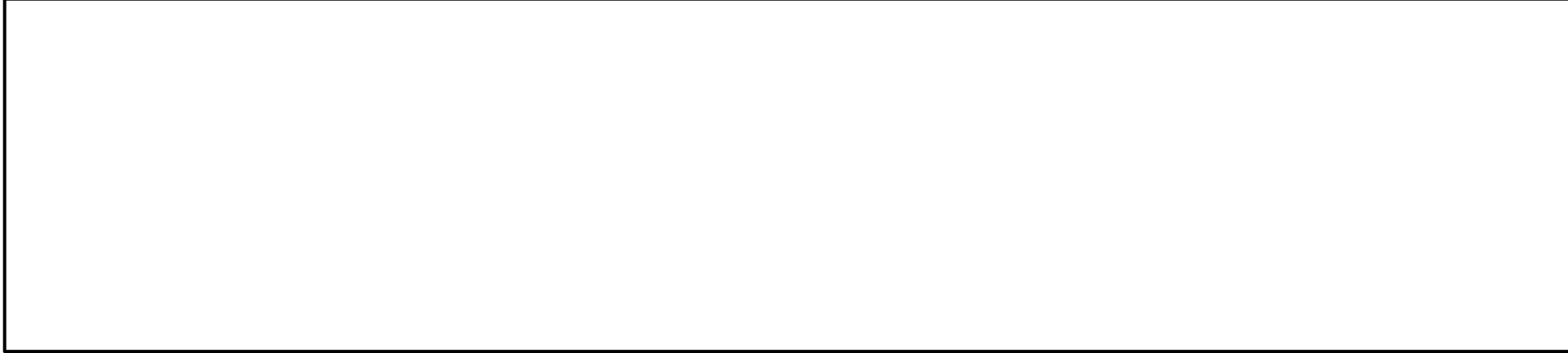
CE Seminar

Thursday March 23, 2017

Summary: Cross-linking of the corneal stroma to strengthen, using riboflavin and UVAL light, continue to gain popularity in the US following its recent FDA approval. Cross-linking has been shown to be beneficial for numerous situations, most notably for the prevention or slowing the down progression of keratoconus. This presentation will give a thorough overview of crosslinking procedure, applications, and up to date research on its outcomes. It will also guide optometrists in shedding light on patient selection and appropriate referral. Finally, several clinical scenarios will be described including potential pitfalls and complications to crosslinking.

Outline:

- I. Corneal Ectasia
 - a. What is keratoconus
 - b. Causes
 - c. Symptoms and diagnosis
 - d. Current treatments for keratoconus
- II. Collagen Crosslinking (CXL)
 - a. What is collagen crosslinking
 - b. How does CXL slow down corneal ectasia
 - c. Current available platforms
 - d. FDA approved platforms
- III. Patient Selection
 - a. Indications
 - b. Contraindications
- IV. Surgical Technique
- V. Outcomes
 - a. International and US studies
- VI. Complications and adverse events
- VII. CXL clinical cases



Duna Raoof, MD

Cornea, Cataract, and Refractive Surgery Specialist
Harvard Eye Associates, Laguna Hills, California

Clinical Instructor
University of California Los Angeles – Harbor, Torrance, California



No Financial Disclosures

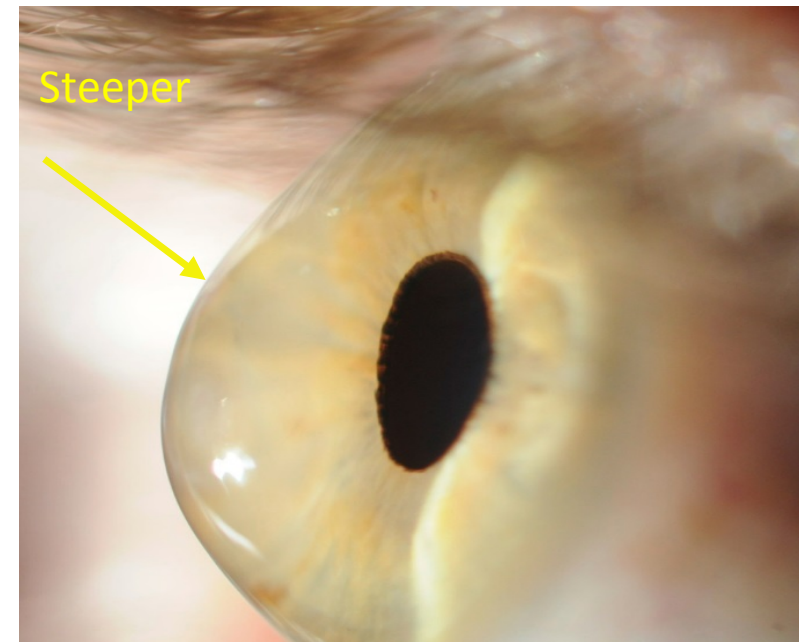
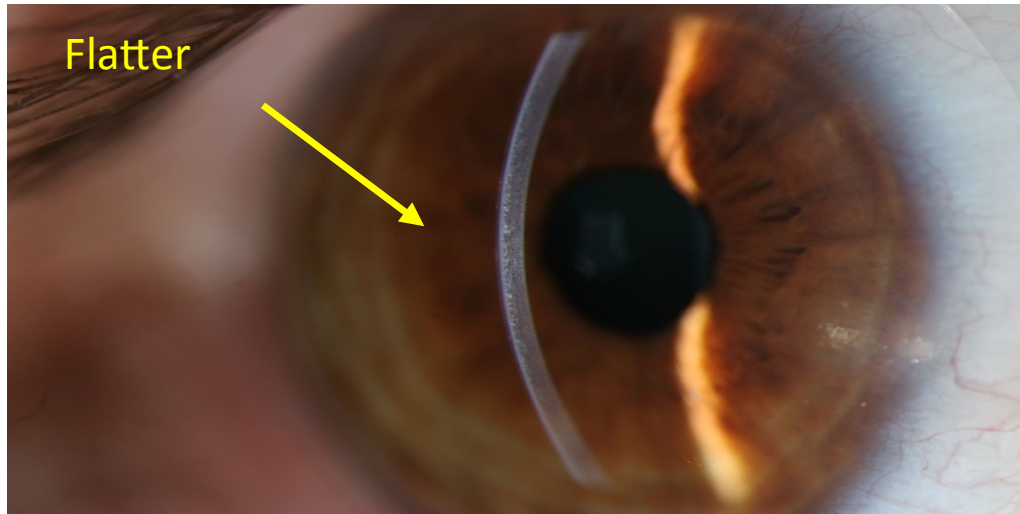
Corneal Ectasia

- Naturally-existing Corneal Pathology
 - Forme Fruste Keratoconus
 - Keratoconus
 - Pellucid Marginal Degeneration
- Surgically induced Pathology
 - Mechanical Instability
 - Post- LASIK ectasia



Background

- KERATOCONUS
 - Corneal condition leading to thinning and protrusion of cornea
 - Leads to distorted and decreased vision



Keratoconus

- Affects 1 in 1,000 people
- Symptoms: blurry vision, double vision, trouble seeing at night, headaches
- Cause is unknown

A



Traditional Treatments

- Contact lenses
- Epikeratophakia
- Corneal ring segment inserts (Intacs)
- Corneal transplants



Keratoconus

Treatment

- ↓ Risk factors
 - Eye rubbing
- Improving vision
 - Spectacles
 - Contact lenses
 - Corneal transplant
 - **Do not alter natural course of keratoconus**



CXL with riboflavin and ultraviolet-A irradiation introduced in 1998

Spoerl E, Huhle M, Seiler T. Induction of cross-links in corneal tissue. Exp Eye Res. 1998;66:97–103.

The concept of cross-linking

- Normal cornea
 - Cornea stroma made up of collagen fibres
 - Bridges/ 'cross-links' between collagen
- Keratoconus
 - Reduction in number and rearrangement of collagen fibres
 - Thinning and decreased strength



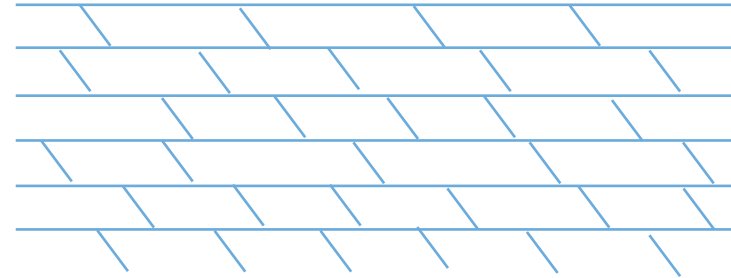
The concept of cross-linking

- Increasing cross-links may stiffen cornea and increase stability to slow progression of keratoconus
 - 1997: Corneal collagen cross-linking (CXL) for keratoconus first published (Spoerl et al, Ophthalmologie, 1997)

Fewer cross-links
(weaker)



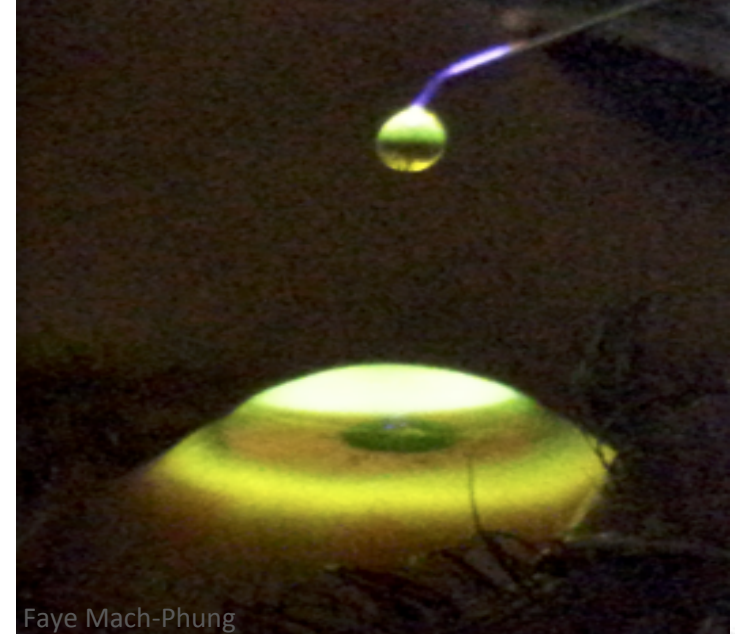
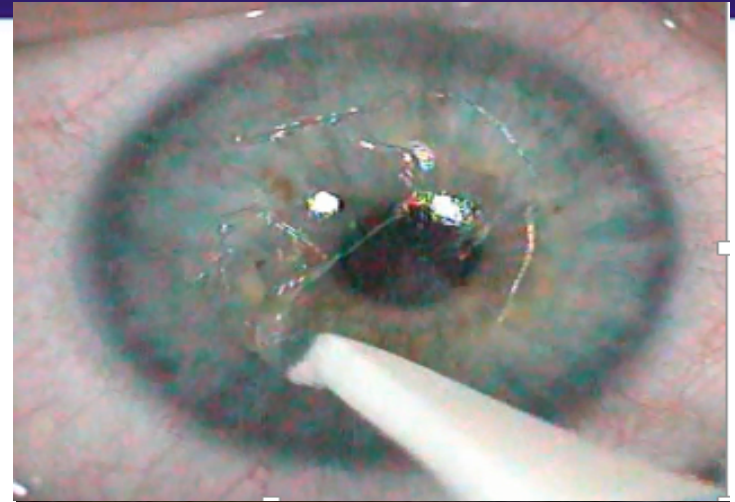
More cross-links
(stronger)



CXL treatment

CXL procedure

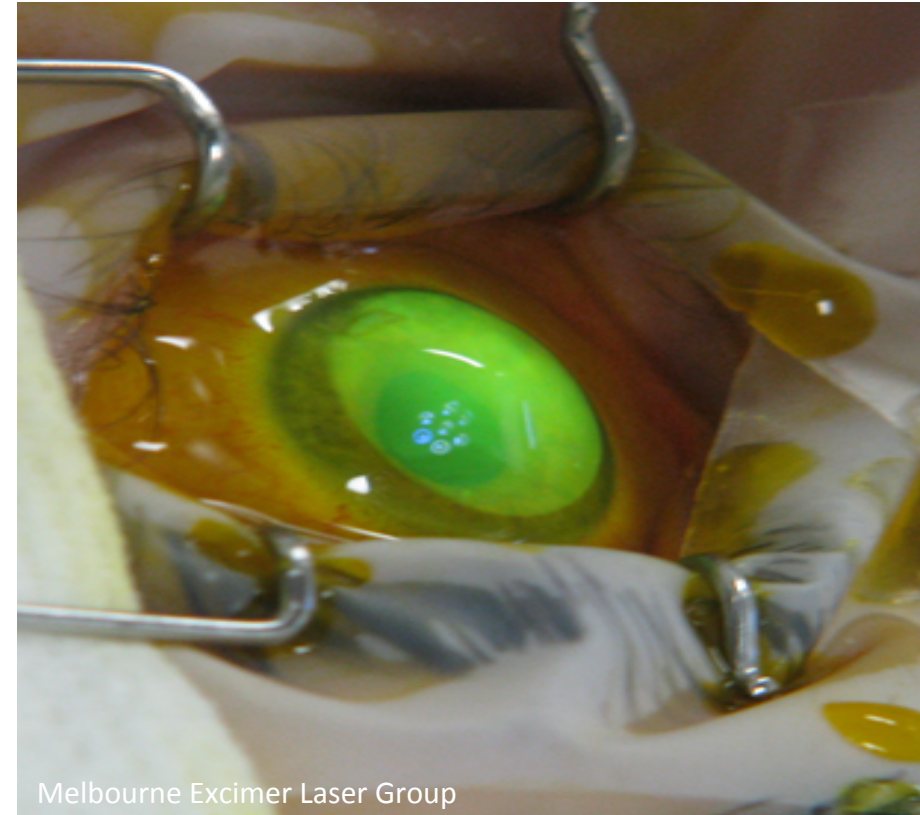
- Step 1 – remove epithelium
- Step 2 – riboflavin drops
(30 minutes)
- Step 3 – UVA + riboflavin (30 minutes)



Faye Mach-Phung

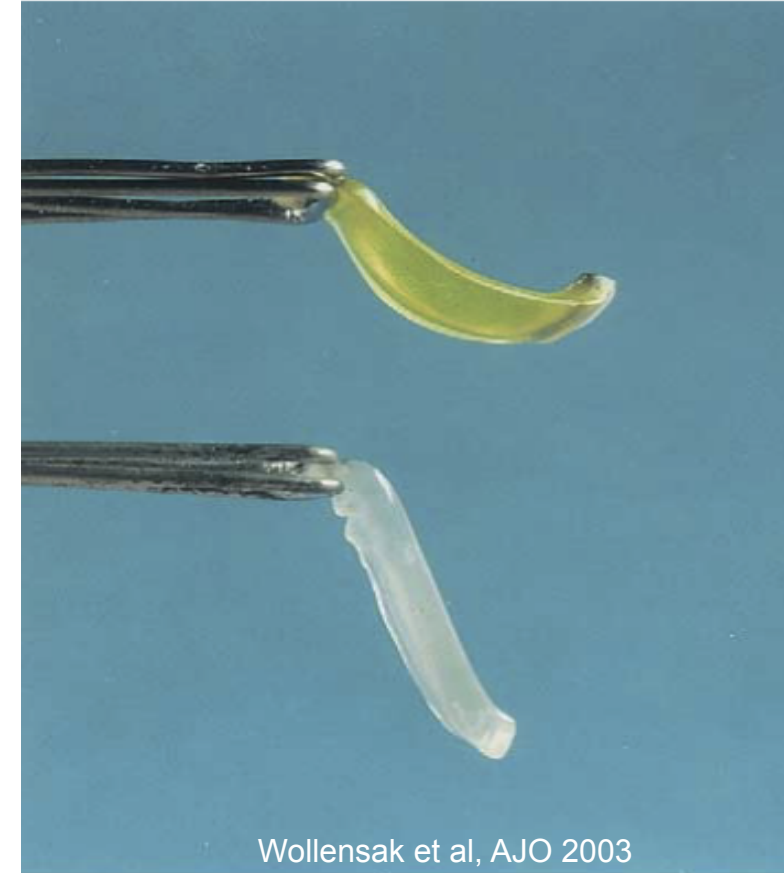
CXL post-procedure

- Temporary 'bandage' contact lens
- Antibiotic eye drops
- Anti-inflammatory eye drops
- Pain relief medications



Pre-clinical testing

- Increased collagen diameter by 12.5% (Wollensak et al, Cornea, 2004)
- Increased stiffness by over 300% (Wollensak et al, JCRS, 2003)
- **Endothelial damage when corneal thickness less than 400 μ m (0.4mm)** (Wollensak et al, JCRS, 2003)



Results

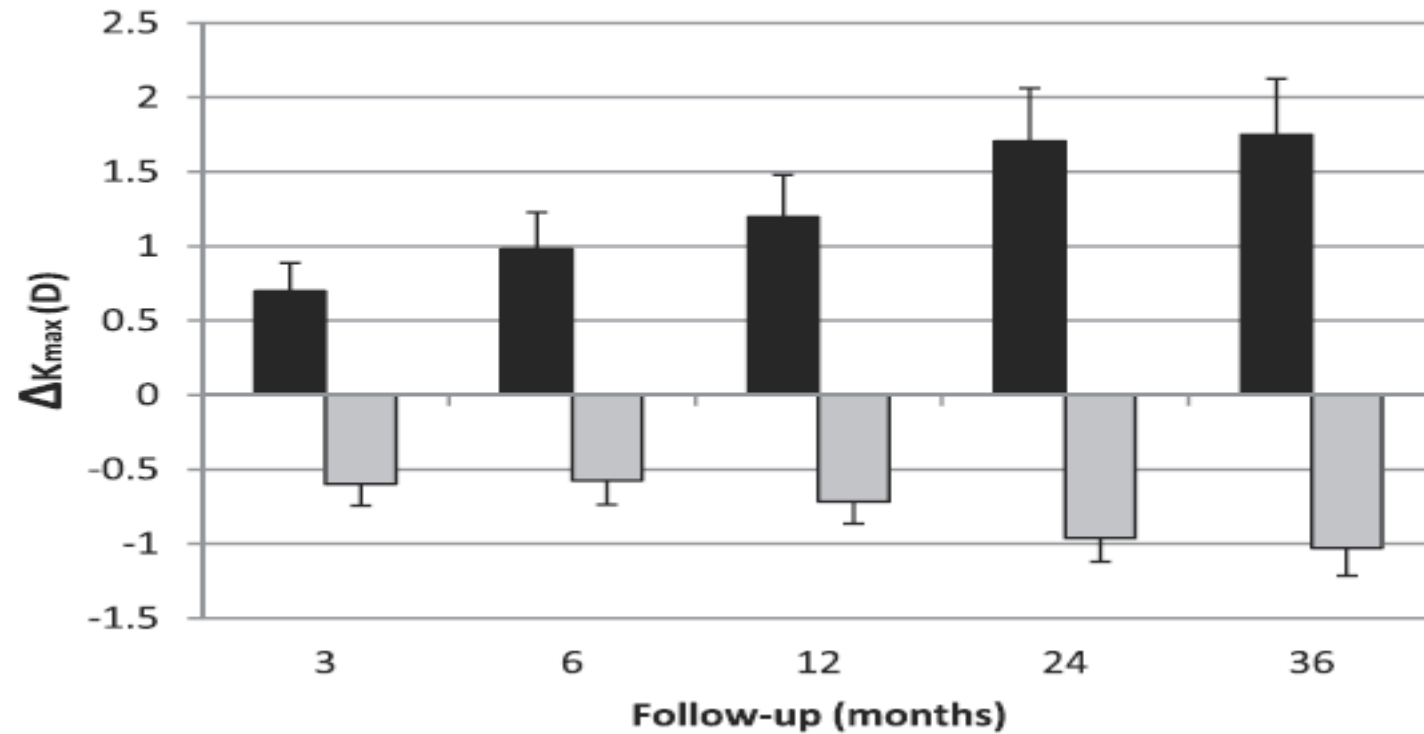
- First study in patients in 2003 (Wollensak et al, AJO, 2003)
- Many publications since then
- 3 randomized, controlled trials in published literature
 - Compare treated versus untreated eyes
 - Tests the effectiveness of the treatment
 - Australia, UK, USA



Melbourne CXL trial

- 2006
- 100 eyes randomised to CXL treatment or control
- Followed up yearly for 5 years
- Inclusion criteria
 - Progressive keratoconus over 12 months
 - Corneal thickness $>400\mu\text{m}$

3 years: Corneal curvature



steeper (worse)

Control
+1.86D

CXL
-1.20D

flatter (better)

- Changes maintained after 4 years

CXL results

- Corneal topography
 - Overall, around 90% stabilise or improve
- Visual acuity
 - Modest improvement
 - ranging from no change to improvement by 2+ lines
- Stability after 12 months until 4-6 years (O'Brart et al, BJO, 2013)

Complications

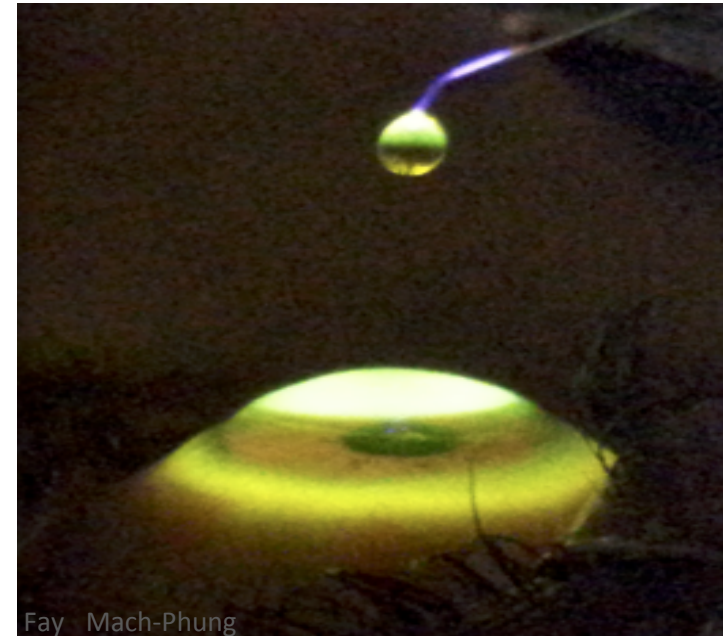
Complications

- Haze
 - Seen in 90%
 - 8.6% reported to permanently affect vision (Raiskup et al, JCRS, 2009)
- Sterile infiltrates
 - Up to 7.6% (Koller et al, JCRS, 2009)
 - May be due to immune reaction
 - Usually improves but can leave scarring and affect vision
- Infections
- Irreversible corneal swelling



'Dresden protocol'

- Standard, most widely used protocol (Spoerl et al, Cornea 2007)
- Epithelial debridement
- 30 minutes riboflavin
- 30 minutes UVA ($3\text{mW}/\text{cm}^2$)

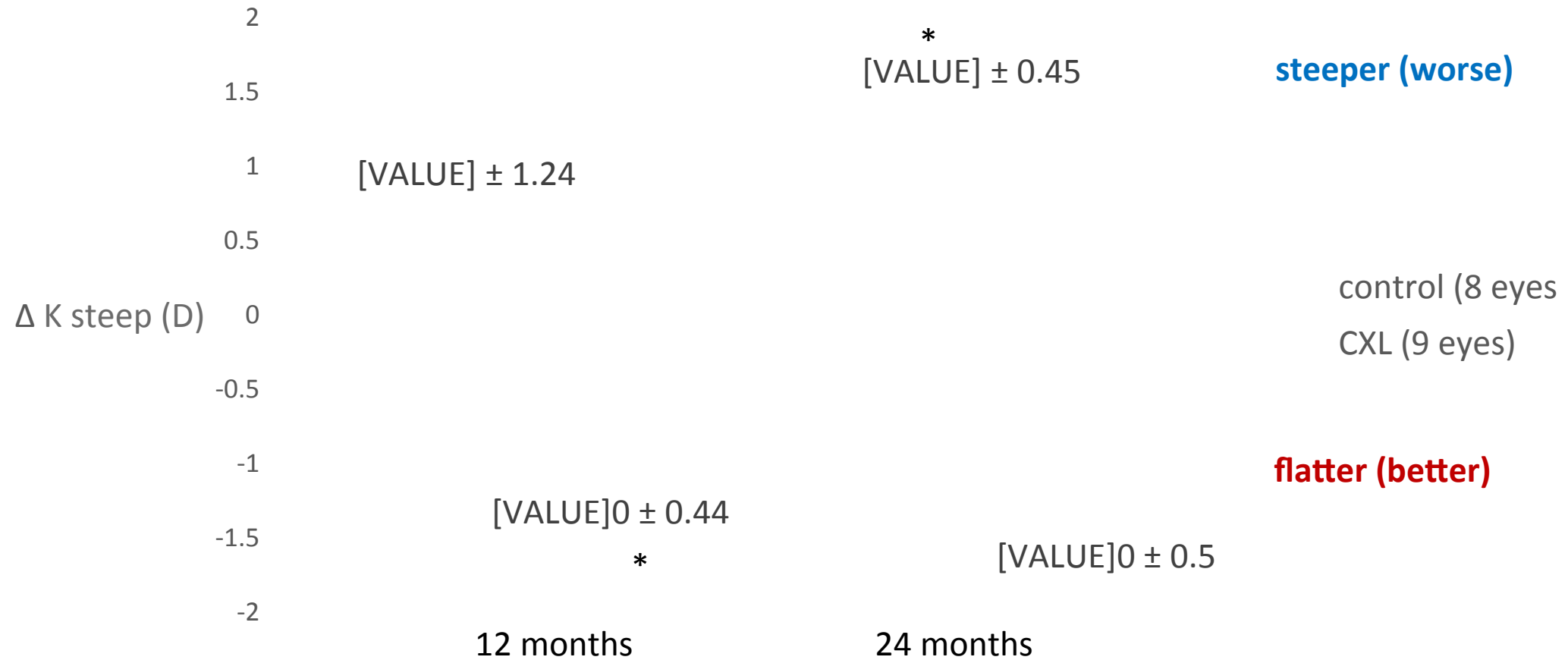


Treatment modifications

1. Thin corneas

- Using standard treatment in cornea $<400\mu\text{m}$
 - Endothelial cell damage can occur
 - Irreversible corneal swelling and reduced vision
- Use of hypotonic riboflavin to swell the cornea
 - Cornea still needs to be $>400\mu\text{m}$ during the UVA stage
- Limited results in the scientific literature

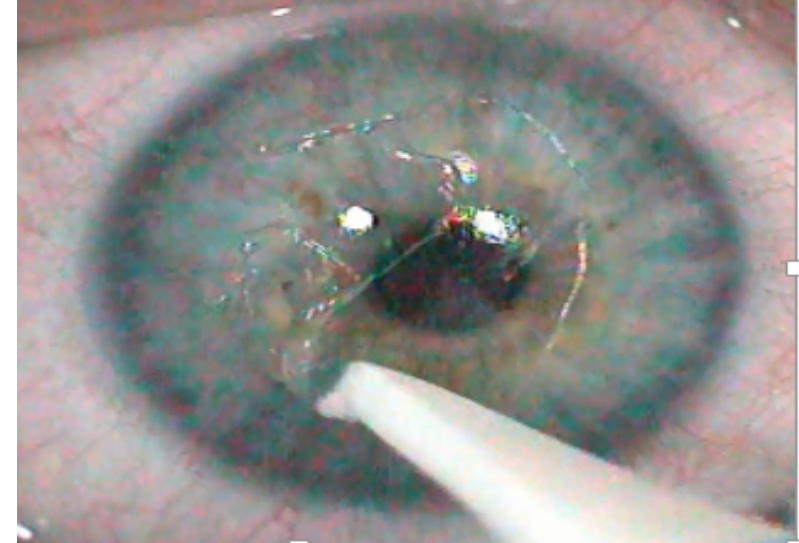
CERA / RVEEH trial – thin corneas



* statistically significant

2. Epithelium-on treatment

- Epithelium off
 - Riboflavin not absorbed through intact epithelium
- Advantages
 - No epithelial defect
 - No need for contact lens
 - Less complications
 - Less pain
- Modification in treatment
 - Additives in riboflavin



2. Epithelium-on treatment

- Summary of results
 - Remain mixed
 - Studies: some improve, some no change, some worsen
 - Treatment depth less (Filippello et al, JCRS, 2012)
- Complications
 - Less

.....but may not work

While it is safe and well tolerated, results are variable – may not effectively and consistently halt the progression of keratoconus

3. Accelerated CXL

- Standard CXL takes over 1 hour!
- Faster CXL may be achievable with higher irradiance for less time to give the same total exposure?

3. Accelerated CXL

- Results slowly becoming available in scientific literature
 - Different studies use different treatment protocols (time and irradiance)
- Corneal stiffness
 - Efficiency of CXL decreases as increase UVA to 18mW/cm² (Hammer et al, IOVS 2014)
- Treatment depth
 - Variable – depends on the study, depends on the time/irradiance
- Clinical trials
 - May be comparable with conventional CXL (Tomita et al, JCRS, 2014)
- Complications
 - Nil reported so far

The future?

- Riboflavin delivery for epithelium-on treatment
 - 'iontophoresis'
 - Using an electrical current to increase the penetration of riboflavin into the cornea (Vinciguerra et al, JCRS 2013)
 - Ultrasound 'phonophoresis' (Lamy et al, IOVS 2013)
 - Other riboflavin formulations being developed
- To determine safest and most effective CXL treatment protocol
- Extending CXL to treatment of other corneal diseases

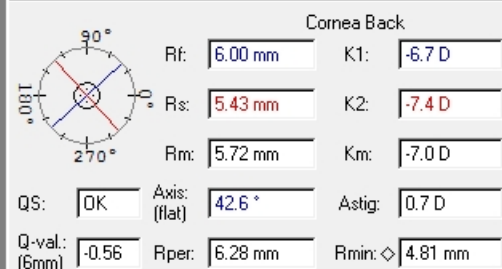
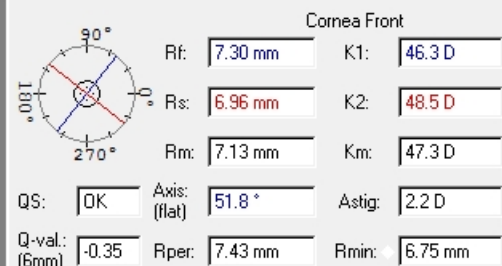
Important points

- Recommended for progressive keratoconus
 - Corneal thickness $>400\mu\text{m}$
- Not a cure but evidence shows it slows the progression of keratoconus in most treated patients for at least 5 years
- Evolving technique
 - Modifications to the technique need further testing

Clinical Cases

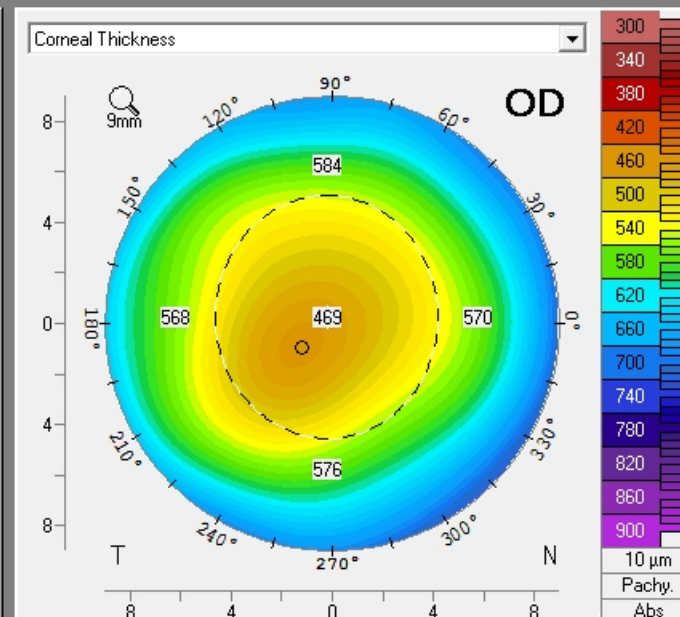
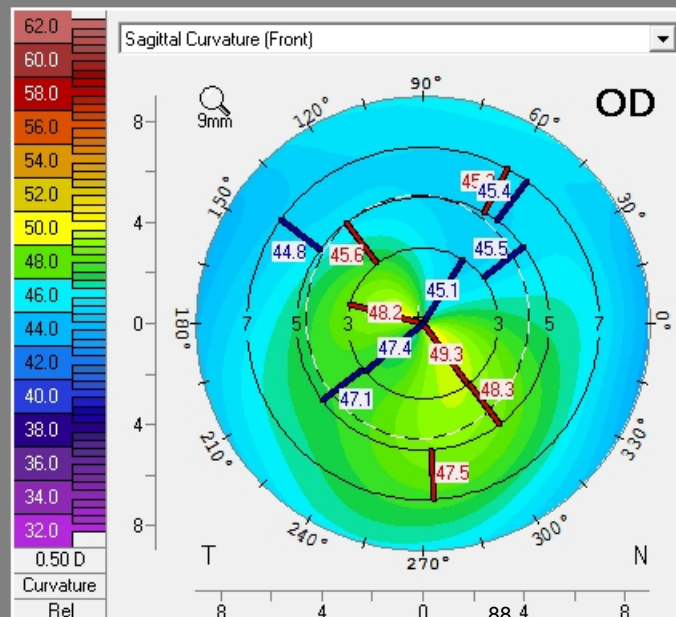
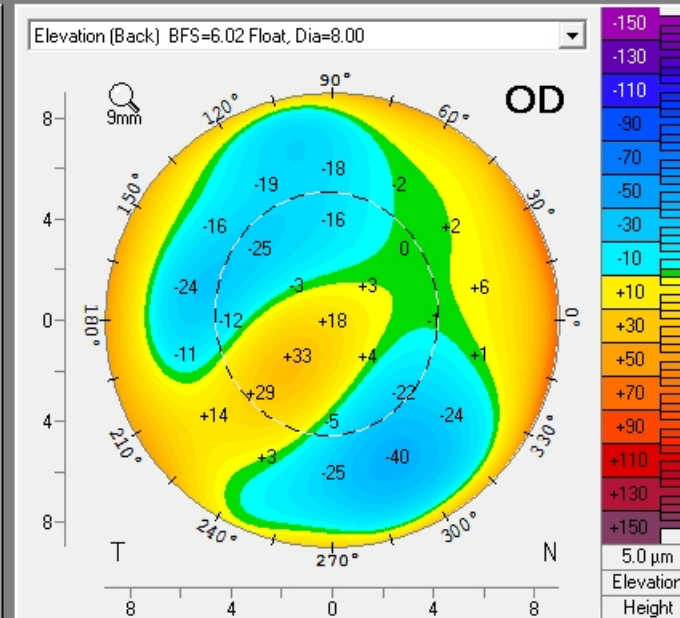
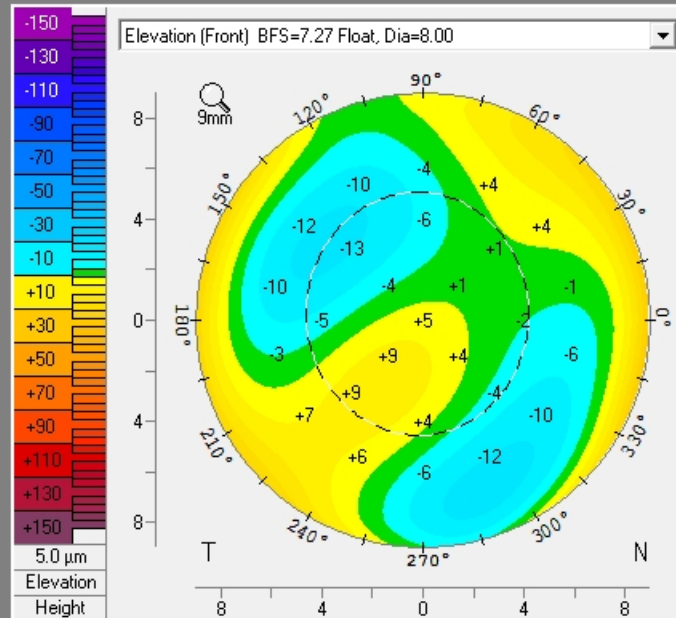
OCULUS - PENTACAM

Last Name:
 First Name:
 ID:
 Date of Birth: 01/01/1986 Eye: Right
 Exam Date: 10/04/2014 Time: 09:35:16
 Exam Info:



Pupil Center: + Pachy: 469 μ m x[mm] -0.11 y[mm] +0.12
 Pachy Apex: 469 μ m 0.00 0.00
 Thinnest Locat.: 461 μ m -0.60 -0.47
 K Max. (Front): 50.0 D +0.20 -0.13

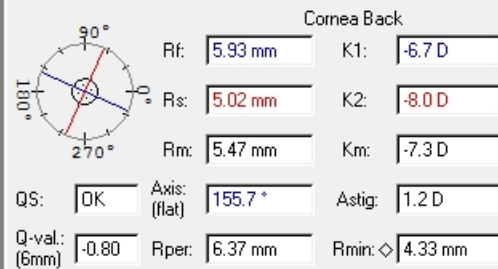
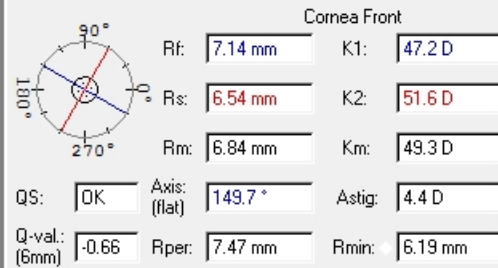
Cornea Volume: 56.9 mm³ \emptyset Cornea: 11.8 mm
 Chamber Volume: 202 mm³ Angle: 39.8°
 A. C. Depth (Int.): 3.54 mm Pupil Dia: 4.60 mm
 Enter IOP IOP(Sum): +3.2 mmHg Lens Th.:



QUARD
 SOCIATES

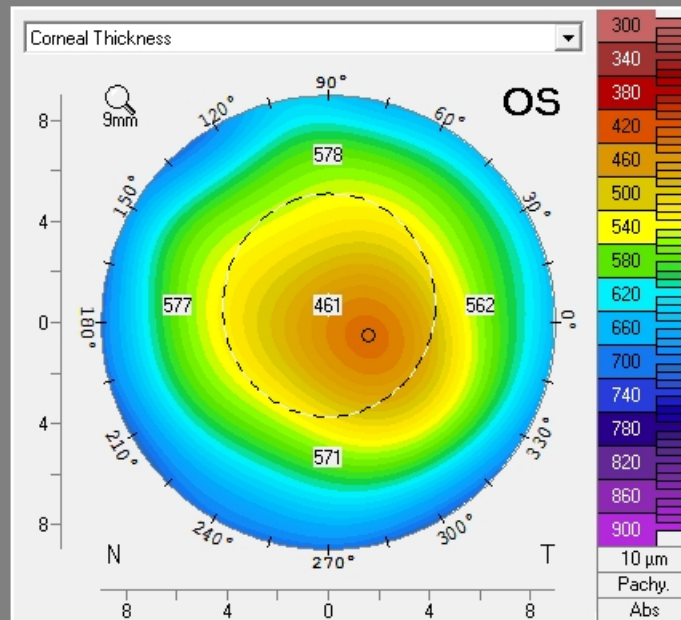
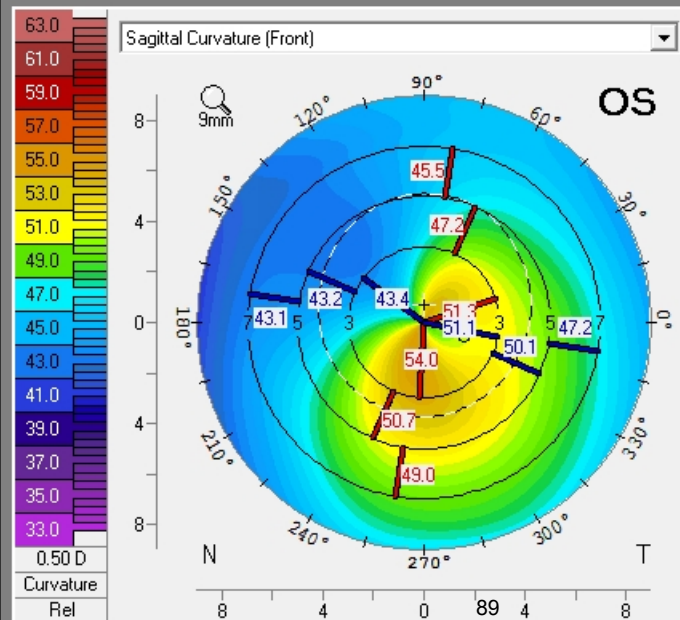
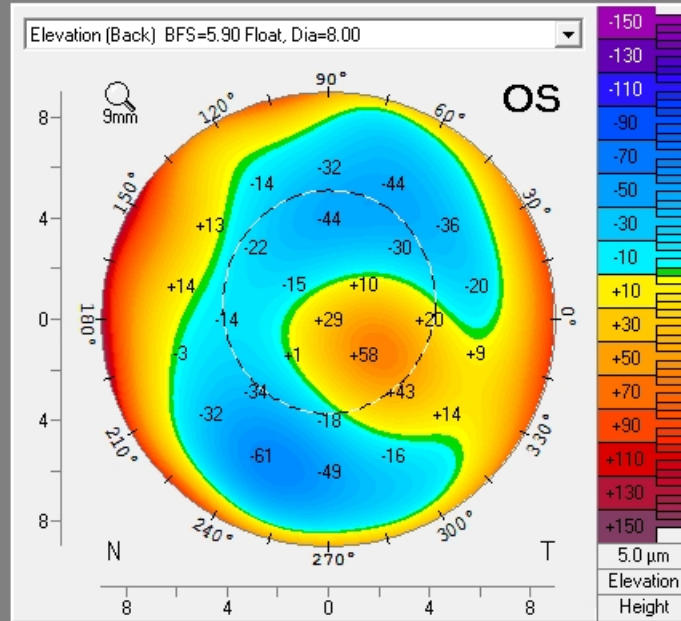
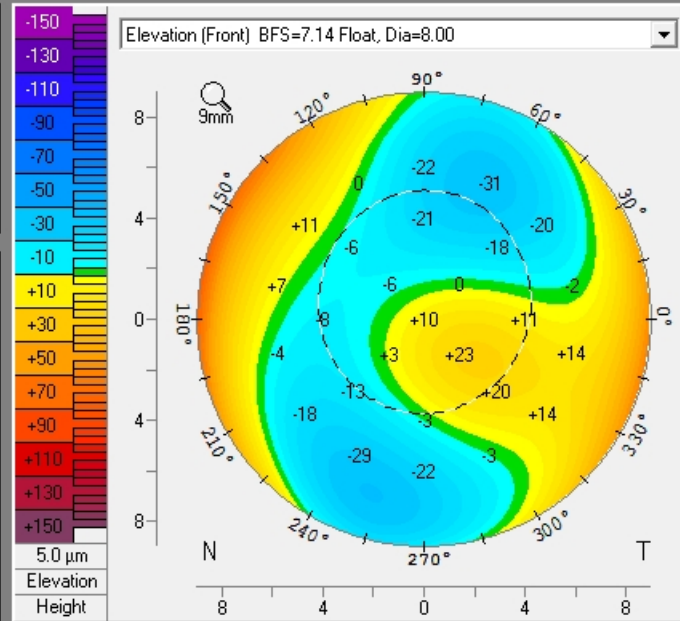
OCULUS - PENTACAM

Last Name:
 First Name:
 ID:
 Date of Birth: 01/01/1986 Eye: Left
 Exam Date: 10/04/2014 Time: 09:36:25
 Exam Info:



Pupil Center: + 461 µm x[mm] +0.01 y[mm] +0.34
 Pachy Apex: 455 µm 0.00 0.00
 Thinnest Locat.: 440 µm +0.79 -0.26
 K Max. (Front): 54.5 D -0.20 -0.72

Cornea Volume: 56.7 mm³ Ø Cornea:
 Chamber Volume: 213 mm³ Angle: 36.7°
 A. C. Depth (Int.): 3.59 mm Pupil Dia: 4.31 mm
 Enter IOP IOP(Sum): +3.8 mmHg Lens Th.:



OCULUS - PENTACAM

Last Name:
 First Name:
 ID:
 Date of Birth: 01/01/1994 Eye: Right
 Exam Date: 10/06/2012 Time: 08:22:13
 Exam Info:

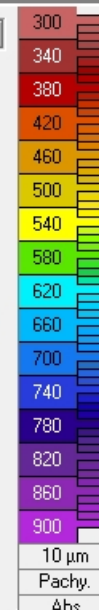
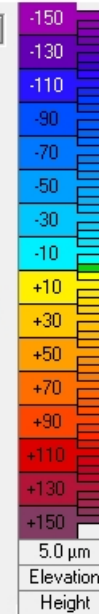
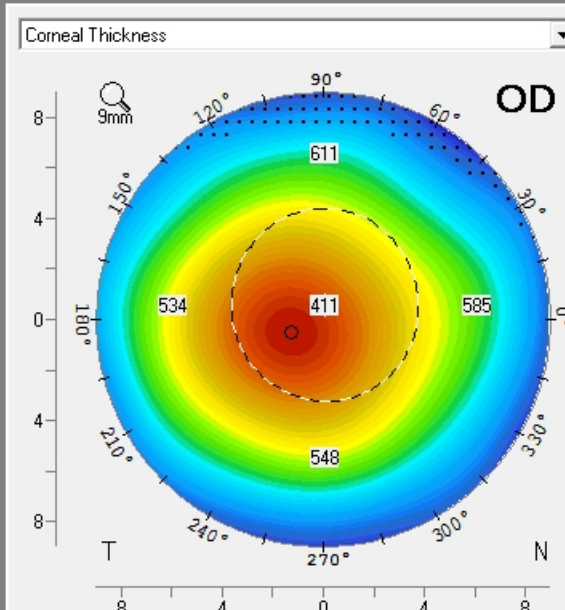
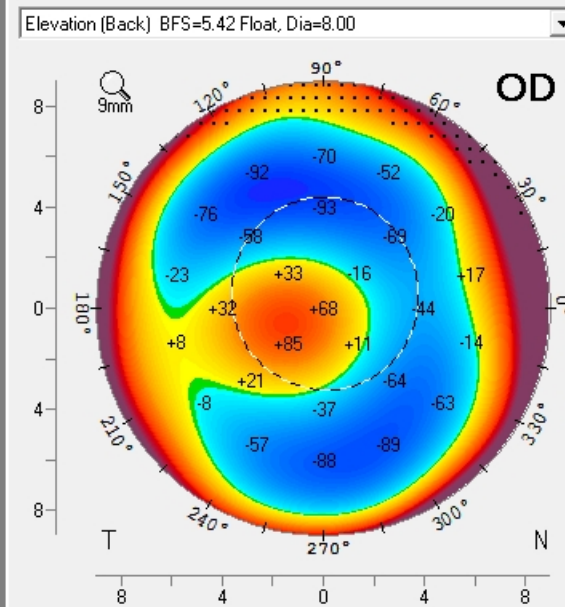
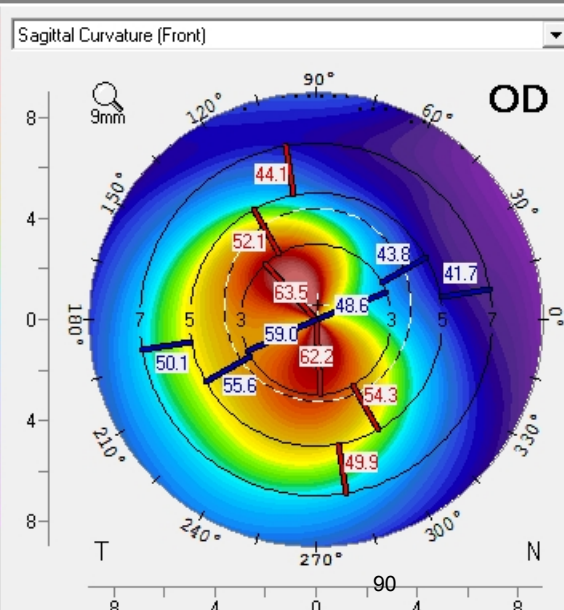
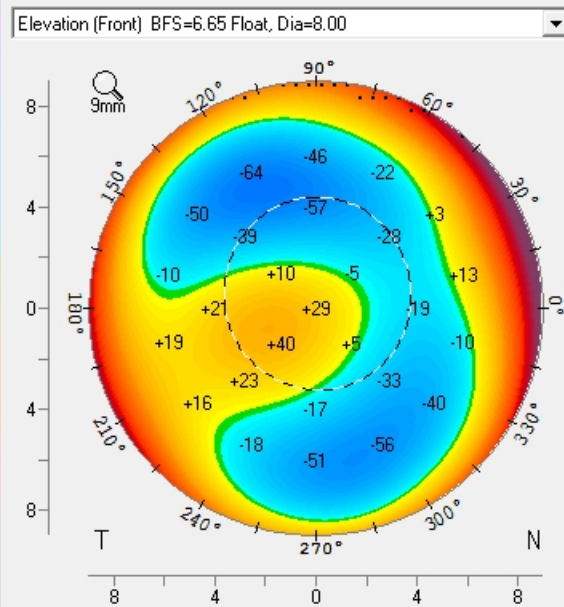
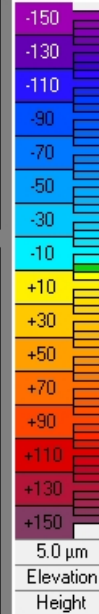
Cornea Front

Rf: 6.33 mm K1: 53.4 D
 Rs: 5.45 mm K2: 61.9 D
 Rm: 5.89 mm Km: 57.3 D
 QS: ☐ OK Axis: (flat) 19.9° Astig: 8.6 D
 Q-val: (6mm) -1.93 Rper: 7.55 mm Rmin: 4.92 mm

Cornea Back

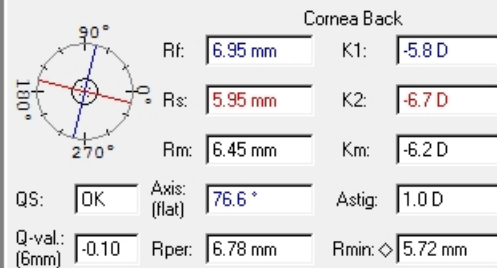
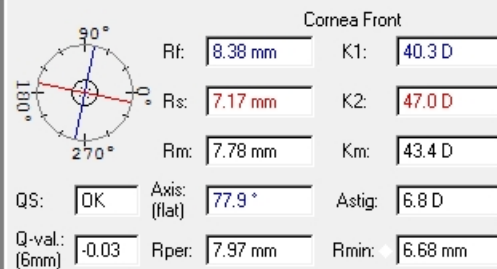
Rf: 4.93 mm K1: -8.1 D
 Rs: 4.11 mm K2: -9.7 D
 Rm: 4.52 mm Km: -8.8 D
 QS: ☐ OK Axis: (flat) 16.2° Astig: 1.6 D
 Q-val: (6mm) -1.90 Rper: 6.27 mm Rmin: 3.37 mm

Pupil Center: + 411 μm x(mm) +0.04 y(mm) +0.00
 Pachy Apex: 401 μm x(mm) +0.00 y(mm) +0.00
 Thinnest Locat.: 385 μm x(mm) -0.63 y(mm) -0.25
 K Max. (Front): 68.7 D x(mm) -0.13 y(mm) +0.38
 Cornea Volume: 58.7 mm³ Cornea
 Chamber Volume: 158 mm³ Angle: 37.2°
 A. C. Depth (Int.): 3.37 mm Pupil Dia: 3.76 mm
 Enter IOP IOP(Sum): +6.0 mmHg Lens Th.:



OCULUS - PENTACAM

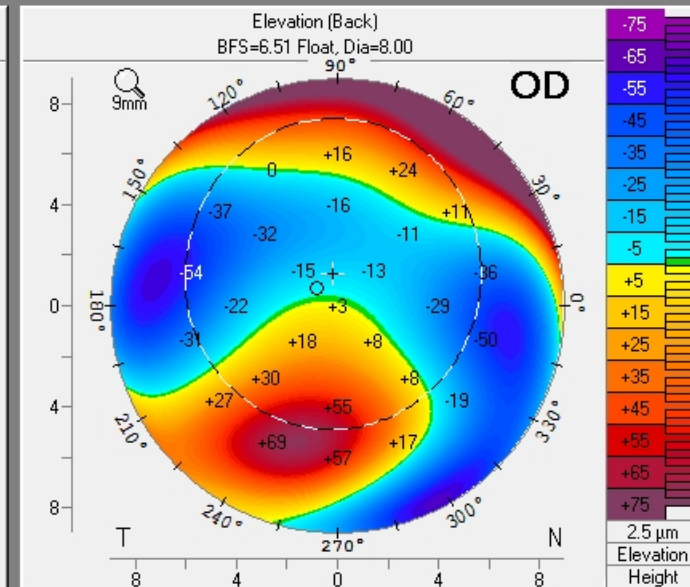
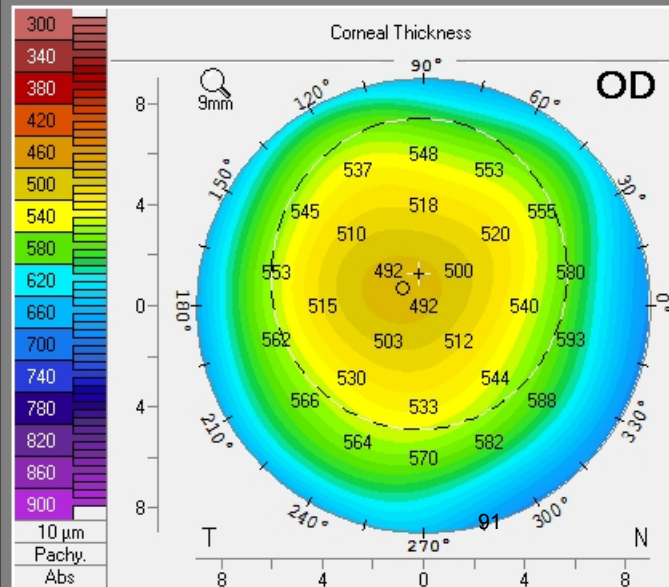
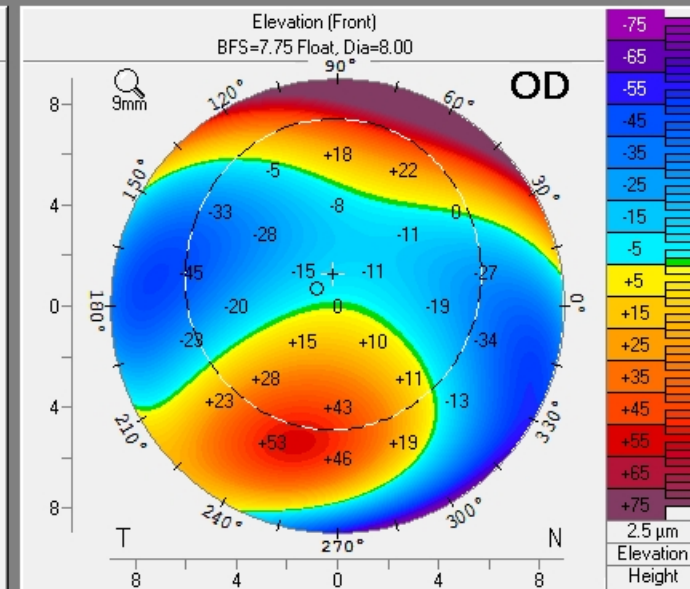
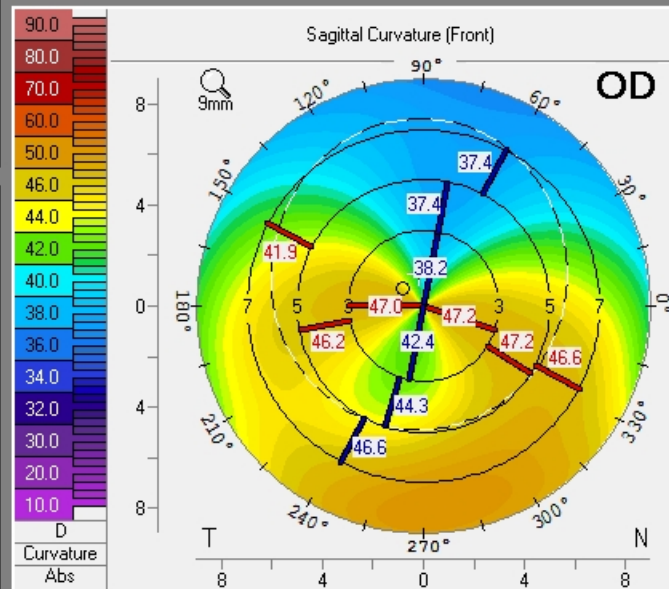
Last Name:
 First Name:
 ID:
 Date of Birth: 01/01/1986 Eye: Right
 Exam Date: 09/25/2014 Time: 08:36:51
 Exam Info:



Pupil Center: + Pachy: 492 µm x(mm) -0.09 y(mm) +0.62
 Pachy Apex: - 492 µm 0.00 0.00
 Thinnest Locat.: O 490 µm -0.42 +0.35
 K Max. (Front): 50.5 D +0.35 -4.02

Cornea Volume: 53.9 mm³ Ø Cornea: 12.5 mm
 Chamber Volume: 258 mm³ Angle: 36.6°
 A. C. Depth (Int.): 3.84 mm Pupil Dia: 6.01 mm
 Enter IOP IOP(Sum): +2.3 mmHg Lens Th.: 3.09 mm

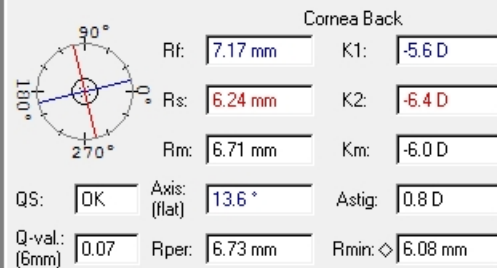
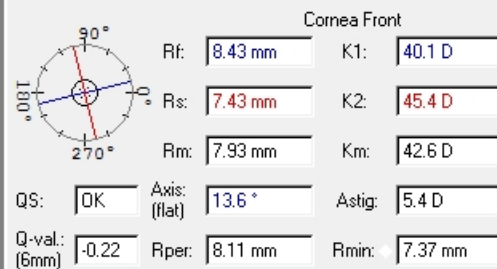
Refractive



VARDA
 SOCIATES

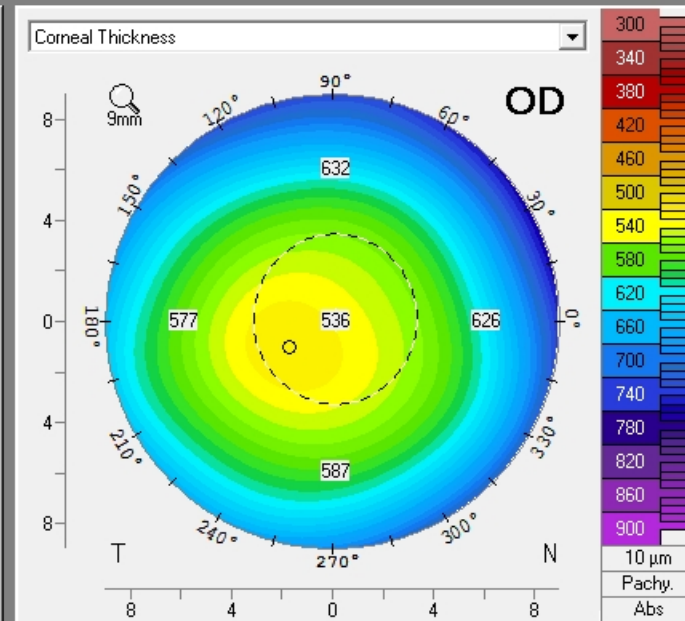
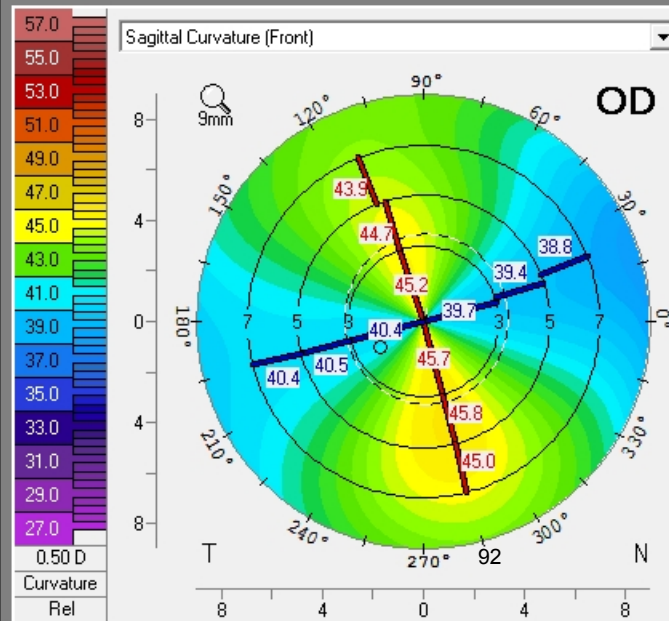
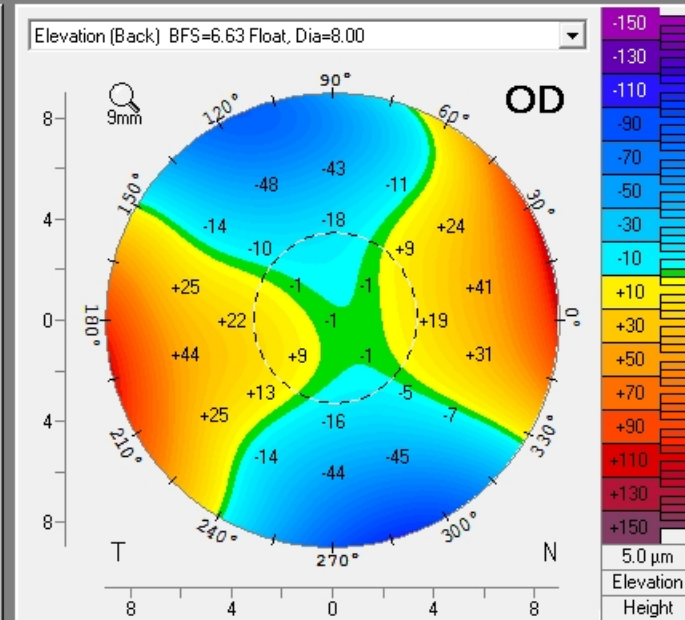
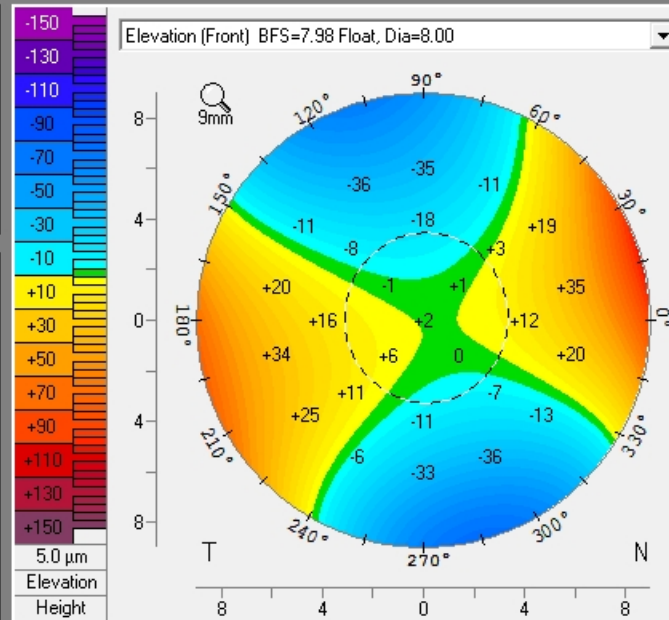
OCULUS - PENTACAM

Last Name:
 First Name:
 ID:
 Date of Birth: 01/01/1992 Eye: Right
 Exam Date: 09/06/2014 Time: 10:16:24
 Exam Info:



Pupil Center: + Pachy: 536 µm x(mm) +0.06 y(mm) +0.04
 Pachy Apex: 535 µm 0.00 0.00
 Thinnest Locat.: 527 µm -0.86 -0.50
 K Max. (Front): 45.8 D +0.43 -2.01

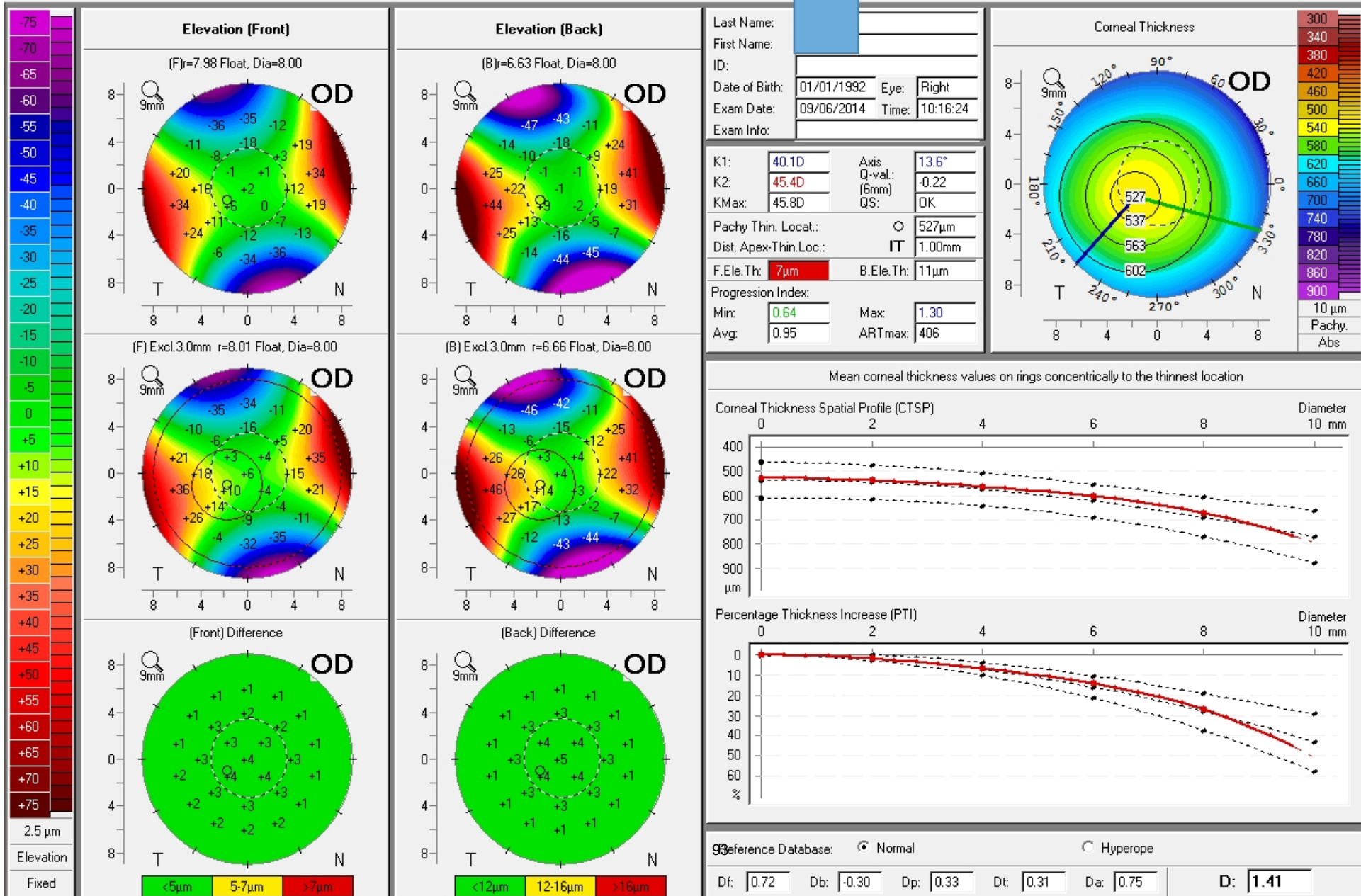
Cornea Volume: 58.4 mm³ Ø Cornea: 12.7 mm
 Chamber Volume: 275 mm³ Angle: 51.8°
 A. C. Depth (Int.): 3.87 mm Pupil Dia: 3.30 mm
 Enter IOP IOP(Sum): +0.6 mmHg Lens Th.:



VARDA
SOCIATES

OCULUS - PENTACAM

Belin / Ambrósio Enhanced Ectasia



OCULUS - PENTACAM

Last Name:
 First Name:
 ID:
 Date of Birth: 01/01/1992 Eye: Right
 Exam Date: 09/06/2014 Time: 10:16:24
 Exam Info:

Cornea Front

Rf: 8.43 mm K1: 40.1 D
 Rs: 7.43 mm K2: 45.4 D
 Rm: 7.93 mm Km: 42.6 D
 QS: OK Axis: (flat) 13.6° Astig: 5.4 D
 Q-val: (6mm) -0.22 Rper: 8.11 mm Rmin: 7.37 mm

Cornea Back

Rf: 7.17 mm K1: -5.6 D
 Rs: 6.24 mm K2: -6.4 D
 Rm: 6.71 mm Km: -6.0 D
 QS: OK Axis: (flat) 13.6° Astig: 0.8 D
 Q-val: (6mm) 0.07 Rper: 6.73 mm Rmin: 6.08 mm

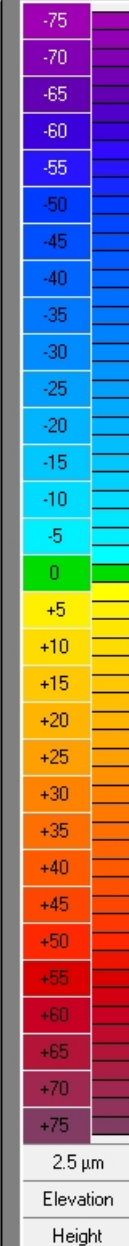
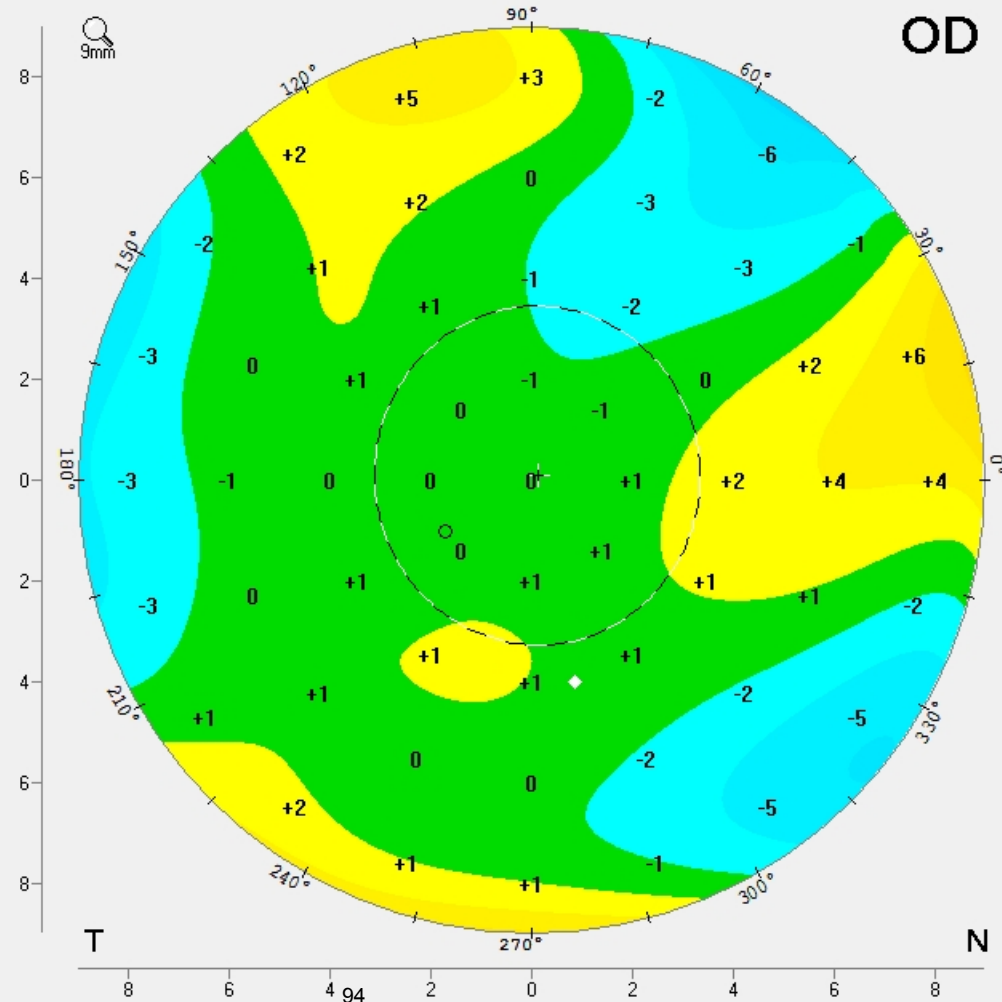
Pupil Center: + 536 µm x[mm] +0.06 y[mm] +0.04
 Pachy Apex: • 535 µm 0.00 0.00
 Thinnest Locat.: ○ 527 µm -0.86 -0.50
 K Max. (Front): • 45.8 D +0.43 -2.01

Cornea Volume: 58.4 mm³ Ø Cornea: 12.7 mm
 Chamber Volume: 275 mm³ Angle: 51.8°
 A. C. Depth (Int.): 3.87 mm Pupil Dia: 3.30 mm
 Enter IOP IOP(Sum): +0.6 mmHg Lens Th.:

Elevation (Front)

to reference shape:

☐ Toric Ellipsoid
☒ Toric Ellips. fixed
☐ Torus
☐ Ellipsoid
☐ Sphere
 Diameter: ☐ Auto. ☒ Manual 8.00
 RMS=1.93 ShiftX: -0.73 ShiftY: -0.53
 Axis: 14
 Ecc: 0.50
☒ Float ☒ Optimise Shift



2.5 µm
 Elevation
 Height
VAR
 SOCIATES

Curriculum Vitae

Duna Raoof MD
(734) 644-6272
duna.raoof@gmail.com

Current Positions

Cornea, Cataract, and Refractive Surgery Specialist

Harvard Eye Associates
Laguna Hills, California

Volunteer Attending Physician

University of California, Los Angeles
Torrence, California

Education

Medical Doctorate	University of Michigan School of Medicine	2005-2009
BS with Distinction	University of Michigan, Honors Program Double concentration: Cell & Molecular Biology Arab, Armenian, Persian, Turkish and Islamic Studies	2001-2005

Post-Doctoral Training

Harvard Medical School, Massachusetts Eye and Ear Infirmary Cornea & Refractive Surgery Clinical Fellow Chief Fellow	2014-2015
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Harvard Medical School, Schepens Eye Research Institute Post-Doctoral Fellow	2013-2014
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University of Michigan, Kellogg Eye Center, Department of Ophthalmology Chief Resident	2012-2013
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University of Michigan, Kellogg Eye Center, Department of Ophthalmology Resident	2010-2013
--	-----------

Oakwood Hospital, Dearborn, Michigan, Department of Internal Medicine Transitional Intern	2009-2010
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Honors

Heed Ophthalmic Foundation Fellow <ul style="list-style-type: none">Most prestigious national award given to select group of graduating ophthalmology residents	2013-2014
--	-----------

Kyoto Prefectural University of Medicine Visiting Fellow, Kyoto, Japan <ul style="list-style-type: none">Selected by MEEI Cornea Department to work with Dr. Shigeru Kinoshita as part of the Harvard Medical School/University of Kyoto exchange programLearned innovative endothelial cell laboratory and corneal surgical techniques	June 2014
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Chief Cornea & Refractive Surgery Fellow	2013-2014
<ul style="list-style-type: none"> Selected to serve as liaison between 6 cornea fellows and 14 faculty Coordinated fellow rotations, weekly clinic/OR schedules, call, and conferences 	
Fellows Representative, Massachusetts Eye & Ear Infirmary	2013-2014
<ul style="list-style-type: none"> Selected to co-represent all MEEI clinical fellows (15 clinical fellows) Directed MEEI Fellows Course including serving as guest Associate Editor for the journal Seminars in Ophthalmology 	
Chief Resident, University of Michigan, Kellogg Eye Center	2012-2013
<ul style="list-style-type: none"> Organized all residency related schedules (21 residents), coordinated intra-departmental conferences, maintained communication between faculty and residents Coordinated interview day activities and participated in resident selection committee including interviewing residency applicants 	
Eye Bank Association of America Travel Grant	2013
<ul style="list-style-type: none"> Awarded to cornea fellows and residents who demonstrate potential for future involvement in eye banking and corneal transplantation 	
Association for Research in Vision and Ophthalmology Travel Grant	2013
James M. LaBerge Research Award, Kellogg Eye Center	2011
<ul style="list-style-type: none"> Given to most outstanding research by a first-year resident 	
Midwest Eye-Banks Eye and Vision Research Program, Research Stipend Award	2010
Ainger Merit Scholarship, University of Michigan School of Medicine	2005-2008
Ting YE Merit Scholarship, University of Michigan School of Medicine	2005-2008
Ernest T. Abdel Massih Award for Excellence in Arabic, University of Michigan	2005
Alpha Epsilon Delta Medical Honor Society, University of Michigan	2004-2005
Honors Program, University of Michigan	2001-2005
Regents Merit Scholarship, University of Michigan	2001-2005
Michigan Competitive Scholarship, State of Michigan	2001
Ann Arbor Rotary Club Scholarship, University of Michigan	2001
President's Education Award, University of Michigan	2001

Community Service

Psychiatry Department, Sheikh Khalifa Medical City, Abu Dhabi, United Arab Emirates	May 2009
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Amol Eye Center, Amol village, Iran	January 2008
Clinic Coordinator, Robert H. Delonis Homeless Shelter, Ann Arbor, Michigan	2006-2007
Medical Students for Cuba, Havana, Cuba	May 2005
Vice President, Foundation of International Medical Relief of Children	2003-2004
Founder and President, Emergency Medical Response Organization	2003-2004

Committees

Fellows Education Committee, Massachusetts Eye and Ear Infirmary	2013-2014
Committee for Continuing Medical Education, Kellogg Eye Center	2012-2013
Committee for Resident and Fellow Education, Kellogg Eye Center	2012-2013
Liaison Committee on Medical Education for Accreditation, University of Michigan	2011-2012
Coordinator, Ophthalmology Interest Group, University of Michigan School of Medicine	2006-2007

Teaching Activities

Harbor UCLA volunteer faculty (once a month), Torrence, California	2015-present
Attending, Emergency Wing, Massachusetts Eye and Ear Infirmary (24 shifts)	2013-2015
Overview of American Medical Education, Kyoto Prefectural Univ of Medicine, Japan	6/8/2014
A Case of Acanthamoeba Keratitis, Cornea Society VISTA, Orlando, Florida	5/4/2014
Traumatic Cataracts, Kellogg Eye Center Grand Rounds, Univ of Michigan	12/20/2013
Infectious Crystalline Keratitis, Kellogg Eye Center Grand Rounds, Univ of Michigan	9/6/2012
Pediatric Lens Dislocations, Kellogg Eye Center Grand Rounds, Univ of Michigan	5/3/2012
APMME, Kellogg Eye Center Grand Rounds, Univ of Michigan	8/25/2011
Cystoid Macular Edema, Kellogg Eye Center, Univ of Michigan	3/7/2011
Biochemistry Instructor, Department of Chemistry, Univ of Michigan	2003-2004
Organic Chemistry Instructor, Department of Chemistry, Univ of Michigan	2003-2004
Undergraduate Student Leader, Women in Science and Engineering, Univ of Michigan	2002-2004
First Aid and CPR Instructor, American Red Cross	2002-2005

Professional Societies

American Academy of Ophthalmology
 Association for Research in Vision and Ophthalmology
 Cornea Society
 American Society of Cataract and Refractive Surgery

Orange County Ophthalmology Society

Manuscripts Submitted or In Preparation

Raoof D, Katikireddy c KR, Schmed T, Jurkunas UV. Menadione-Induced ROS Production Leads to Endothelial Cell Rosette Formation and Endothelial Mesenchymal Transition Seen in Fuchs Endothelial Corneal Dystrophy.

Raoof D, JacobsD, Jurkunas UV. Assessment of Corneal Endothelial Function Following Hypoxic Stress.

Raoof D, Jurkunas UV. Role of Dietary Factors in Fuchs Endothelial Corneal Dystrophy.

Raoof D, Colby K. Descemet's Stripping Without Endothelial Keratoplasty for Fuchs Corneal Endothelial Dystrophy.

Raoof D, Pineda R. Use of Brimonidine in Conjunctivochalasis Management.

Publications

Boynton, G. E., Raoof, D., Niziol, L. M., Hussain, M., & Mian, S. I. Prospective Randomized Trial Comparing Efficacy of Topical Loteprednol Etabonate 0.5% Versus Cyclosporine-A 0.05% for Treatment of Dry Eye Syndrome Following Hematopoietic Stem Cell Transplantation. *Cornea*, 2014; 34(7), 725-732.

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Borkar D, Raoof D, Colby K. Treatment of Fuchs' endothelial dystrophy by Descemet stripping without endothelial keratoplasty. American Academy of Ophthalmology Annual Meeting, Las Vegas, Nevada, November 16, 2015.

Raoof D, Pineda R. Femtosecond-Assisted Lamellar Corneal Tattooing for Visual Disturbances from Traumatic and Post-Surgical Iris Defects. World Cornea Congress VII, San Diego, CA, April 15-17, 2015.

Raoof D, Katikireddy, Kishore Reddy, Schmedt, Thore, Jurkunas, Ula. Menadione Induces Endothelial Mesenchymal Transition in Human Corneal Endothelial Cells. The Association for Research in Vision and Ophthalmology Annual Meeting, Orlando, FL, May 6, 2014.

Raoof D, Shtein RM, Blachley TS, Woodward MA, Mian SI, Sugar A, Stein JD. Comparison of Resource Consumption in Penetrating versus Endothelial Keratoplasty from 2009-2010. Eye Bank Association of America Annual Meeting, Chicago, Illinois, June 8, 2013.

Raoof D, Shtein RM, Blachley TS, Woodward MA, Mian SI, Sugar A, Stein JD. Comparison of Resource Consumption in Penetrating versus Endothelial Keratoplasty from 2009-2010. University of Michigan Kellogg Eye Center Research Day, Ann Arbor, Michigan, June 1, 2013.

Raoof D, Shtein RM, Terry M, Woodward MA. Correlation of Descemet's Stripping Endothelial Keratoplasty (DSAEK) Postoperative Graft Thickness with Visual Acuity over Time. University of Michigan Kellogg Eye Center Research Day, Ann Arbor, Michigan, June 8, 2012.

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