GP LENS UPDATE

- **EDWARD S. BENNETT OD, MSED, FAAO, FSLS**
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- KEY OPINION LEADER: LENSTECH
- ALSO ASSOCIATED WITH CONTACT LENS SPECTRUM (CLINICAL FEATURES EDITOR)

GP LENSES IN 2023

1) GP UPDATE
2) MYOPIA CONTROL/MANAGEMENT
3) MATERIALS AND COATINGS
4) LENS DESIGN AND FITTING TODAY
5) BITORICS MADE EASY
6) SCLERAL LENS FITTING AND APPLICATIONS
7) LENS CARE
8) GP RESOURCES

- **NICHOLS J. FISHER D. CONTACT LENS ANNUAL REPORT CONTACT LENS SPECTRUM JAN, 2022**

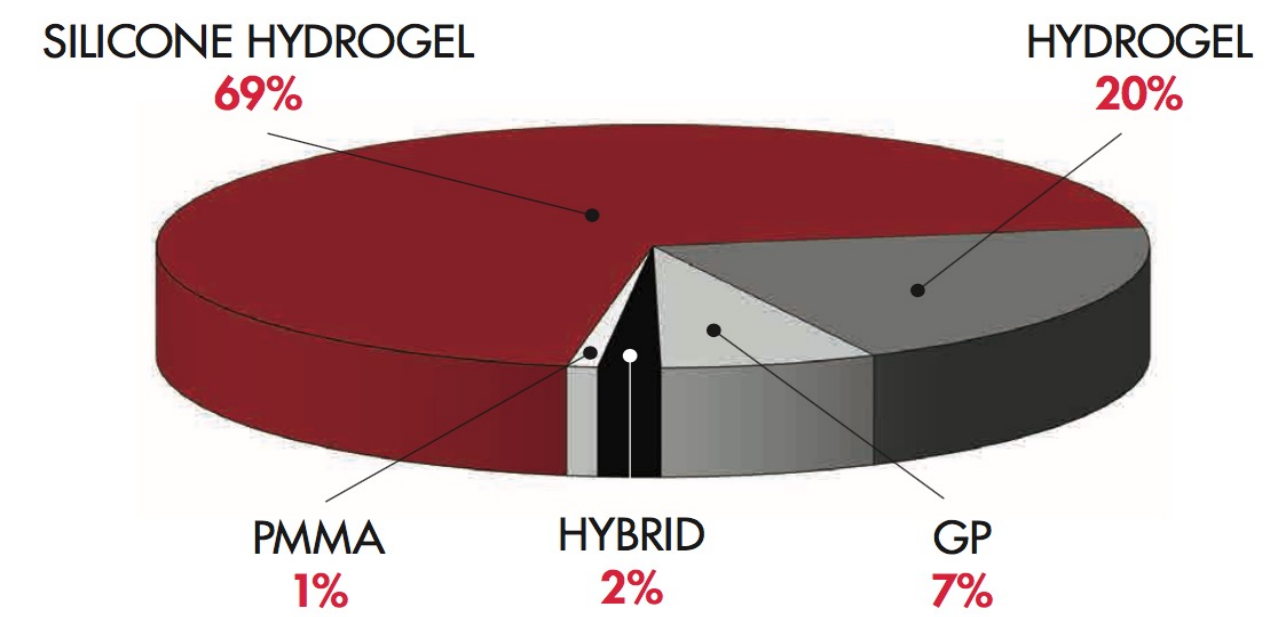

Figure 2. 2021 contact lens fits & refits by material classes.

CL ANNUAL REPORT (NICHOLS J, FISHER D: CONTACT LENS SPECTRUM, JAN., 2022

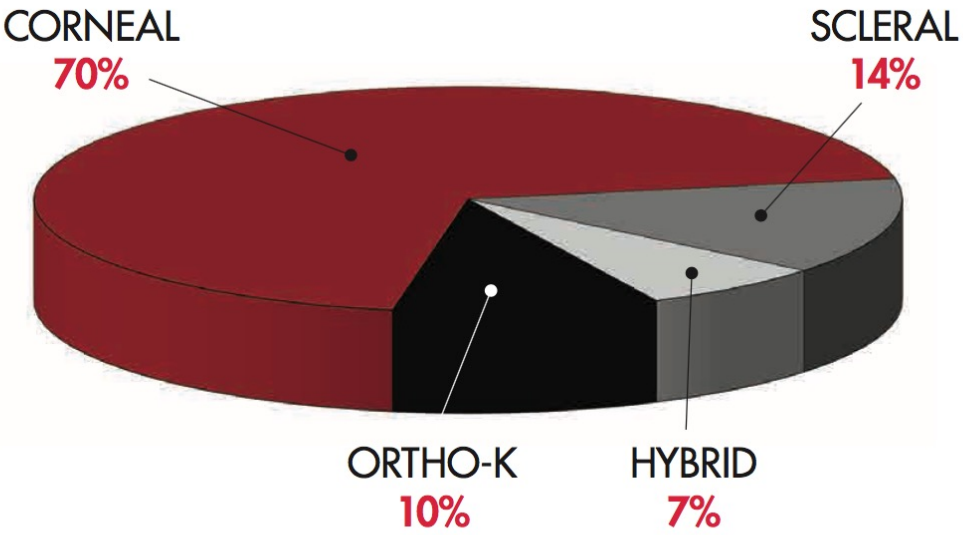

Figure 4. 2021 overall estimated distribution of lens fits by design for any lens with rigid GP material.

BIGGEST ADVANCEMENT IN GP LENSES IN 2022 (N = 49 GPLI AB)

- NEW ORTHOKERAOLOGY DESIGNS
- WAVEFRONT CORRECTION(UNDERSTANDING OF OPTICS, HOAS, WAVEFRONT-GUIDED LENS DESIGNS
- PROFILOMETRY/TOPOGRAPHY-DRIVEN SCLERAL DESIGNS
- HYPER DK LENS MATERIALS

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MYOPIA RISK (KATE GIFFORD, JAN., 2017, GSLS)

Risk of myopia

	Cataract (PSCC)	Retinal detachment	Myopic Maculopathy
-1.00 to -3.00	2.1	3.1	2.2
-3.00 to -6.00	3.1	9.0	9.7
-6.00 to -8.00	5.5	21.5	40.6

Younan et al 2002, Ogawa & Tanaka 1988, Vongphanit et al 2002 in Flitcroft 2012.

HOW CAN WE SLOW DOWN MYOPIA PROGRESSION IN YOUNG PEOPLE?

- OVERNIGHT ORTHOKERATOLOGY
- PERIPHERAL PLUS POWER (I.E, CENTER-NEAR MULTIFOCAL) SOFT LENSES
- ATROPINE

October 2022 Issue

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Subscription Information

GP AND CUSTOM SOFT ANNUAL REPORT

Both categories have positive outlooks, fueled by **new technologies in the areas of drug delivery,** accommodating lenses, and options for correction of HOAs.

GP AND CUSTOM SOFT ANNUAL REPORT 2022

Both categories have positive outlooks, fueled by new technologies in the areas of drug delivery, accommodating lenses, and options for correction of HOAs.

EDWARD S. BENNETT, OD, MSED

As with past annual reports, the information in this article is obtained from a combination of recent research and polling of both the *Contact Lens Spectrum* readership and experts in the contact lens industry. Recent developments in corneal GPs, scleral lenses, myopia management, and custom soft lenses will be highlighted. Likewise, new advancements in keratoconus and multifocal contact lenses will be presented.

The GP Lens Institute (GPLI) Advisory Board, consisting of prominent experts in specialty contact lenses, were surveyed as to what they believed the most important developments in GP and custom soft lenses were associated as with the management of myopia. With the current interest in this area—which will only increase in the years ahead—the emphasis in the contact lens industry today is toward technology in this field that has culminated in the introduction of new designs with the potential of exhibiting even greater effect on the progression of myopia in young people. According to *Contact Lens Spectrum*'s recent market data, when asked about the greatest growth potential in 2022 of several specialty lens options, custom soft and orthokeratology were ranked at the top.[1]

Soft Multifocal Lenses As in recent years, soft multifocals have been the most popular method of myopia management among our responding readership (Figure 1). Clinical research has been very promising

Figure 1. Your myopia control program includes (select all that apply):

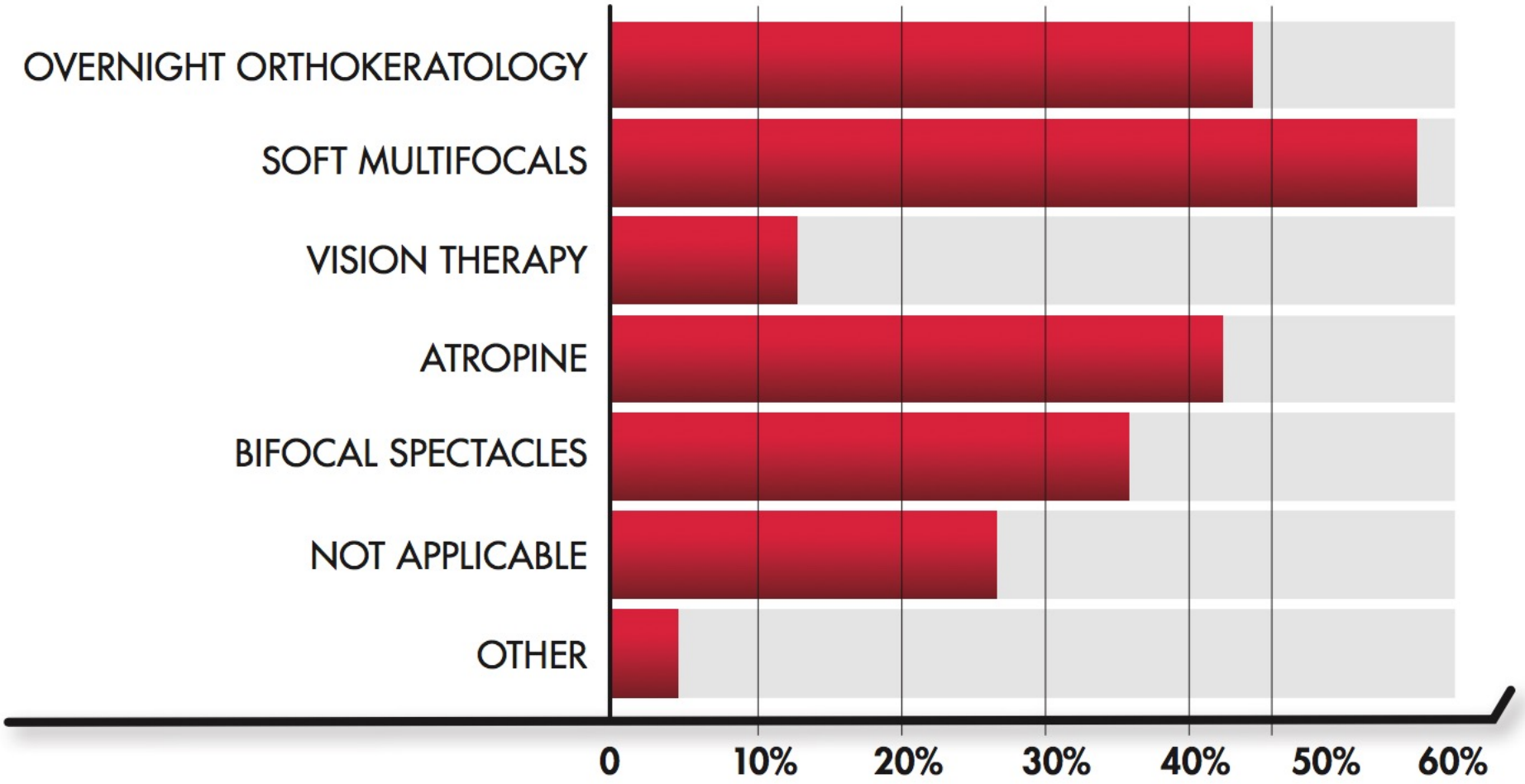
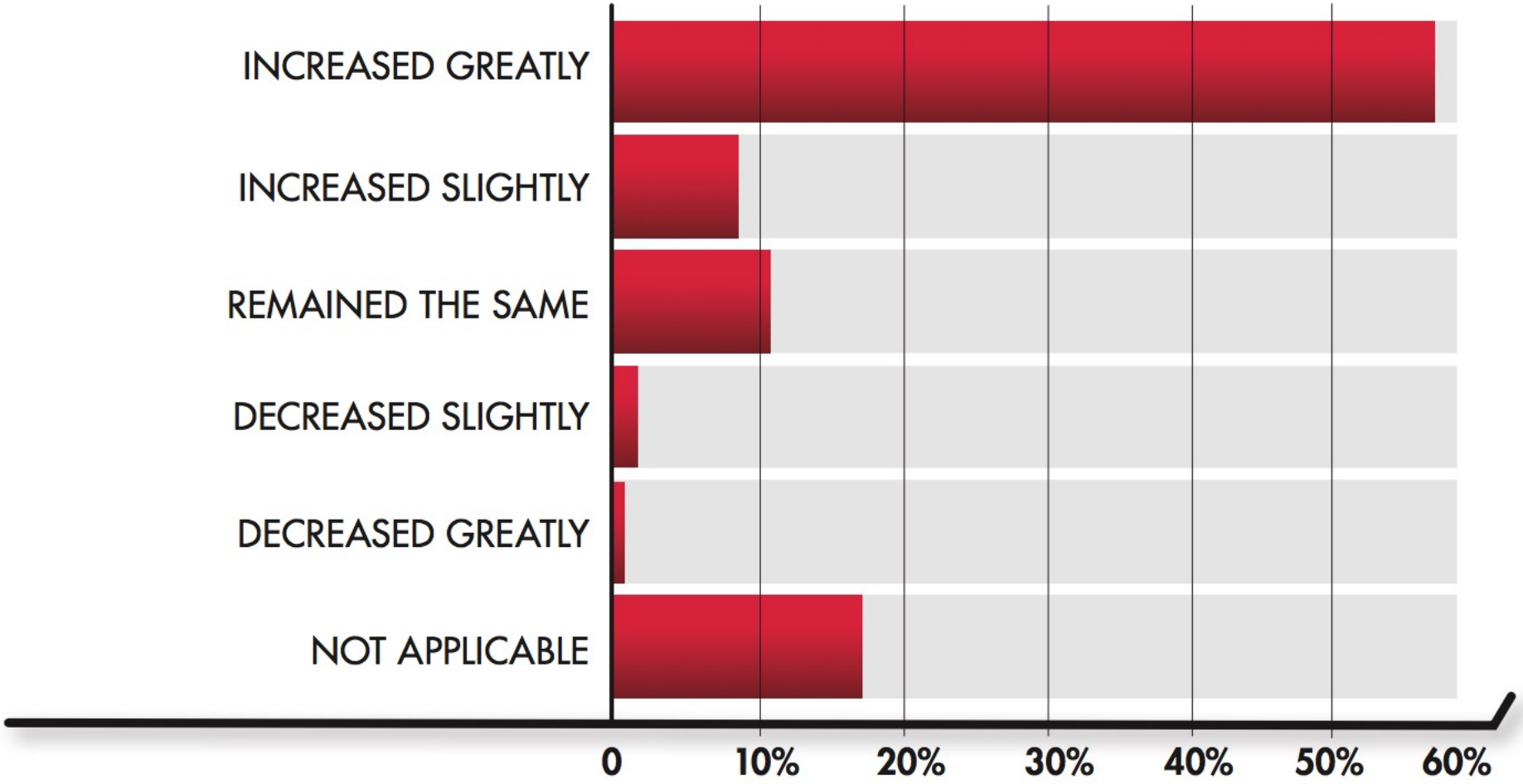


Figure 2. The use of corneal reshaping/overnight orthokeratology lens designs (if applicable) in your practice in the past 12 months has:

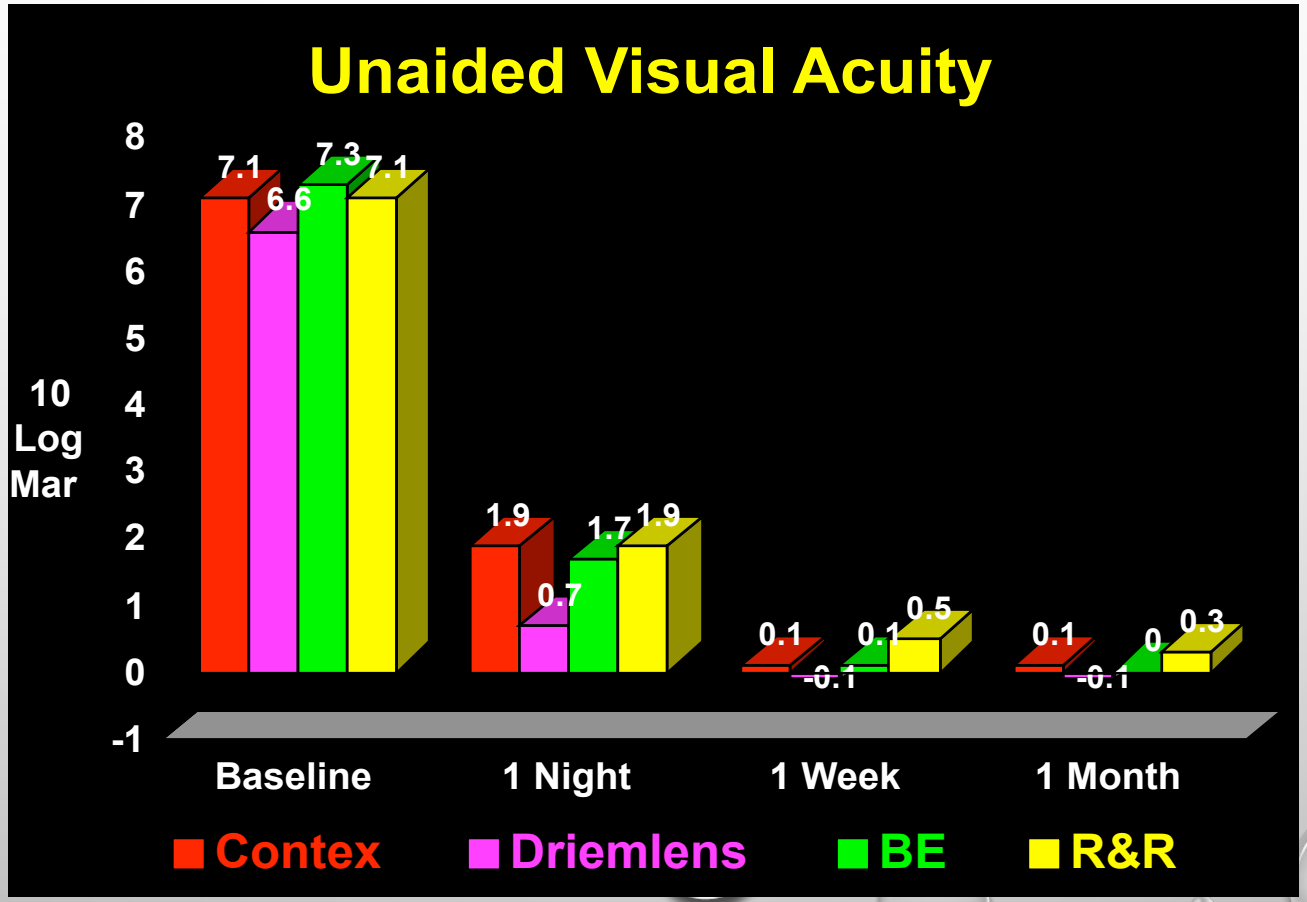


ORTHO-K FITTING SYSTEMS

- **APPROVED FITTING SYSTEMS: CRT (PARAGON) & VST (B + L)**
  - MOONLENS (ART OPTICAL)
  - CRT (PARAGON)
  - DREAMLENS (TRUFORM)
  - EMERALD DESIGN (EUCLID)
  - REMLENS (X-CEL) COMING SOON
- **FITTING METHODS**
  - CENTRAL KS (CK) AND REFRACTION
  - CENTRAL KS, REFRACTION AND TOPOGRAPHY
  - DISPENSING INVENTORY SET
- **BASELINE TOPOGRAPHY NECESSARY**
  - COMPARE CORNEAL CHANGES PRE AND POST FIT

ACUVUE® Abiliti™ Overnight Therapeutic Lenses for Myopia Management

- Received FDA approval in May, 2021
- Expanded parameters of up to 6D of myopia
- FitAbiliti™ software results in first fit success of 90%
- Announced greater availability of lenses, October 2022


Unaided Visual Acuity
10 Log Mar
8
7
6
5
4
3
2
1
0
-1
7.1
6.6
7.3
7.1
1.9
0.7
1.7
1.9
0.1
-0.1
0.1
0.5
0.1
-0.1
0
0.3
Baseline
1 Night
1 Week
1 Month
Contex
Driemlens
BE
R&R

Comparison of Two Main Orthokeratology Lens Designs in Efficacy and Safety for Myopia Control

Weiwei Lu [1 2], Rui Ning [1 2], Kai Diao [1 2], Yang Ding [1 2], Ruru Chen [1 2], Lei Zhou [3], Yan Lian [1 2], Colm McAlinden [4], Francis W B Sanders [4], Fangfang Xia [1 2], Jinhai Huang [5 6 7], Wanqing Jin [1 2]

Affiliations + expand

PMID: 35433737 PMCID: PMC9010613 DOI: 10.3389/fmed.2022.798314

Free PMC article

Abstract

Purpose: This study aimed to compare the efficacy and safety of corneal refractive therapy (CRT) lenses and vision shaping treatment (VST) lenses for myopia control in children.

Methods: Medical records of 1,001 children (2,002 eyes) who had been fitted with orthokeratology lenses for over 1.5 years were retrospectively reviewed. We collected the clinical data of four types of orthokeratology (OK) lenses available: one CRT lens (brand: CRT) and three VST lenses (brands: Euclid, Alpha, and Hiline) over 1.5 years. Results were compared and analyzed using a one-way ANOVA and Pearson's chi-square test.

Results: Axial length elongation in the CRT lens group was 0.13 ± 0.02 mm faster than that in the Euclid lens, 0.1 ± 0.02 mm faster in the Alpha lens, and 0.08 ± 0.02 mm faster in the Hiline lens over the 1.5-year period (all $P < 0.05$). Among the subjects, 37.3% of them using the CRT lens experienced more than 1 D of refractive growth, compared with 20.2–30.8% of subjects wearing the three groups of VST lenses (all $P < 0.05$). A lower incidence of total adverse events was found with the CRT lenses compared with the VST lenses ($P < 0.05$), especially corneal staining. No difference was found in axial length elongation, refraction growth, and incidence of adverse events among the three types of VST lenses (all $P > 0.05$).

Conclusions: Compared with the VST lenses, CRT lenses demonstrated a weaker effect on myopia control but with a better safety profile. Different types of VST lenses had similar efficacy and safety in the context of controlling myopia progression.

DISPELLING THE CONCERNS

- MUCH QUICKER ADAPTATION THAN OTHER GP LENSES (OFTEN WITHIN A FEW NIGHTS)
- CERTIFICATION IS ONLINE; THOUSANDS OF ECPS HAVE BEEN CERTIFIED
- STUDIES HAVE FOUND THAT THE GREAT MAJORITY OF KIDS SUCCESSFULLY ADAPT TO – AND CAN HANDLE – OK LENSES
- THE GREAT MAJORITY OF REPORTS OF MICROBIAL KERATITIS HAVE BEEN FROM SOUTHEAST ASIA (CHINA)
- THEY CAN BE FIT EMPIRICALLY WITH VERY GOOD FIRST-FIT SUCCESS

MedCrave
Step into the World of Research

Advances in Ophthalmology & Visual System

Stabilizing Myopia by Accelerating Reshaping Technique (SMART)-Study Three Year Outcomes and Overview

Abstract

Objectives: The SMART study is a three-year, longitudinal, multicenter evaluation comparing corneal reshaping contact lenses (CRCL) influence on the progression of myopia in children (age 8 to 14 at enrollment) to the wearing of soft silicone hydrogel contact lenses (SCL) worn on a daily wear basis with monthly replacement. This study represents one of the largest patient enrollment with ten investigators and adds to the literature by verifying the outcomes of smaller enrolled investigations strengthen the outcomes of corneal reshaping techniques.

Methods: At enrollment 172 subjects were fit with corneal reshaping contact lenses worn overnight on a nightly basis (Emerald design by Euclid Systems) and 110 subjects were fit with silicone hydrogel contact lenses on a daily wear monthly-replacement basis (Pure Vision by Bausch & Lomb). Visits were conducted at 24 hours, one week, one month, three months, and every six months thereafter for three years. A regression protocol was conducted for the CRCL subjects at each yearly visit for three years by discontinuing lens wear and monitoring for stability of refraction and topography for consecutive visits until baseline was reached.

Results: The outcome of the three-year investigation indicated that myopia progressed at a statistically significantly higher degree in the SCL group as compared to the CRCL group. Mean spherical equivalent change in myopia for the SCL group was -1.03 ± 0.58 diopters, vs. CRCL group -0.13 ± 0.62 diopters s ($p < 0.0001$). There were no cases of reduced best corrected visual acuity for three years for either group. There were no significant adverse events in either group from baseline to the three-years. 80% of eyes were successfully fit with CRCL with the first lens fit empirically and 95% of eyes were fit successfully with only one lens change. There was no significant difference between dropout rates during the three year study between the two groups.

Conclusion: The three year longitudinal study found that myopia progressed at a significantly higher degree in the SCL vs. CRCL subjects. . Efficacy, safety, and dropout rate of corneal reshaping in our sample population appears to be comparable to wearing SCL.

Research Article

Volume 2 Issue 3 - 2015

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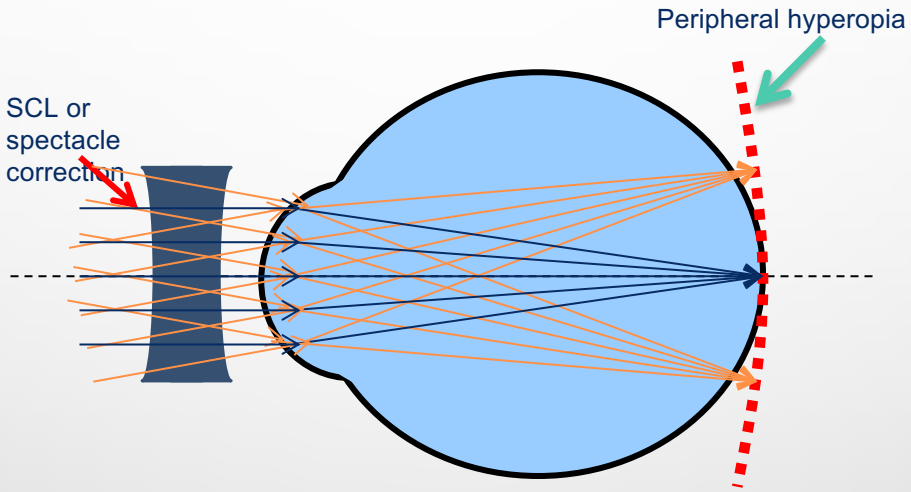
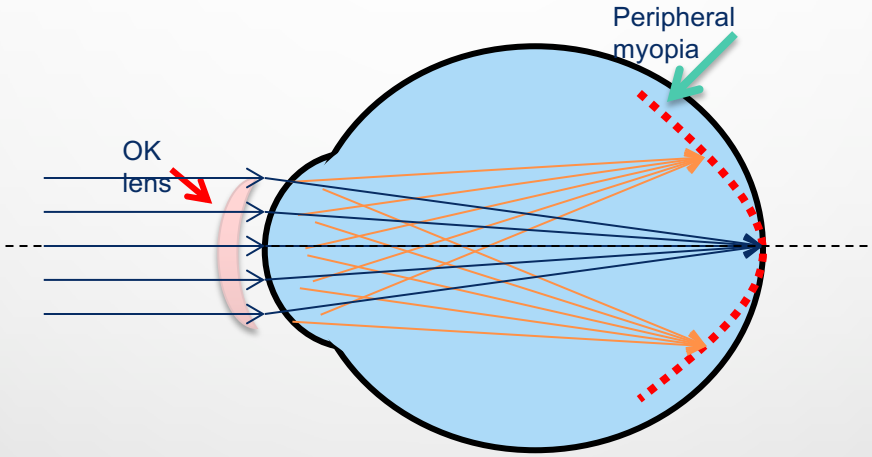
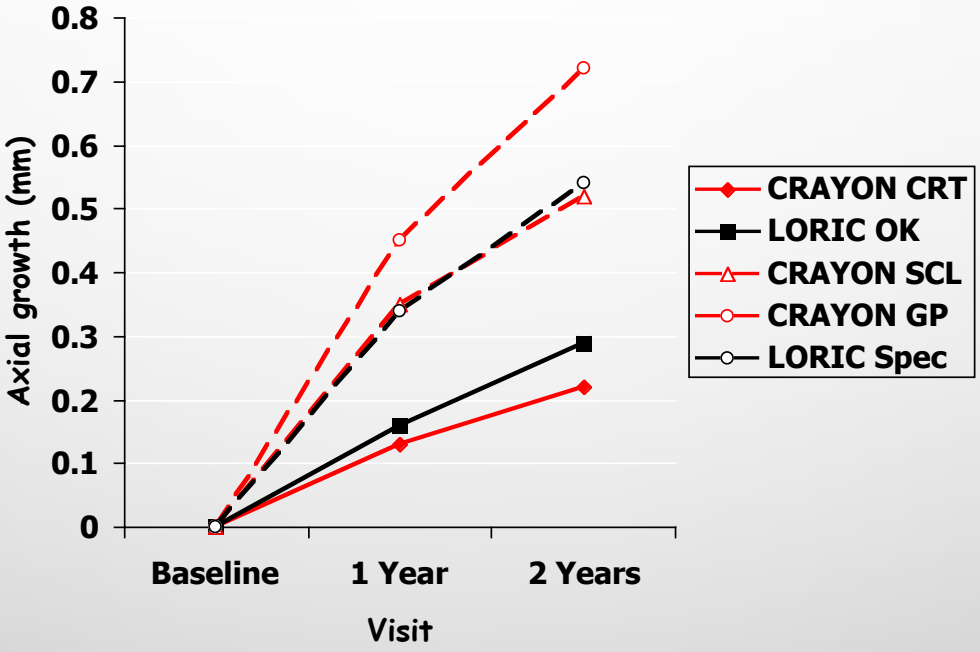
PERIPHERAL DEFOCUS (SWARBRICK)




Peripheral
myopia
OK
lens

RESULTS OF CRAYON (WALLINE) AND LORIC (CHO) STUDIES



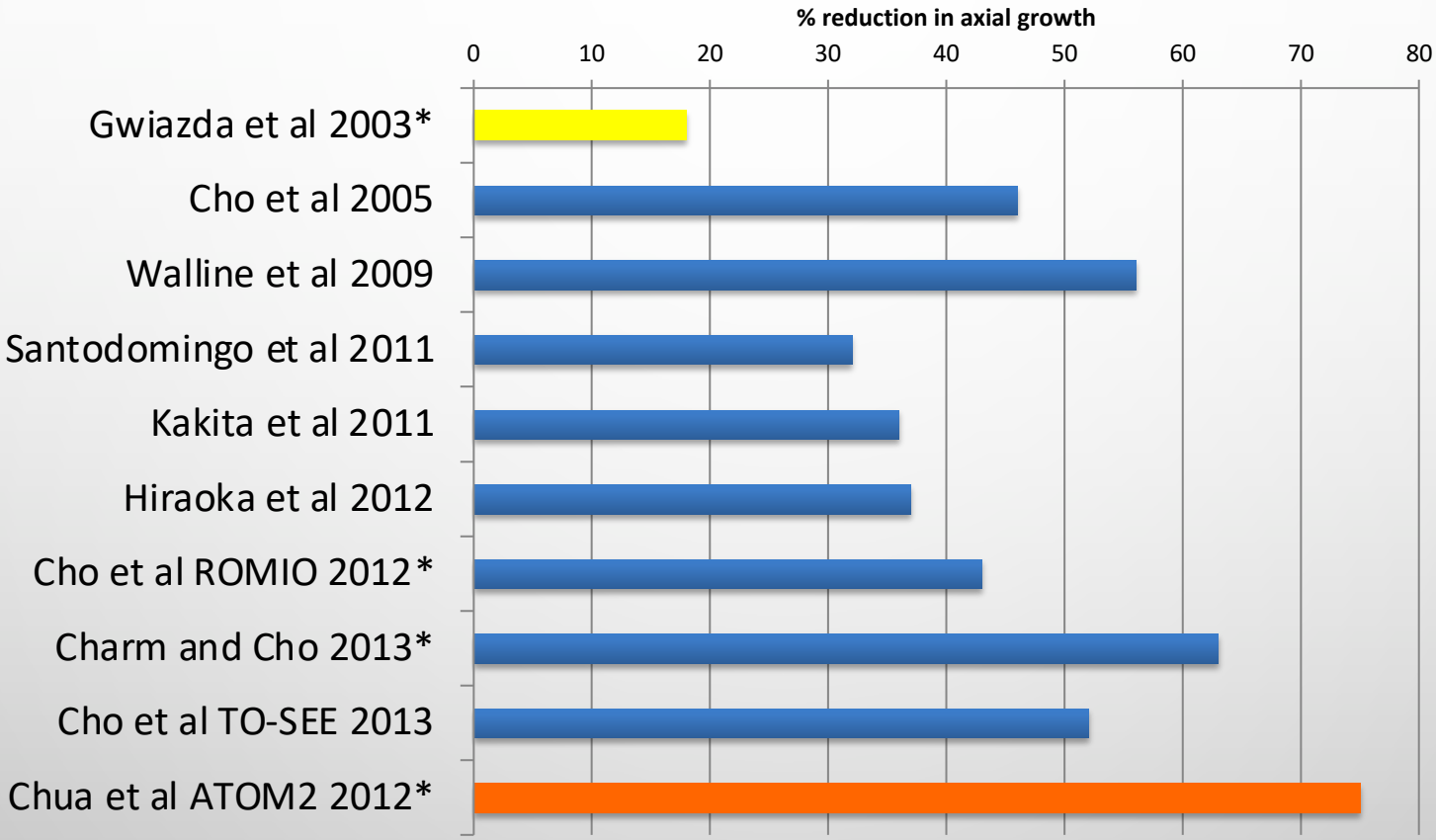
MYOPIA CONTROL, BY HOW MUCH?

(WALLINE, OCT., 2012, CL SPECTRUM)

- **REDUCTION IN MYOPIA PROGRESSION OF 50% IS CLINICALLY MEANINGFUL TO PATIENTS BUT IT HAS BEEN SUGGESTED THAT 33% DECREASE IN MYOPIA = 73% DECREASE IN HIGH (≥ 5D) MYOPIA**
- **-1.00 D AT AGE 8 PROGRESSING AT 0.5 D / YEAR**

% Myopia Progression Reduced	Final myopia (at 16 years)
0	-5.00D
25	-4.00D
50	-3.00D
75	-2.00D
100	-1.00D

MYOPIA CONTROL: ORTHOKERATOLOGY



WALLINE (GLOBAL SPECIALTY LENS SYMPOSIUM, JANUARY, 2018)

- MYOPIA CONTROL SUMMARY
  - ATROPINE 76% (6 STUDIES)
  - ORTHOKERATOLOGY 43% (8 STUDIES)
  - SOFT BIFOCAL 39% (8 STUDIES)
  - MULTIFOCAL SPECTACLES 21% (9 STUDIES)

COMBINED ATROPINE WITH ORTHOKERATOLOGY (AOK) FOR MYOPIA CONTROL: 1 YEAR RESULTS (Q TAN ET AL, GLOBAL SPECIALTY LENS SYMPOSIUM, JANUARY, 2020)

- 2 RANDOMIZED GROUPS: 1) AOK (NIGHTLY .01% ATROPINE COMBINED WITH ORTHOK), AND 2) ORTHOK ALONE
- WHEREAS THERE WAS NOT A SIGNIFICANT DIFFERENCE BETWEEN GROUPS IN AXIAL LENGTH FROM 6 – 12 MONTHS, THERE WAS A SIGNIFICANT CHANGE THE FIRST 6 MONTHS AND OVERALL AN ADDITIONAL 24% EFFECT IN AOK VERSUS OK ALONE
- HOPEFULLY .01% AND/OR .05% ATROPINE WILL BE AVAILABLE IN THE FUTURE

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Overnight orthokeratology

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ARTICLE INFO

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Overnight orthokeratology
RGP lenses
Myopia control
Safety
Microbial keratitis

ABSTRACT

Overnight orthokeratology lenses are approved in countries all over the world for the temporary reduction in myopia, and recently, one lens design has received regulatory approval for myopia control in Europe. The modern orthokeratology lens has a substantial history from its origins of attempting to flatten the corneal curvature with a spherical rigid contact lens to sophisticated gas permeable lenses, designed to reshape the cornea. These lenses are predominantly prescribed for children to slow myopia progression and limit axial elongation of the eye. This article reviews the peer-reviewed literature on the efficacy of orthokeratology for myopia control, sustainability after treatment is discontinued, and the safety concerns of overnight contact lens wear. Future avenues of research are discussed.

CONCLUSIONS

- "THE EFFECTIVENESS OF ORTHOKERATOLOGY FOR MYOPIA CONTROL IS WELL ESTABLISHED"
- THE RATE OF MICROBIAL KERATITIS – AS ESTABLISHED IN AUTHOR'S 2013 REPORT – IS SIMILAR TO EXTENDED WEAR
- "OVERNIGHT ORTHOKERATOLOGY, EITHER ALONE OR IN COMBINATIONS WITH OTHER THERAPIES, WILL UNDOUBTEDLY PLAY A ROLE IN FUTURE EFFORTS TO OBTAIN GREATER TREATMENT MAGNITUDES"

RESOURCES

- AMERICAN ACADEMY OF ORTHOKERATOLOGY AND MYOPIA CONTROL: WWW.ORTHOKACADEMY.COM
- GAS PERMEABLE LENS INSTITUTE: WWW.GPLI.INFO (FOR MYOPIA BROCHURE/WEBINARS)
- GLOBAL MYOPIA SYMPOSIUM
- MYOPIA PROFILE: WWW.MYOPIAPROFILE.COM
- WWW.MYKIDSVISION.ORG (SURVEY TOOL TO HELP PARENTS ASSESS AND MANAGE MYOPIA RISKS FOR THEIR KIDS)

Things to consider when choosing contact lens myopia management

Situation	Orthokeratology	Soft Multifocal
Contact lenses only worn at home	X	
Child swims frequently	X	
Most parents know how to care for soft contact lenses		X
High myopia, more than -5.00 D		X
Child has difficulty with dexterity	X	
Child mostly wants to wear glasses		X

Which is better, orthokeratology or soft multifocal contact lenses?

- Both provide effective myopia management
- Randomized study indicated no difference in myopia management
- Decision should be based on lifestyle of family

Resources for Parents

www.mykidsvision.org

www.allaboutvision.com/conditions/myopia.htm

www.orthokacademy.com/information-for-patients

Resources for Doctors

www.myopiaprofile.com

www.orthokacademy.com

www.brienholdenvision.org

www.gpli.info

(for webinars as well as references for the information provided in this brochure)

GPLI

Learn more about Myopia Management

www.contactlenses.org

www.allaboutvision.com

GP LENSES CHANGE LIVES™

Thanks to Jeff Walline OD, PhD for providing content

To reorder this brochure visit www.GPLI.info

Myopia Management

Slow the progression of myopia (nearsightedness) with contact lenses or eyedrops

- Orthokeratology contact lenses
- Soft multifocal contact lenses
- Low concentration atropine eye drops

Does your child need a new prescription every 6 to 12 months? You should consider myopia mangement!

What does myopia management mean?

- Kids typically have -1.00 D myopia when they first get glasses
- Normally progress -0.50 D per year from age 8 to age 16 years
- Would therefore have -5.00 D myopia as an adult
- If myopia management slows progression by 50%, would only have –3.00 D myopia as adult and have much less risk of sight threatening complications later in life

Myopia Facts

Myopia affects one-out-of-three people in the United States
- As much as 90% of people in some East Asia countries

Typically onsets at 8 years of age and progresses until 16 years of age
- Younger age one becomes myopic typically means higher myopia in adulthood

High myopia increases the risk of sight-threatening complications
- Retinal detachment
- Glaucoma
- Central vision loss

We can slow the progression with contact lenses

Myopia Management Treatments

Orthokeratology Contact Lenses

- Worn only while sleeping to reshape or flatten the front surface of the eye
- Removed in the morning, resulting in clear vision all day without glasses or contact lenses
- Risk of significant complications is the same as an overnight contact lens wear (about 20 cases per 10,000 years of wear)
- Slows myopia progression about 45%

Soft Multifocal Contact Lenses

- Contact lenses with specialty-designed multifocal optics
- May replace monthly, every two weeks, or daily
- Risk of eye infection is about 20 cases per 10,000 years of wear
- Slows myopia progression about 34%

Atropine

- Low concentrations (0.01 to 0.05%) slow myopia progression with few side effects
  - – May make near vision blurry (can wear reading glasses)
  - – May increase pupil size (can wear sunglasses to decrease light sensitivity)
  - – These rarely require additional treatment
- Drops taken every night at bedtime
- Drops don't sting
- Slows myopia progression about 58%

Combination

- May combine orthokeratology contact lenses and atropine
- May combine soft multifocal contact lenses and atropine
- Combination of orthokeratology contact lenses and atropine works better than

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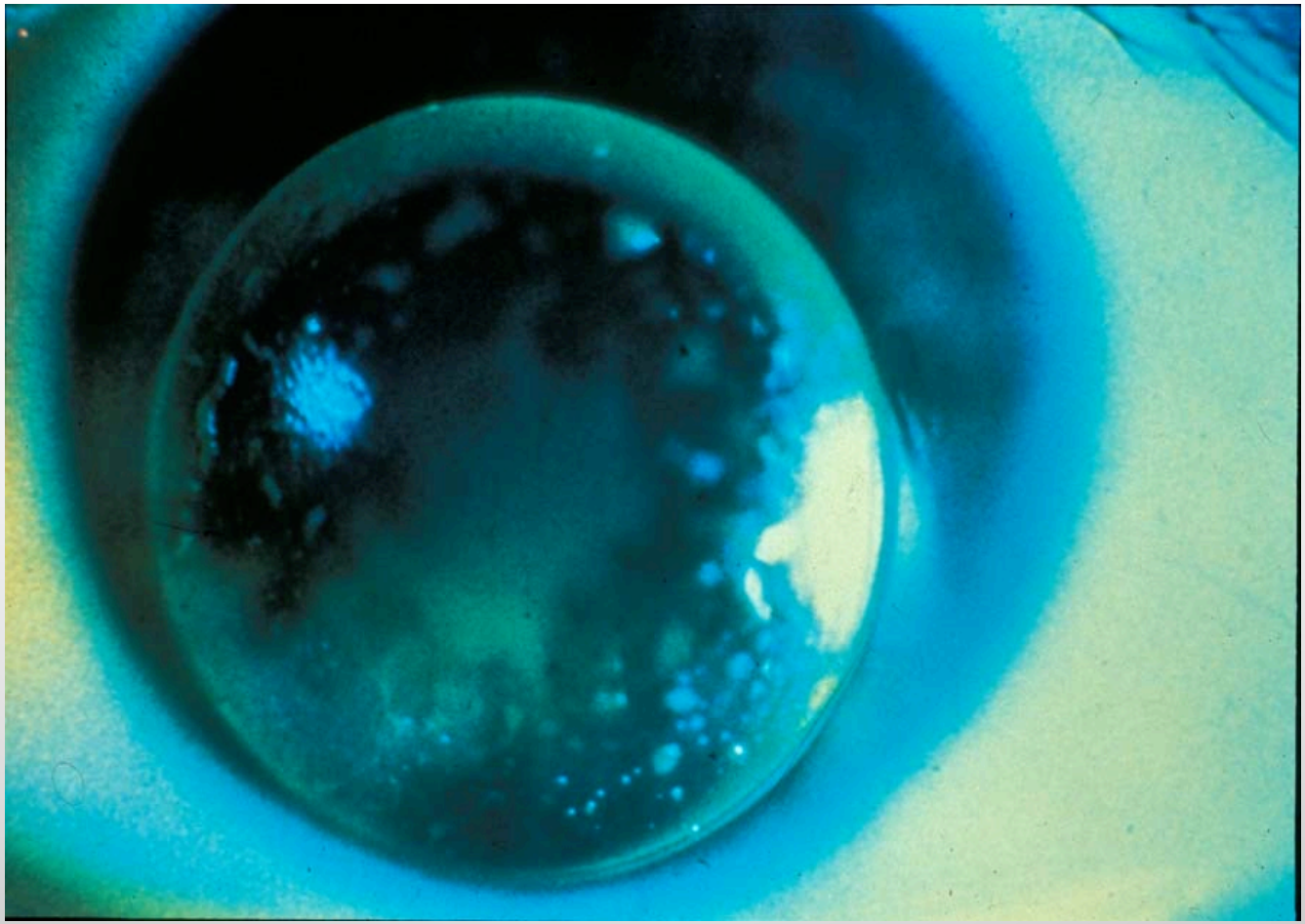
OXYGEN PERMEABILITY (DK) AND LENS SELECTION

- **LOW DK = 25 – 50 (DAILY WEAR MYOPES; BITORICS)**
- **HIGH DK = 51 - 99 DW (HYPEROPES,FLEXIBLE/WEAR, MULTIFOCALS, KERATOCONUS)**
- **HYPER DK = ≥ 100 (EXTENDED WEAR, SCLERALS, CORNEAL RESHAPING)**
- **BOTTOM LINE: YOUR LABORATORY IS VERY GOOD AT MATCHING MATERIAL WITH PATIENT'S SPECIFIC LENS DESIGN!!!**

FLUORO-SILICONE/ACRYLATE MATERIALS TODAY VERSUS 15-20 YEARS AGO

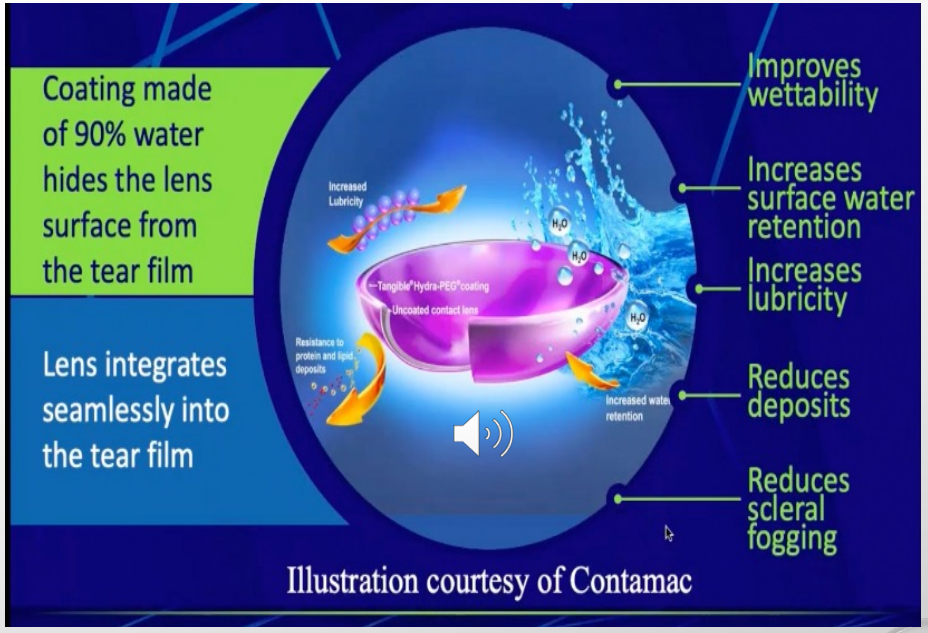
IMPROVEMENTS IN:

- OXYGEN PERMEABILITY
- SURFACE WETTABILITY
- RIGIDITY (I.E., GREATER FLEXURAL RESISTANCE)
- MEMORY (I.E., MUCH LESS WARPAGE)
- SCRATCH RESISTANCE



POLYETHYLENE GLYCOL (PEG) (TANGIBLE SCIENCE)

- TANGIBLE HYDRA-PEG IS A 90% WATER PEG-BASED POLYMER MIXTURE THAT IS COVALENTLY (PERMANENTLY) BONDED TO THE SURFACE OF THE CONTACT LENS
- SEPARATES THE LENS MATERIAL FROM THE TEAR FILM
  - OPTICALLY-CLEAR COATING ENCAPSULATES THE CORE CONTACT LENS WITH A MUCIN-LIKE HYDROPHILIC SHELL.



TANGIBLE HYDRAPEG

(TANGIBLE SCIENCES)

- HOW IS THE LENS TREATED??
  - PLASMA TREAT THE SURFACE
  - CLEANS AND ACTIVATES THE SURFACE
  - SOAK LENS IN THE TANGIBLE HYDRA-PEG POLYMERS
  - 90 MINUTES

HYDRAPEG: MATERIALS AND NEW DEVELOPMENTS

- **APPROVED MATERIALS:**
  - OPTIMUM (CONTAMAC), BOSTON (B+L), PARAGON, ACUITY 200, AND SYNERGEYES
- **SOLUTION DEPENDENT:**
  - YES: CLEAR CARE/CLEAR CARE PLUS , UNIQUE PH, BOSTON SIMPLUS, TANGIBLE CLEAN
  - NO: TAP WATER, PROGENT, ABRASIVE CLEANERS, ALCOHOLS & POLISHING REMOVE IT (AS DOES RUBBING)
- **TANGIBLE BOOST**: CONDITIONING SOLUTION TO BE USED BY PATIENTS MONTHLY TO RESTORE AND MAINTAIN COATING; INTRODUCED FIRST QUARTER, 2021

TANGIBLE BOOST

- THIS IS A CONDITIONING SOLUTION DESIGNED TO RESTORE THE TANGIBLE HYDRA-PEG LAYER ON LENS SURFACE
- THIS IS A FIVE STEP MONTHLY PROCESS TO BE PERFORMED BY THE PATIENT
- IT IS A PRESCRIPTION ONLY PRODUCT THAT CAN BE SOLD DIRECTLY BY EYE CARE PRACTITIONERS OR VIA CONTACT LENS LABORATORIES
- LABS THAT CAN FULFILL ORDERS INCLUDE X-CEL, ABB, ACCULENS, AVT, VALLEY CONTAX, & X-CEL

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COMFORT

- THE MOST COMMON CAUSE FOR DISCONTINUATION OF GP LENS WEAR IS DISCOMFORT
- FACTORS IMPORTANT IN OPTIMIZING COMFORT:
  - PRESENTATION
  - TOPICAL ANESTHETIC
  - VISION
  - LENS DESIGN

PRESENTATION METHODS

- GAUGE PATIENT'S REACTIONS TO OCULAR TESTS
- HIGH REACTORS = GRADUAL ADAPTATION
- DON'T USE NEGATIVE PHRASES
  - DISCOMFORT, PAIN, INTOLERANCE, FAILURE
  - "GP" (NOT "RGP")
- DON'T BE TENTATIVE IN GP DESCRIPTION
- OFFER REALISTIC EXPECTATIONS: "YOU WILL EXPERIENCE SOME LENS AWARENESS INITIALLY DUE TO THE LID INTERACTION WITH THE EDGE; GP LENSES ARE SMALLER THAN SOFT LENSES AND MOVE MORE ON THE EYE". THAT SAID THEY SHOULD BE TOTALLY COMFORTABLE WITHIN 1 – 2 WEEKS"

GP DESIGN/FITTING IN 2023

- MUCH EASIER; QUALITY OF MANUFACTURING IS VERY HIGH/ LENSES VERY REPRODUCIBLE: CNC LATHES, IMPROVED POLISHING METHODS
- LABS HAVE THEIR OWN PERIPHERAL CURVE RADII
- ULTRATHIN DESIGNS ARE BECOMING POPULAR
- THEREFORE IMPROVEMENTS IN INITIAL COMFORT AND WETTABILITY

EMPIRICAL FITTING

- VERY EASY AND SUCCESSFUL TODAY DUE TO IMPROVEMENTS IN MANUFACTURING TECHNOLOGY (I.E., THIN DESIGNS, STANDARD PERIPHERIES)
- TYPICALLY PROVIDE REFRACTIVE INFORMATION TO LABORATORY (OR USE THEIR NOMOGRAM)
- COMMONLY USED FOR SPHERICAL, TORIC, HYBRID, AND MULTIFOCAL DESIGNS
- HAS BENEFITS OF GOOD INITIAL VISION, EASE OF FITTING AND PATIENT SATISFACTION
- PSYCHOLOGICAL BENEFIT TO PATIENT

SURVEY OF READERSHIP: EMPIRICAL VERSUS DIAGNOSTIC FITTING:

GP UPDATE (BENNETT OCT., 2022 CONTACT LENS SPECTRUM)

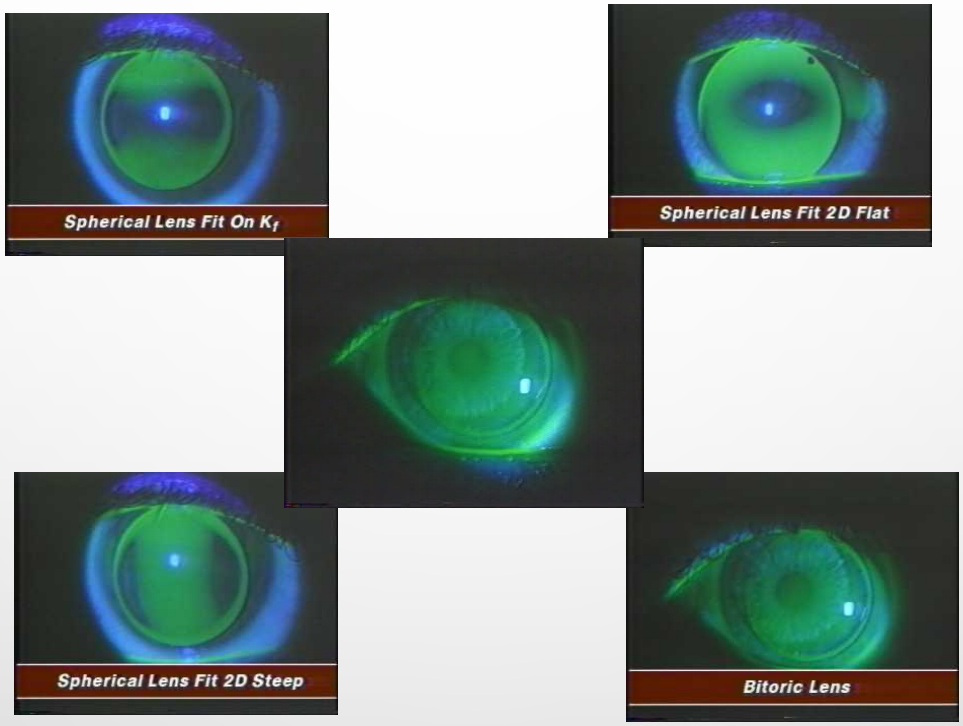
TABLE 1

EMPIRICAL VERSUS DIAGNOSTIC GP FITTING

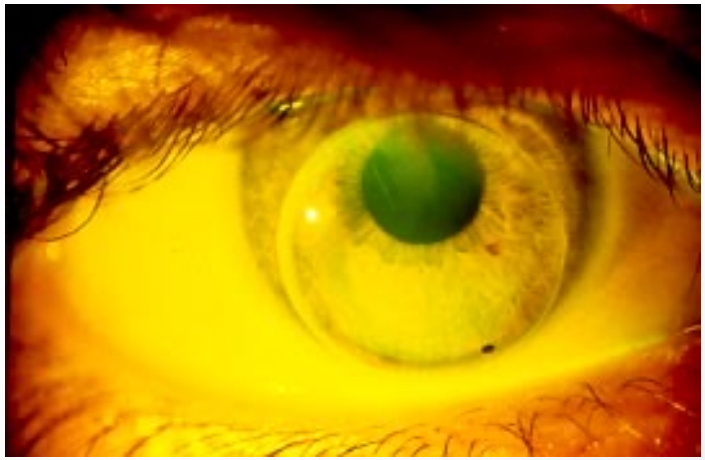
TYPE OF DESIGN	EMPIRICAL (%)	DIAGNOSTIC (%)
Toric	83	17
Multifocal	86	14
Spherical	79	21
Hybrid	67	33
Corneal Reshaping	71	29
Non-Scleral Irregular Cornea GP	48	52
Scleral	35	65

GP LENSES IN 2023

1) GP UPDATE
2) MYOPIA CONTROL/MANAGEMENT
3) MATERIALS AND COATINGS
4) LENS DESIGN AND FITTING TODAY
5) CONTACT LENS BITORICS MADE EASY
6) SCLERAL LENS FITTING AND APPLICATIONS
7) LENS CARE
8) GP RESOURCES


Spherical Lens Fit On K_f
Spherical Lens Fit 2D Flat
Spherical Lens Fit 2D Steep
Bitoric Lens

Sphere lens
on toric eye…



…toric lens
on same toric eye
(courtesy of Dr. Tom Quinn)

BITORIC EMPIRICAL METHODS

- MANDELL-MOORE GUIDE CALCULATOR (WWW.GPLI.INFO)
- GPLI TORIC AND SPHERICAL CALCULATOR (WWW.GPLI.INFO)
- NEWMAN GUIDE (WWW.GPLI.INFO)
- WWW.EYEDOCK.COM

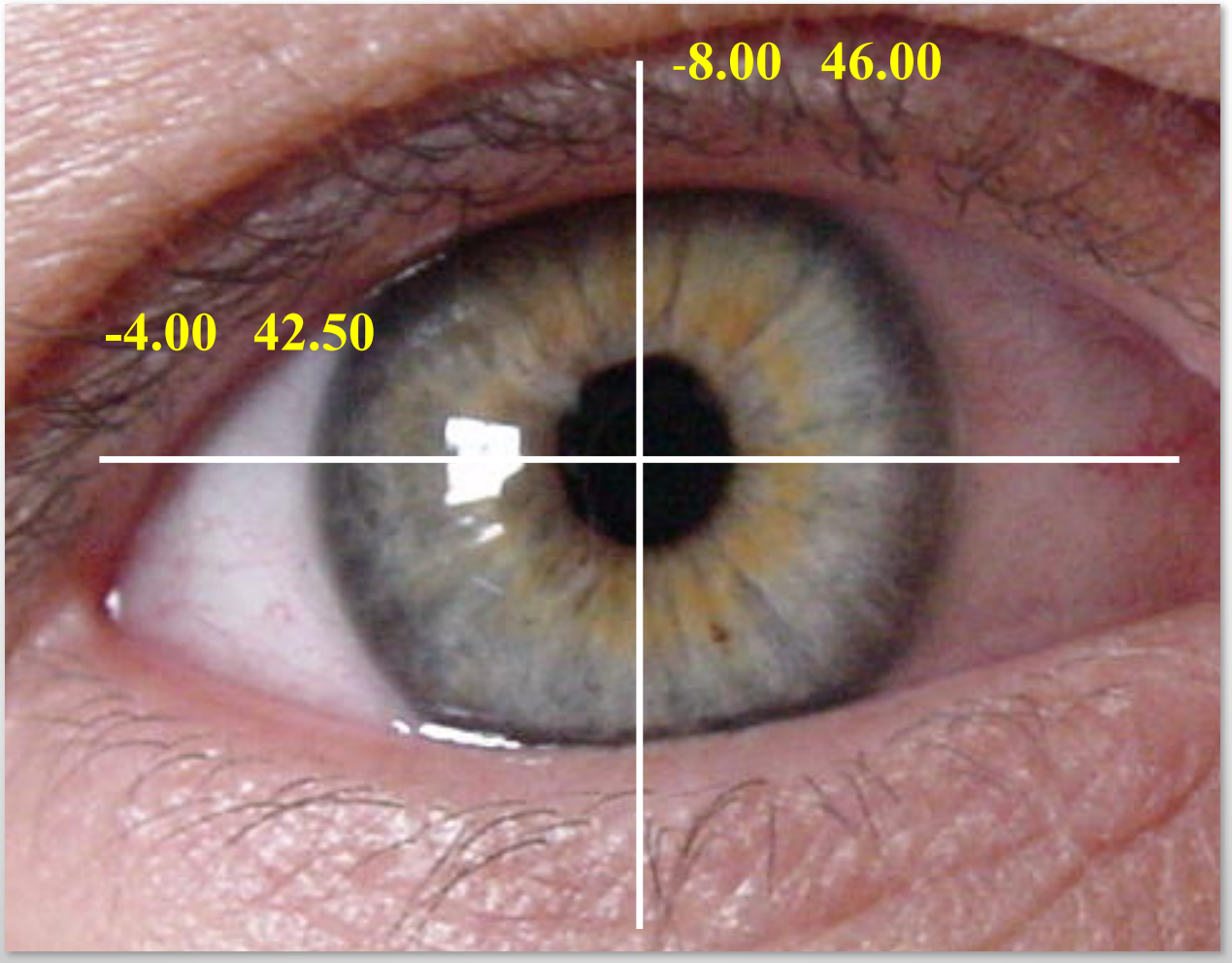
Example of How to Fill in the Guide

1. Keratometry	42.50 @ 180	46.00 @ 90
2. Spectacle Rx (Minus Cyl Form)	-4.00 -4.00 x 180	

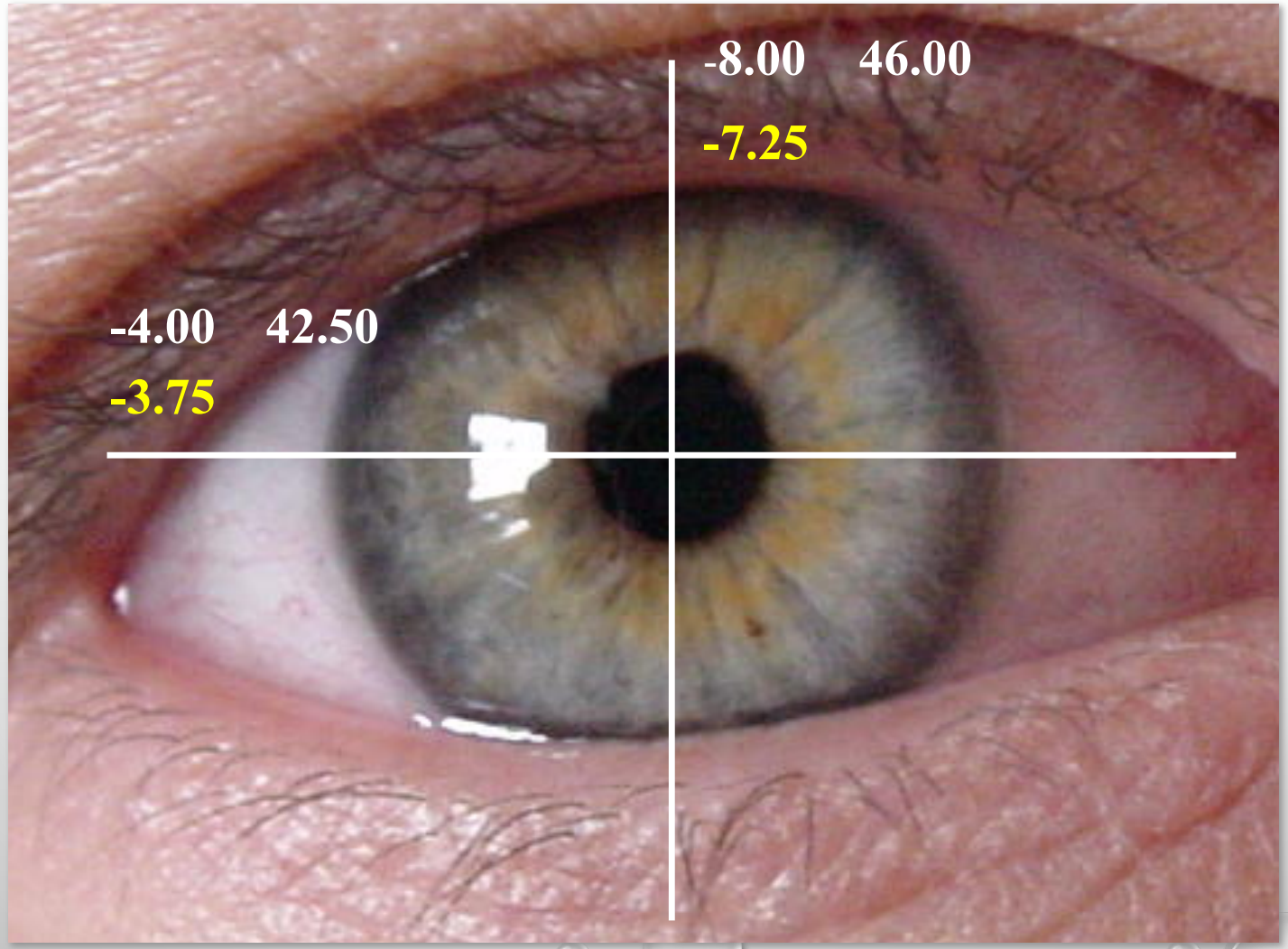
	Flattest K	Sphere Power	Steepest K	Sph+Cyl Power
3. Enter K	42.50		46.00	
4. Enter Spectacle Power		-4.00		-8.00
5. Vertex Adjust Line 4		-3.75		-7.25
6. Insert Fit Factor	(-) 0.25	(+) 0.25	(-) 0.75	(+) 0.75
Add Lines	(3&6)	(5&6)	(3&6)	(5&6)
7. Final CL Rx	42.25	-3.50	45.25	-6.50
	Base Curve	**Power**	**Base Curve**	**Power**

Click here for a blank guide, which you can print for your office.

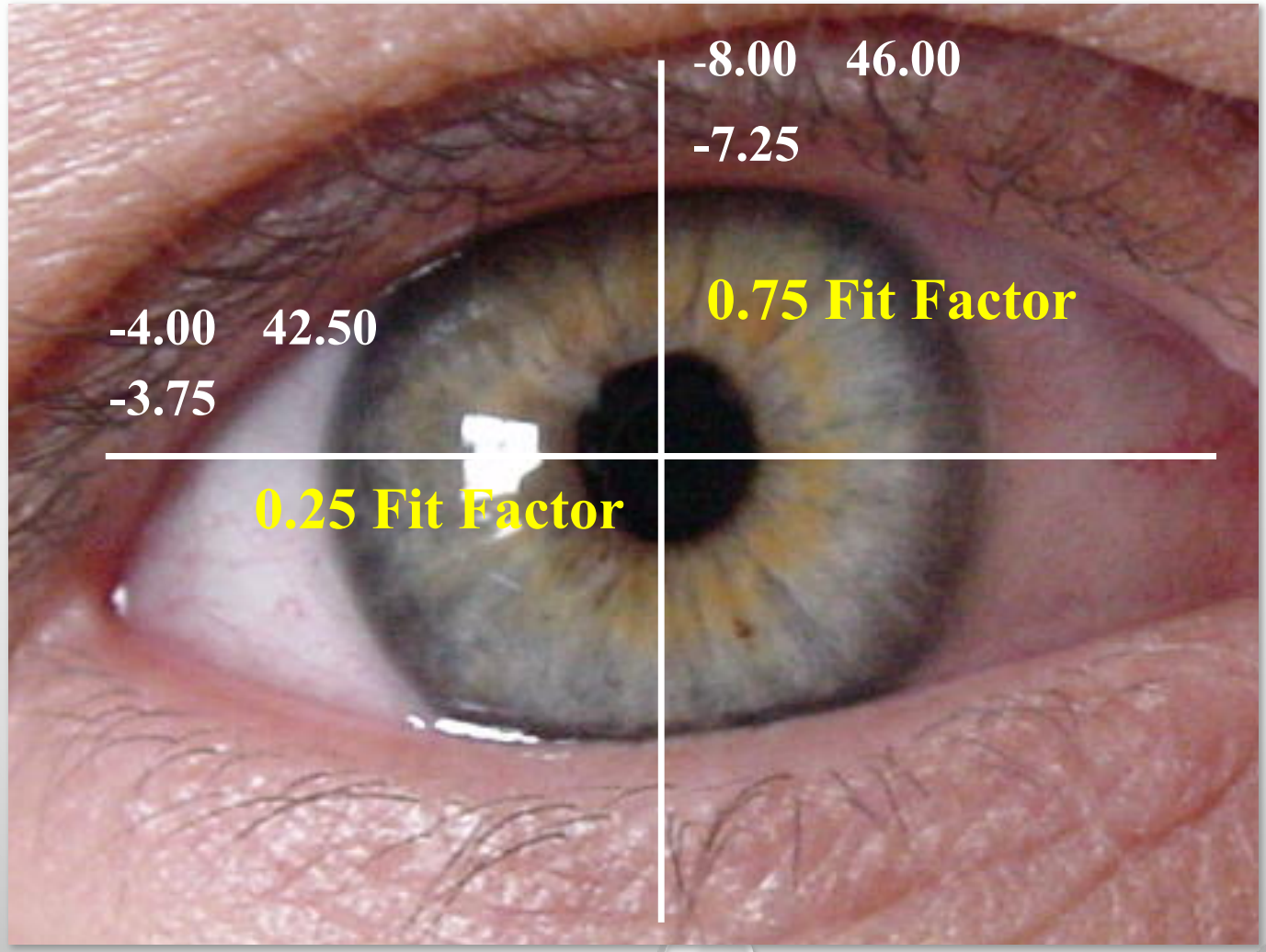
STEP 1 – 4



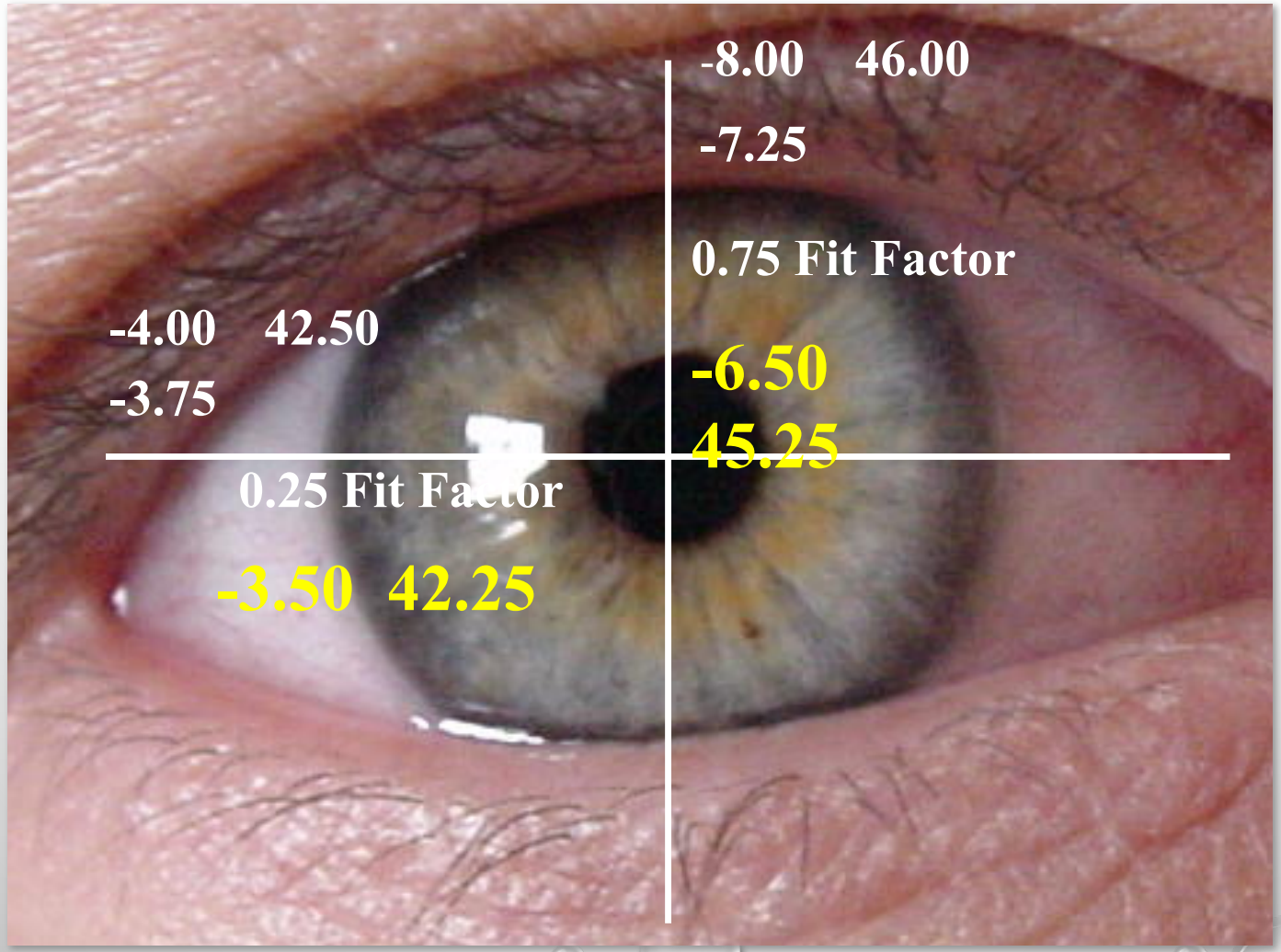
STEP 5 - VERTEX



STEP 6 – FIT FACTOR



STEP 7 +/- FIT FACTOR

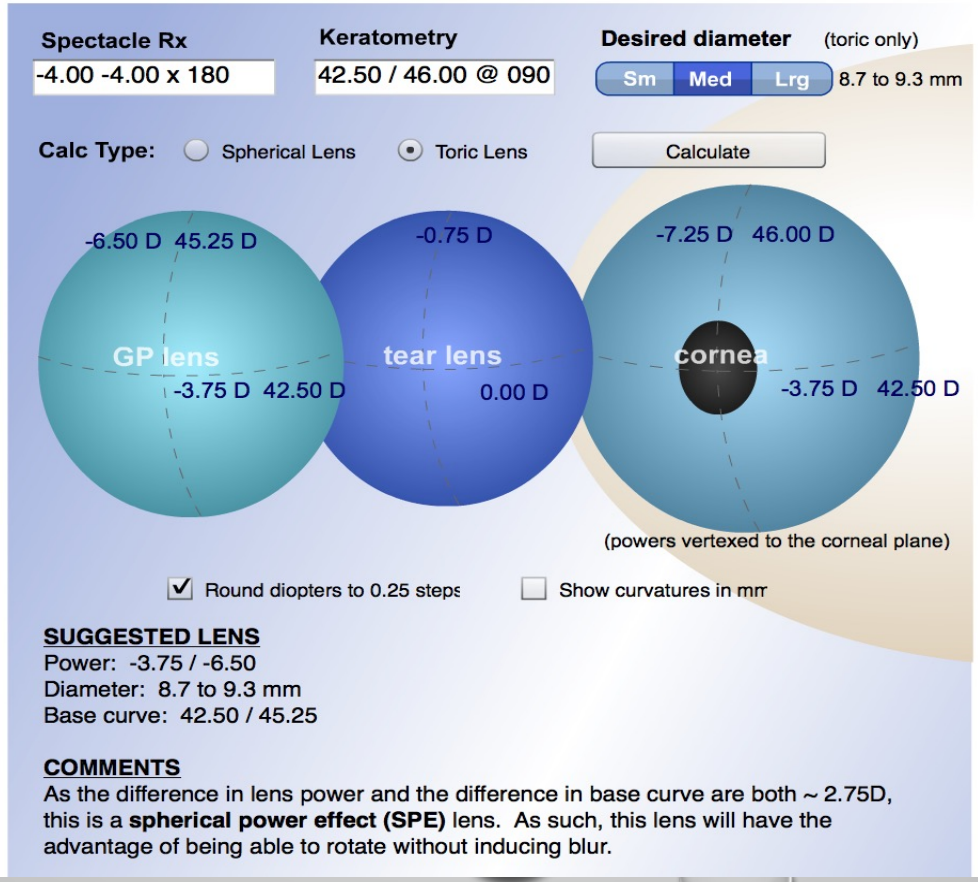


GPLI Toric and Spherical Lens Calculator

This calculator combines a spherical GP lens design nomogram developed by Dr. Ed Bennett with a GP toric lens calculator developed by Dr. Tom Quinn. This combined calculator was made possible via the assistance of Dr. Todd Zarwell of EyeDock.com.

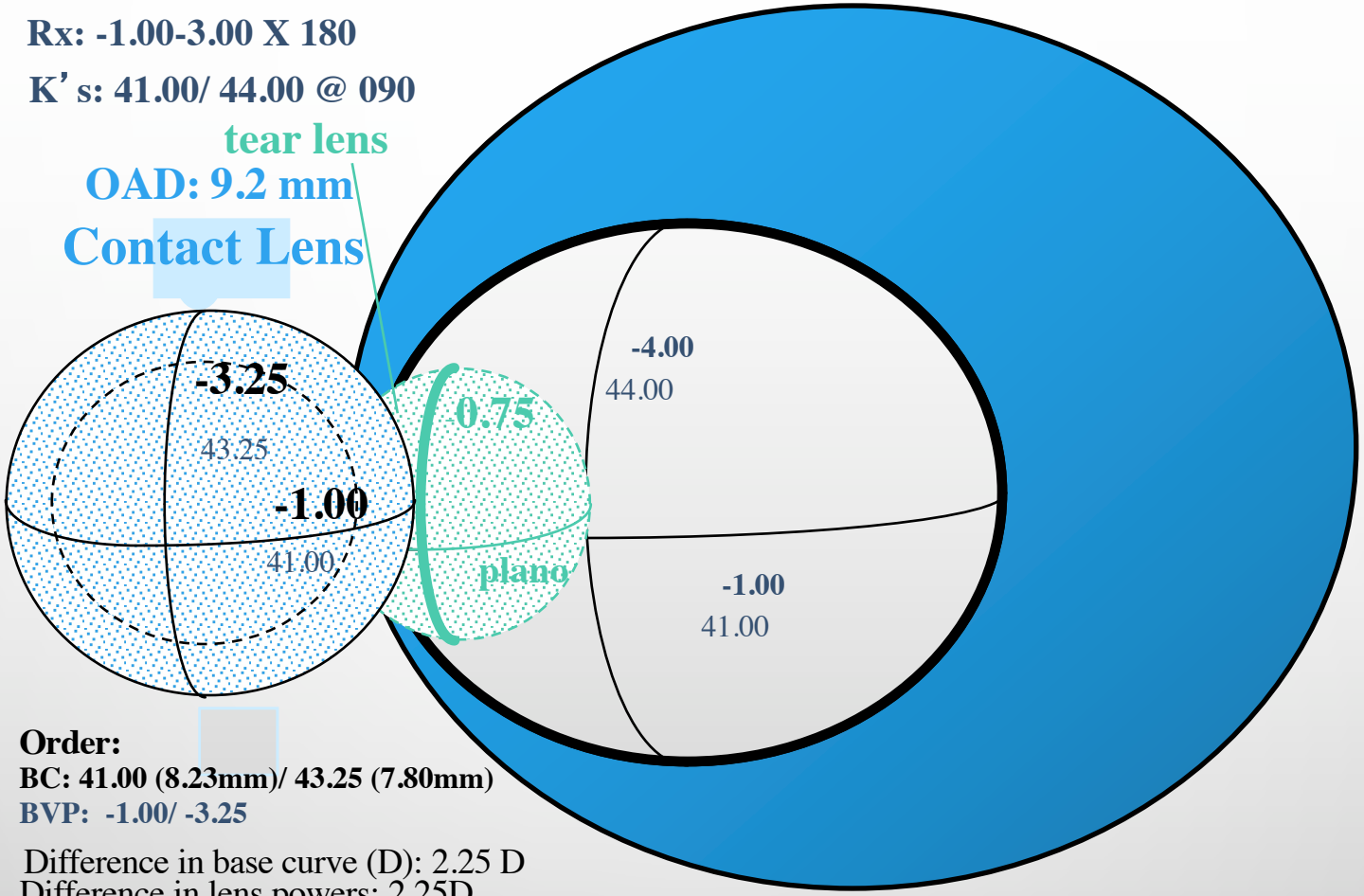
This is a dynamic empirical method of determining GP spherical lens power, base curve radius, overall diameter and peripheral curve values for patients manifesting ≤2D of corneal cylinder. For patients with >2D of corneal astigmatism, a GP toric lens will be recommended and the toric lens powers, base curve radii, and overall diameter will be provided via dynamic "on-eye" optical crosses.

This calculator requires Adobe Flash Player. For details, please scroll below the calculator.



Rx: -1.00-3.00 X 180

K's: 41.00/ 44.00 @ 090



Order:

BC: 41.00 (8.23mm)/ 43.25 (7.80mm)

BVP: -1.00/ -3.25

Difference in base curve (D): 2.25 D
Difference in lens powers: 2.25D

Conclusion:**Spherical Power Effect Design**

CYLINDER POWER EFFECT EXAMPLE

- +0.50 - 4.00 X 180; 42/45
- DX SPE = 41.50/44.50, PL/-3.00D

  IF VA = 20/30, PERFORM SPH-CYL OR

OR: +1.00 - 1.00 X 180 20/20

Resources

Webinars

- Spherical and Toric GP Lens Design, Fitting, and Problem-Solving: Dr. Ed Bennett (June 2022)
- Management of the Irregular Cornea: Dr. Karen DeLoss (October 2019)
- GP Toric Lens Design and Fitting: Dr. Tom Quinn (March 2018)
- GP Contact Lens Case Grand Rounds: Dr. Ed Bennett (January 2015)
- Bitoric GP Lens Design and Fitting: Dr. Ed Bennett (December 2014)
- Contact Lens Management of the Irregular Cornea: Case Grand Rounds: Mr. Michael Ward (June 2014)
- Custom Soft Lens Applications for the High Astigmat: Dr. Stephanie Woo (February 2014)
- Correcting Astigmatism with RGPs: Dr. Clarke Newman (November 2011)

FAQs:

1. When Should I Fit a Toric GP Lens?
2. How Do I Design and Fit a Bitoric Lens?

GPLI Toric and Spherical Lens Calculator
Plug in the spectacle Rx and keratometry, get instant calculations of lens parameters.

Mandell-Moore Bitoric Lens Calculator
Here's a calculator you can use online.

Mandell-Moore Guide for Empirical Bitoric Design
The Guide includes a printable blank form, instructions and sample form.

Newman GP Toric Guide
This modification of the Mandell-Moore Guide is used as an empirical design GP toric calculator and complements both the Mandell-Moore and GPLI calculators listed above.

Grand Rounds Troubleshooting Guide
Assists in troubleshooting spherical, multifocal, high astigmatism, KC, irregular cornea, post-surgical and corneal reshaping fits.

Contact Lens Clinical Pocket Guide
Helpful for fitting or evaluating patients; view as a smart phone-ready PDF or order a printed

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LARGE DIAMETER (MINI-SCLERAL)

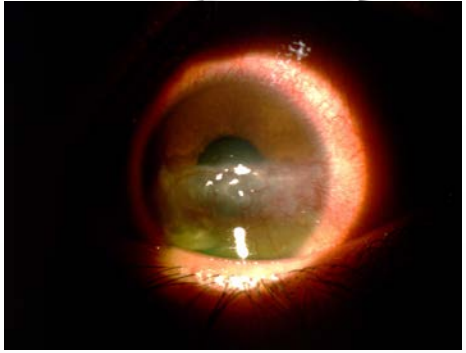
THE COMFORT ADVANTAGE !!!

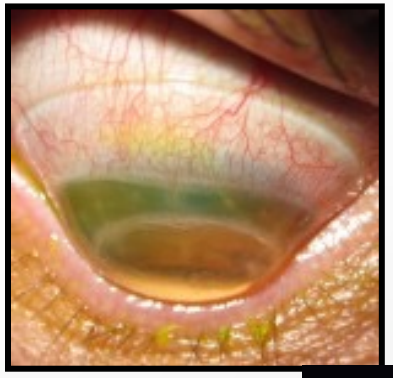
- **SIMILAR INITIAL COMFORT TO A SOFT LENS**
- **PACIFIC UNIVERSITY STUDY: 1 – 10 SCALE)**
  - **CORNEAL GP: 2 – 4**
  - **SOFT LENS: 8.5**
  - **SCLERAL LENS: 8.5**

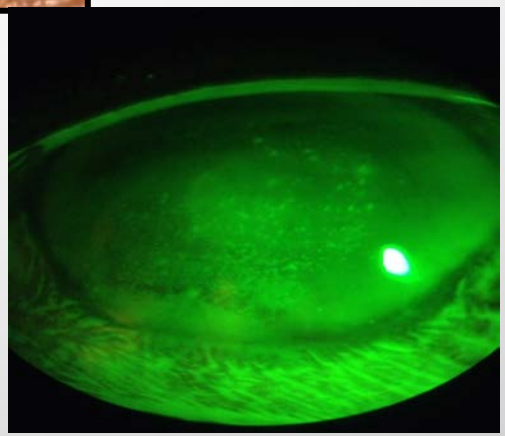
GP SCLERAL LENS CATEGORIES (SCLERAL LENS EDUCATION SOCIETY)

NAME	**DIAMETER**	**FITTING RELATIONSHIP**
CORNEO-SCLERA TOUCH	12.9 – 13.5MM	CORNEAL BEARING & SCLERAL
SEMI-SCLERAL	13.6 – 14.9MM	CORNEAL & SCLERAL BEARING
MINI-SCLERAL	15.0 – 18.0MM	SCLERAL BEARING AND MINIMAL CORNEAL CLEARANCE
FULL SCLERAL	18.1 – 24+MM	SCLERAL BEARING & MAXIMUM CORNEAL CLEARANCE

INDICATIONS







- IRREGULAR CORNEA
  - KERATOCONUS / PMD
  - PK
  - POST-REFRACTIVE SURGERY
- SEVERE DES
- SCARRED AND/OR SEVERELY PATHOLOGICAL CORNEA
- HEALTHY CORNEA (VERY HIGH ASTIGMATISM)

INDICATIONS (84K FITS, SCOPE STUDY, SCHORNACK ET AL)

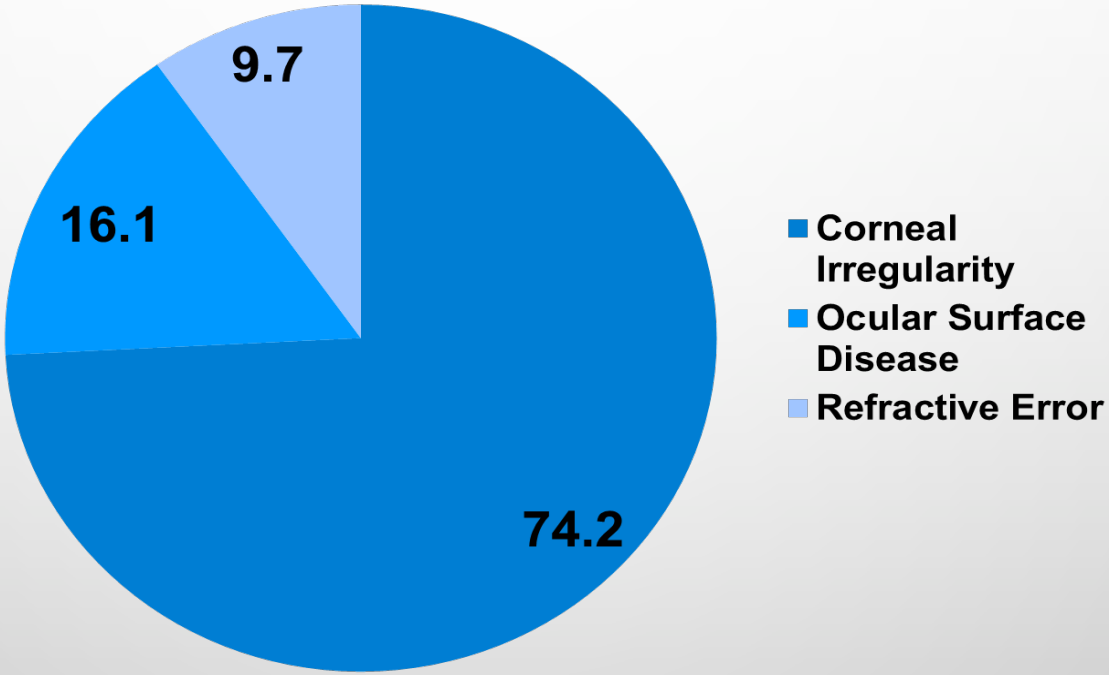


TABLE 2

SCLERAL VERSUS CORNEAL GP LENS APPLICATIONS (FROM MICHAUD AND RESNICK[16])

SCLERAL	CORNEAL
1. Moderate-Severe Irregular Cornea	1. Mild-to-Moderate Irregular Cornea
2. Ocular Surface Disease/Severe Dry Eye Disease	2. Presbyopia
3. "Wow" Effect with Initial Comfort	3. Orthokeratology
4. Cannot Dislodge or Eject	4. Tear Exchange
5. Ease of Handling	

Figure 4. In the last 12 months (if applicable), scleral lens use in your practice has:

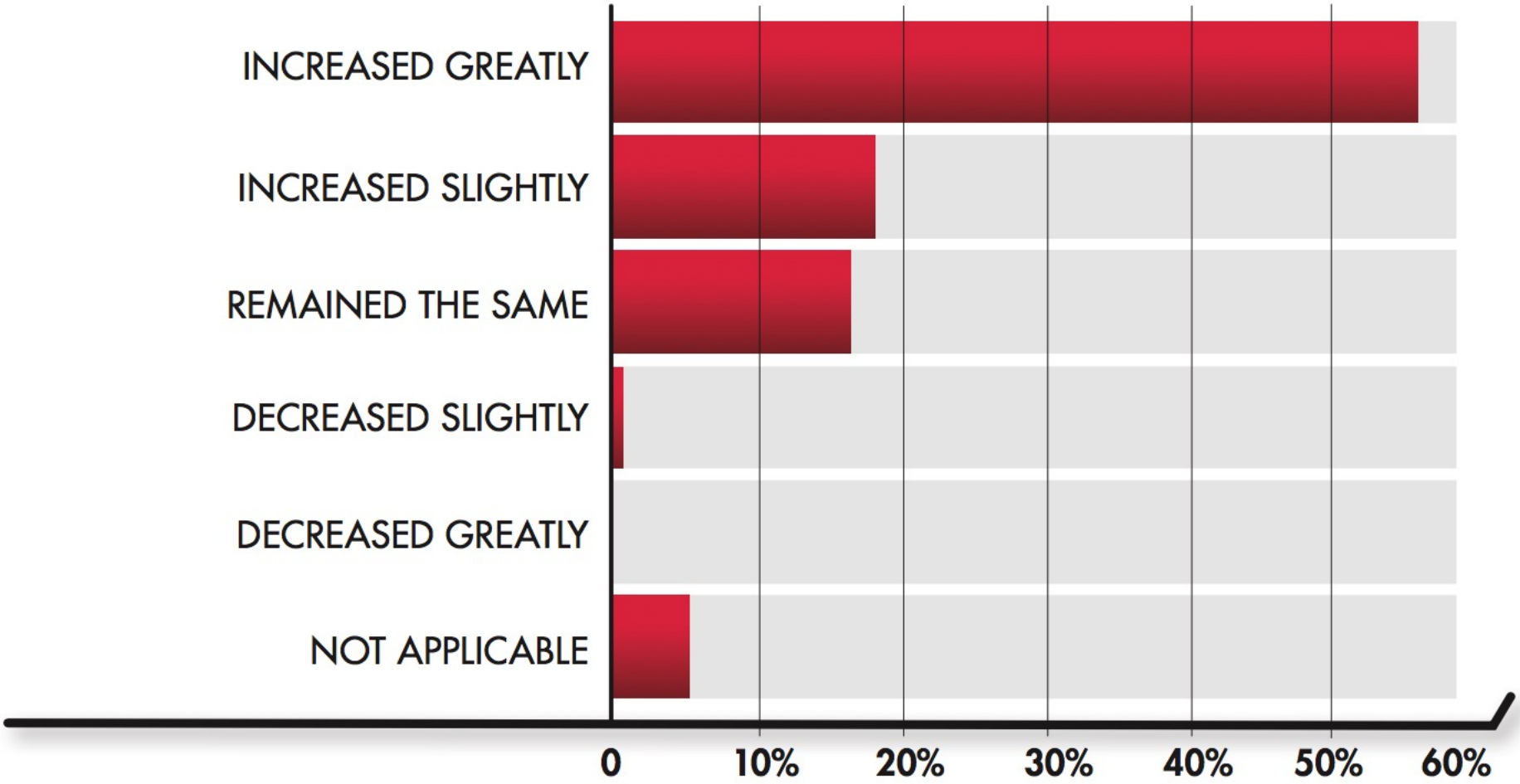


TABLE 3

WHAT PERCENTAGE OF YOUR IRREGULAR CORNEA PATIENTS DO YOU FIT INTO EACH OF THE FOLLOWING MODALITIES?

LENS TYPE	≥ 20% OF PATIENTS	≥ 50% OF PATIENTS	NOT APPLICABLE (I.E., DOES NOT FIT)
Scleral Lenses	70%	47%	17%
Intralimbal	23%	11%	45%
Small-Diameter GPs	43%	9%	15%
Hybrid	36%	4%	23%
Custom Soft	19%	4%	34%
Piggyback	9%	2%	40%

WHAT DOES SCIENCE TELL US

- SAFETY (FULLER, SEPT 2020 OVS: ADVERSE EVENTS IN 9.6% OF EYES (N = 157); OVERALL QUITE SAFE
- WAVEFRONT-GUIDED LENSES (RIJAL ET AL, OVS, SEPT 2020)
- EFFECT ON CORNEAL TRANSPLANTS: KOPPEN ET AL, AJO 2017; 40/51 EYES PREVENTED FROM PK VIA SCLERALS

CORNEA
The Journal of Cornea and External Disease

CLINICAL SCIENCE

Impact of Scleral Contact Lens Use on the Rate of Corneal Transplantation for Keratoconus

Ling, Jennifer J. MD*; Mian, Shahzad I. MD*; Stein, Joshua D. MD, MSc*,†,‡; Rahman, Moshiur PhD*; Poliskey, Joel BSc§; Woodward, Maria A. MD, MSc*,† Author Information

Cornea: January 2021 - Volume 40 - Issue 1 - p 39-42

Results:

Two thousand eight hundred six eyes met the inclusion criteria. CL use in each eye was 36.2% with no CL, 7.2% soft, 33.9% rigid gas permeable (RGP), and 22.7% scleral. A total of 3.2% of eyes underwent keratoplasty. In the adjusted model, SCL or RGP CL use significantly lowered the hazard of undergoing keratoplasty (HR = 0.19, 95% confidence interval [CI] 0.09–0.39, $P < 0.0001$ and HR = 0.30, 95% CI 0.17–0.52, $P < 0.0001$, respectively) when compared with no CL use. Factors associated with increased risk of keratoplasty were black race as compared to white (HR = 1.87, 95% CI 1.10–3.16, $P = 0.02$), younger age (HR = 0.92 per 5-year increment, 95% CI 0.86–0.99, $P = 0.032$), and lower socioeconomic status (HR = 1.08 per 5-point increase in the Area Deprivation Index, 95% CI 1.03–1.13, $P = 0.0008$). Keratoplasty was not associated with sex, insurance, or maximum keratometry.

Conclusions:

Physicians should maximize the use of scleral or RGP CL because patients who successfully use CL have almost one-fifth the risk of undergoing keratoplasty.

OPTOMETRY and VISION SCIENCE
Journal of the American Academy of Optometry

ORIGINAL INVESTIGATIONS

The Impact of Misaligned Wavefront-guided Correction in a Scleral Lens for the Highly Aberrated Eye

Rijal, Sujata BOptom[1,*]; Hastings, Gareth D. PhD, BOptom[1,2]; Nguyen, Lan Chi MBA, FAAO[1]; Kauffman, Matthew J. OD, FAAO[1]; Applegate, Raymond A. OD, PhD, FAAO[1]; Marsack, Jason D. PhD, FAAO[1]
Author Information

Optometry and Vision Science: September 2020 - Volume 97 - Issue 9 - p 732-740
doi: 10.1097/OPX.0000000000001577

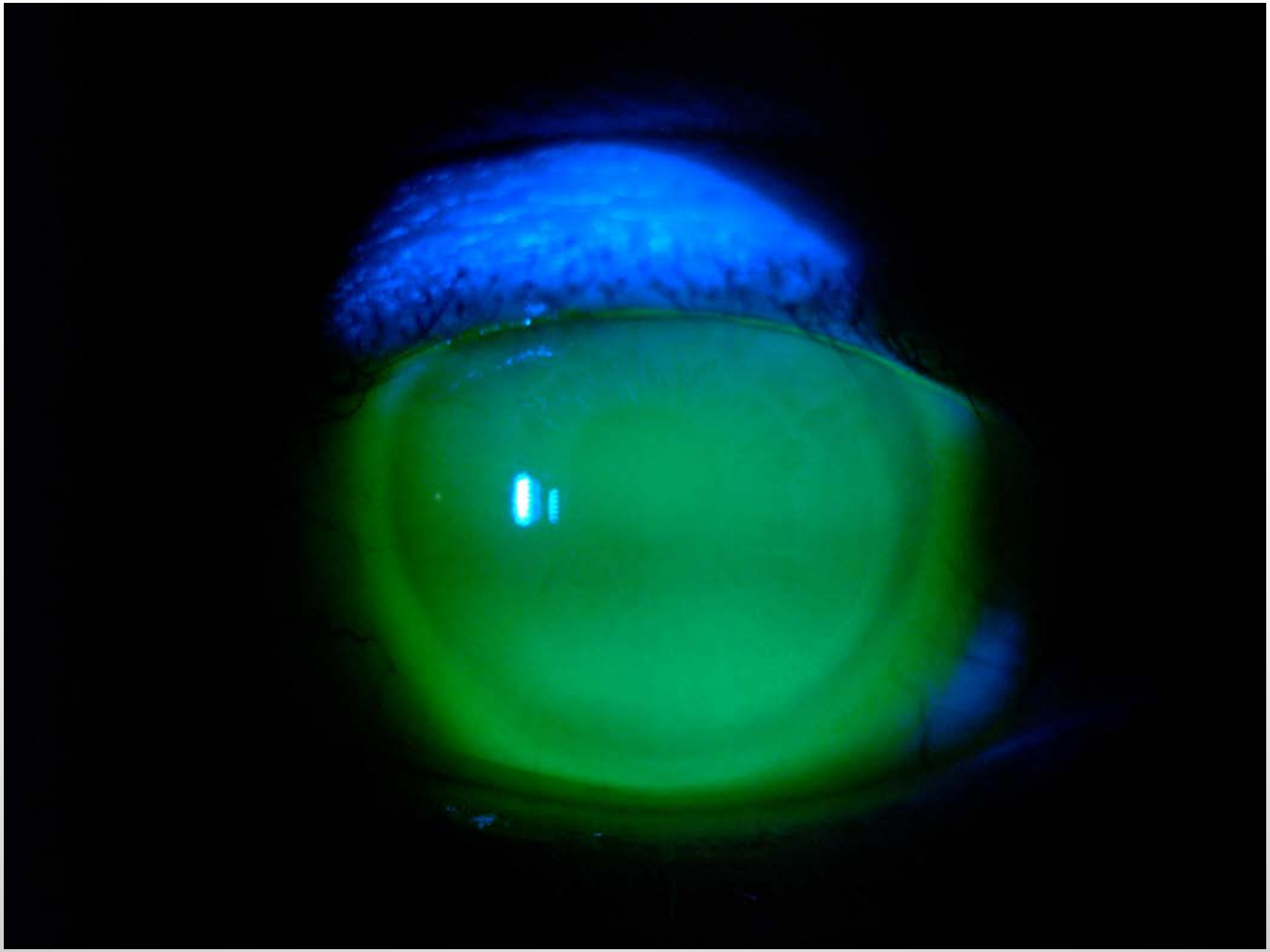
Metrics

Abstract

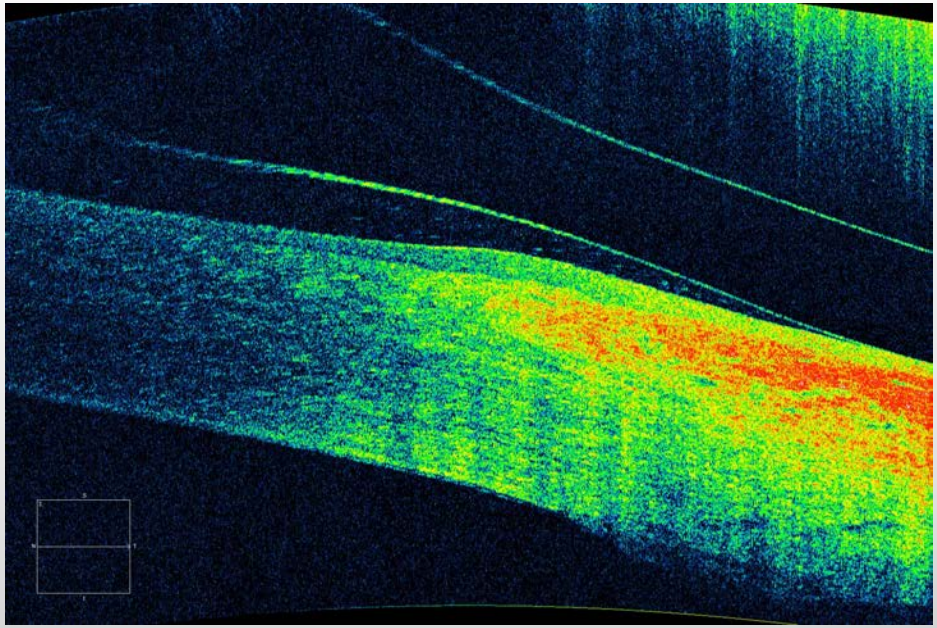
SIGNIFICANCE

To achieve maximum visual benefit, wavefront-guided scleral lens corrections (WGCs) are aligned with the underlying wavefront error of each individual eye. This requirement adds complexity to the fitting process. With a view toward simplification in lens fitting, this study quantified the consequences of placing WGCs at two pre-defined locations.

- THIS STUDY DEMONSTRATED THE IMPORTANCE OF PROPER ALIGNMENT OF OPTICS CONSISTENT WITH THE SPECIFIC DECENTRATION OF A GIVEN LENS.
- SCLERAL LENSES LEND THEMSELVES TO WAVEFRONT-GUIDED OPTICS, NOTABLY IF A STABLE FIT IS PROVIDED (CONSISTENT WITH LYNETTE JOHNS: 1/22/2021)



GOOD LIMBAL CLEARANCE AND PERIPHERAL ALIGNMENT (DR. TOM ARNOLD)



SCLERAL LENS RESOURCES

- SCLERAL LENS EDUCATION SOCIETY (SLS) (WWW.SCLERALLENS.ORG). **WORKSHOPS** AND EDUCATIONAL MATERIALS AND **VIDEOS,** FELLOWSHIP
- GP LENS INSTITUTE (WWW.GPLI.INFO): **27 NARRATED WEBINARS. SCLERAL LENS TROUBLESHOOTING FAQS** (WITH SLS); CODING AND BILLING MODULE, CONSUMER BROCHURE, HANDLING TIPS CARD
- A GUIDE TO SCLERAL LENS FITTING (VAN DER WORP): HTTP://COMMONS.PACIFICU.EDU/MONO/4/
- SCLERAL LENS FIT SCALES: HTTP://WWW.FERRIS.EDU/HTMLS/COLLEGES/MICHOPT/VISION-RESEARCH-INSTITUTE/PDFS/SCLERAL-LENS-FIT-SCALES_V2.PDF
- CONTEMPORARY SCLERAL LENSES: BARNETT & JOHNS
- JEDLICKA J, ET AL. SCLERAL LENS PRIMER. CL SPECTRUM, OCTOBER, 2020.

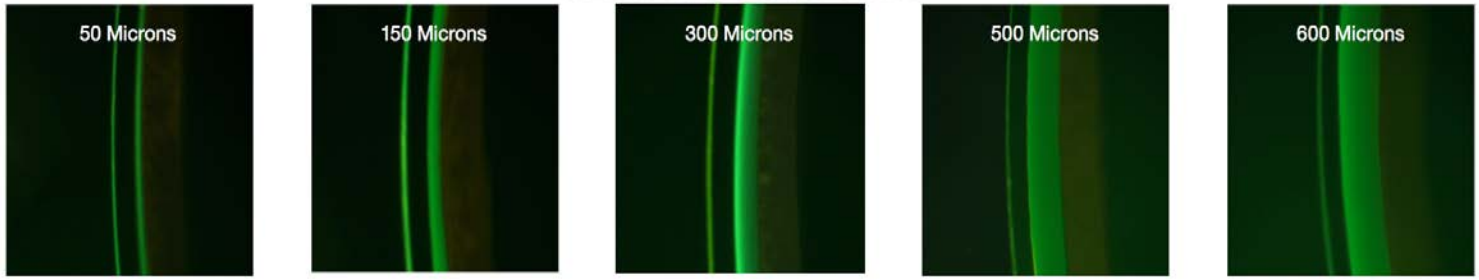
LENS INSERTION (GREAT VIDEOS AT WWW.SCLERALLENS.ORG)

- **COVER PATIENT'S LAP WITH PAPER TOWELS (OR PATIENT CAN HOLD PAPER TOWELS) AND POSITION PATIENT'S FACE PARALLEL TO THE GROUND**
- **POSITION LENS ON LARGE DMV SCLERAL CUP (OR EQUIVALENT); SUCTION IS USUALLY NOT NECESSARY**
- **(OVER)FILL LENS WELL WITH INDICATED SOLUTION**
- **DIP FLUORESCEIN STRIP INTO WELL**

FERRIS STATE UNIVERSITY
Michigan College of Optometry
Vision Research Institute

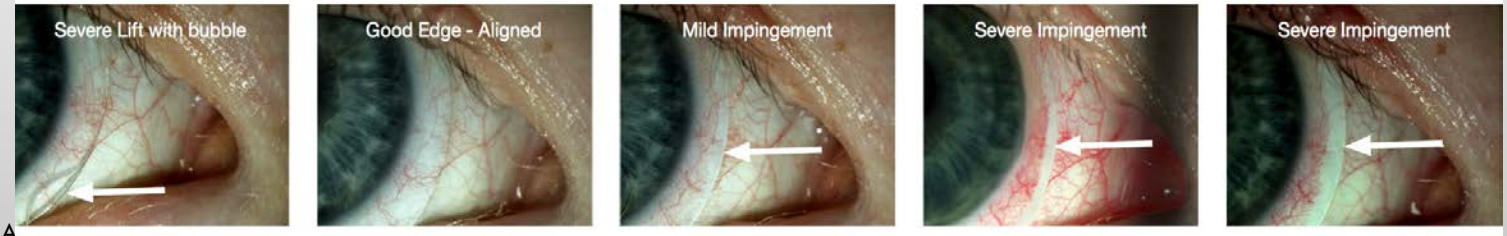
SCLERAL LENS FIT SCALES

CENTRAL VAULTING



LIMBAL VAULTING

EDGE RELATIONSHIP



www.clspectrum.com. October, 2020

SCLERAL LENS PRIMER

This guide provides the how and why of scleral lenses for both beginner and experienced fitters.

JASON JEDLICKA, OD; BRITTNEY MAZZA, OD; DANIEL FULLER, OD; KAREN LEE, OD; & EDWARD S. BENNETT, OD, MSED

Interest in scleral lens use continues to increase as more eyecare professionals (ECPs) understand how invaluable they are to both their practice and their patients. In fact, they are often life-changing for patients who have corneal disease or dry eye and who have been unsuccessful with other forms of contact lenses. The purpose of this article is to provide a clinical primer for ECPs desiring to incorporate scleral lenses into their practice.

GETTING STARTED

A number of excellent sources are available to help anyone interested in fitting scleral lenses. This article in

able. Express your interest in working with sclerals. The consultants should be able to provide resources (webinars, videos, fitting guides, etc.) on their specific lens design(s). Watch the webinars/videos, read the guides, and become familiar with the fitting process and then obtain your fitting set(s). If possible, ask a laboratory consultant to visit your practice to teach you hands-on for your first few fits; or, visit a practice that fits sclerals to observe for a day. Your first few fits could consist of highly motivated patients who are very likely to be successful and/or staff members. Certainly, the benefits of initially fitting a staff member include both experience

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THE ISSUE: TO DISCARD OR RE-USE

- GP LENSES CAN BE RE-USED UNLESS THE PATIENT HAS THE FOLLOWING:
  - HEPATITIS
  - HIV
  - PRION DISEASE
  - HERPES OCULAR INFECTION
  - ACANTHAMOEBA KERATITIS
  - ACTIVE BACTERIAL OR FUNGAL INFECTION

GUIDELINES FOR HANDLING OF MULTI-PATIENT CONTACT LENSES IN THE CLINICAL SETTING

- COMBINED EFFORT FROM THE AMERICAN ACADEMY OF OPTOMETRY CORNEA, CONTACT LENSES & REFRACTIVE TECHNOLOGIES SECTION AND AOA CONTACT LENS AND CORNEA SECTION
- • IT HAS BEEN ADOPTED BY BOTH AAO AND AOA
- • SUBMITTED TO OPTOMETRY AND VISION SCIENCE; CURRENTLY IN PRESS.
- • GUIDELINES CONSISTENT WITH 2018 INTERNATIONAL ORGANIZATION FOR STANDARDIZATION GUIDELINES

INDIANA UNIVERISTY SCHOOL OF OPtometry
Presenters from the Class or 1979

Technical Report: Guidelines for Handling of Multipatient Contact Lenses in the Clinical Setting

Christine Sindt, OD, FAAO,[1,2] Ed Bennett, OD, MSEd, FAAO(Dipl),[1,2]
Loretta Szczotka-Flynn, OD, PhD, FAAO(Dipl),[1,2] Louise Sclafani, OD, FAAO(Dipl),[1,2]
and Melissa Barnett, OD, FAAO[1,2]*; for The American Academy of Optometry (AAO) Section on Cornea, Contact Lenses & Refractive Technologies, and The American Optometric Association (AOA) Contact Lens and Cornea Section

SIGNIFICANCE: Standardized guidelines that are clinically practical are needed to assist the prescriber in minimizing the risk of conveying infection through multiuse diagnostic contact lens use and reuse.

Contact lens prescribers face the specter of transferring potential pathogens from one patient to another when reusing diagnostic (trial) contact lenses on multiple patients because infectious organisms have been recovered from worn contact lenses, although there is no evidence of transmission through this mechanism. These pathogens can be introduced into the system from one patient to another, or they may be introduced by clinician lens handling, storage, or both. These pathogens can cause acute or chronic systemic or ocular infection that can lead to significant morbidity (temporary or permanent) that includes vision loss.

Optom Vis Sci 2020;97:544–548. doi:10.1097/OPX.0000000000001547

Author Affiliations:
[1]The American Academy of Optometry (AAO) Section on Cornea, Contact Lenses & Refractive Technologies
[2]The American Optometric Association (AOA) Contact Lens and Cornea Section
*drbarnett@ucdavis.edu

Infection from a contact lens can potentially occur by single or multiple microbial agents, such as bacterial, fungal, viral, parasitic, or amoebic, or other transmissible pathogens.[1–5] Each microbe has different avenues and barriers to a lens, and their respective survivability can depend on the lens material (soft hydrogel lenses, gas-permeable plastics, and variations in polymers from different manufacturers), as well as the disinfection solution, the lens

to throughout as the 2018 ISO Standard)[6] to prevent vision and eye health compromise among patients requiring fittings with reusable diagnostic contact lenses, from potentially infectious agents on various trial lens materials. For this article, cleaning will refer to the removal of deposits, debris, and some organisms from the surface of lenses. Disinfection will refer to the killing of most but not all microbial forms (e.g., bacterial endospores and fungal

In-Office Disinfection of Multi-Patient Use Diagnostic Contact Lenses

Gas permeable

1. Place 3% hydrogen peroxide with GP lens in a non-neutralizing case.
2. Disinfect lens for 3 hours.
3. Rinse GP lens with Multipurpose Solution (MPS). Pat dry, store dry.

Hybrid and Soft

1. Place 3% hydrogen peroxide with soft or hybrid lens in non-neutralizing case for 3 hours.
2. Transfer soft or hybrid lens to a neutralizing case. Fill with fresh 3% hydrogen peroxide. Add neutralizing disc or tablet as recommended by manufacturer.
3. Neutralize lens for 6+ hours, or as directed by manufacturer.
4. Rinse soft or hybrid lens with MPS. Store in a disinfected case with MPS.

- Multipurpose solutions are acceptable for rinsing.
- ISO recommends this process every 28 days for soft or hybrid diagnostic lenses if they have been opened and not re-used and subsequently re-disinfected in that time period.

These methods have been approved by the American Academy of Optometry Section on Cornea, Contact Lenses and Refractive Technologies and The American Optometric Association, Contact Lens & Cornea Section adapted from the Standard of the International Organization for Standardization (ISO); ISO 19979:2018(E).

Created by Angelica Polizzi, 2020 OD candidate.

SURVEY OF READERSHIP: SCLERAL LENS FILLING SOLUTION: GP UPDATE (BENNETT OCT., 2020 CONTACT LENS SPECTRUM)

- FDA-APPROVED NACL SOLUTION: 48%
- NACL INHALATION SOLUTION: 33%
- NON-PRESERVED TEARS/LUBRICANTS: 13%
- **PRESERVED FILLING SOLUTION: 12%**

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ORGANIZATIONAL RESOURCES

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- SCLERAL LENS EDUCATIONAL SOCIETY (WWW.SCLERALLENS.ORG)
- THE AMERICAN ACADEMY OF ORTHOKERATOLOGY AND MYOPIA CONTROL (ORTHOKACADEMY.COM)
- INTERNATIONAL KERATOCONUS ACADEMY OF EYE CARE PROFESSIONALS (KERATOCONUSACADEMY.COM)
- NATIONAL KERATOCONUS FOUNDATION (WWW.NKCF.ORG)
- NEWSLETTERS FROM GPLI AND I-SITE (WWW.NETHERLANDS.COM)


GPLI
GP Lens Institute™
The Educational Resource For Custom Manufactured Contact Lenses
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EDUCATORS
RESIDENTS & STUDENTS
Webinar: "Expanding Your Practice through Education: Becoming a Specialty Contact Lens Externship Site"
Tuesday, August 23rd
7PM Central
REGISTER NOW!
Education by Lens Type: Webinars, FAQ and Guides to All Specialty Lenses
Specialty Contact Lens Grand Rounds: The Decision-Making Process
Tuesday, August 16 – 8PM Central
August 16 Webinar: Specialty Contact Lens Grand Rounds: The Decision-Making Process
Covid-19 Resource Center: What to Know About Contact Lenses and Practice Reopening
Educate Your Patients with Brochures About Wear & Care
2022 GPLI Award Winners
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100+ Archived Webinars Will

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Jan 19	GP Corneal and Scleral Multifocal Fitting — *Susan Gromacki OD, MS, FAAO, FSLS* **Watch »**
Feb 16	Hybrid Applications for Normal and Irregular Corneas — *Tiffany Andrzejewski OD, FAAO* **Register now »**
Mar 16	OrthoK: Initial Fitting Challenges and Problem-Solving — *Michael Lipson OD, FAAO, FSLS* **Register now »**
Apr 20	Scleral Lens Practice Management — *Edward Boshnick OD, FAAO* **Register now »**
May 18	Management of the Scleral Lens Ocular Surface Disease Patient Beyond the Fit — *Karen C Carrasquillo OD, PhD, FAAO, FSLS, FBCLA* **Register now »**
Jun 15	Pediatric Specialty Contact Lens Applications — *Heidi Miller OD, FAAO, FSLS* **Register now »**
Jul 20	Myopia Management Update — *Jeffrey J. Walline OD, PhD, FAAO* **Register now »**
Aug 17	Contact Lens Management of Keratoconus — *Stephanie L. Woo OD, FAAO, FSLS* **Register now »**
Sep 21	Custom Soft Lens Update for Healthy and Irregular Cornea Patients — *Renee Reeder OD, FAAO, FBCLA, FSLS, FIACLE* **Register now »**
Oct 19	Software Applications for Specialty Lens Designs — *Jason Jedlicka OD, FAAO, FSLS* **Register now »**
Nov 16	Beyond the Basics: Advanced Scleral Lens Design — *Greg DeNaeyer OD, FAAO, FSLS* **Register now »**
Dec 21	GP Material Update — *Maria K. Walker OD, MS, FAAO, FSLS* **Register now »**

YOUR CLMA LABORATORY CONSULTANT: YOUR BEST RESOURCE

- CONSULTANT CAN GUIDE YOU THROUGH THE MATERIAL, DESIGN AND FITTING QUESTIONS.
- MOST IMPORTANT, THEY CAN TROUBLESHOOT SPECIAL DESIGNS (THEY DO IT EVERY DAY!)
- PROVIDE PHOTOS, VIDEO, TOPOGRAPHY
- FITTING SETS
- WEB SITES HAVE PRODUCT INFORMATION, FITTING GUIDES, CALCULATORS, WEBINARS

EQUATION FOR GP SPECIAL DESIGN SUCCESS: LAB CONSULTANT + TOPOGRAPHY + IPHONE ADAPTOR

THE BOTTOM LINE

- GP LENSES WILL CONTINUE TO REPRESENT AN IMPORTANT COMPONENT OF SUCCESSFUL CONTACT LENS PRACTICE TODAY AND WELL INTO THE FUTURE. THE CONTINUING INTRODUCTION OF INNOVATIVE LARGE-DIAMETER, REVERSE GEOMETRY, CORNEAL RESHAPING, AND MULTIFOCAL DESIGNS WILL MEET THE NEEDS OF BOTH YOUNG AND OLD PATIENTS WHO DESIRE GOOD QUALITY VISION AT ALL DISTANCES, COMFORT, AND CONVENIENCE.