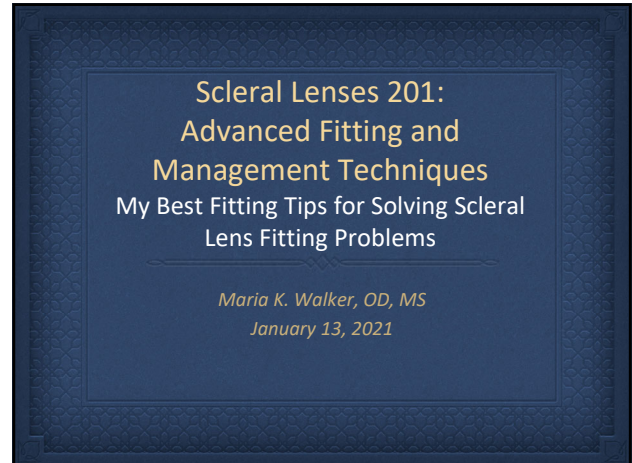



My Best Fitting Tips for Solving Scleral Lens Fitting Problems



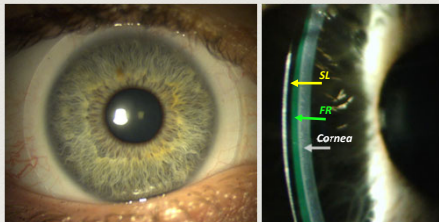
Maria K. Walker, OD MS

Attended New England College of Optometry where she earned her Doctor of Optometry and Master of Vision Science degrees

She went on to complete a Residency in Cornea & Contact Lenses at Pacific University In the fall of 2014, Dr. Walker joined the faculty at UHCO as a Visiting Assistant Professor, working as an attending clinician as well as on various research initiatives.

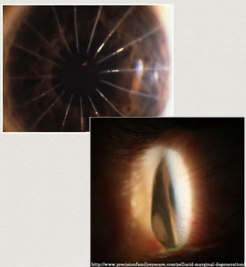


The Scleral Lens



Indications for SL wear

- Irregular Astigmatism
 - Keratoconus
 - Pellucid Marginal Degeneration
 - Post-LASIK Ectasia
 - Post-Radial Keratectomy
 - Post-Penetrating Keratoplasty
 - Post-Infectious irregularities
 - Herpetic
 - Post-Scarring / Surgical
 - Penetrating injury scars
 - Suture irregularities



Indications for SL wear

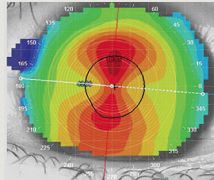
- Ocular surface disease:
 - Graft versus Host disease
 - Sjogrens
 - Sarcoidosis
 - Rheumatoid Arthritis
 - Ocular surface exposure (post-surgical)
 - Neurotrophic Keratopathy
 - Neuropathic Ocular Pain
 - Limbal Stem Cell Deficiency
 - Ocular Cicatricial Pemphigoid
 - Familial Dysautonomia
 - Ocular Allergies
 - Steven's Johnsons syndrome



My Best Fitting Tips for Solving Scleral Lens Fitting Problems

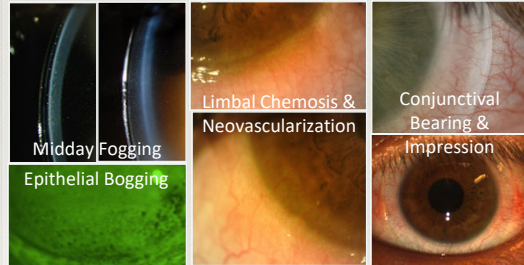
Indications for SL wear

- Normal cornea:
 - High refractive error
 - High astigmatism
 - Amblyopia/strabismus
 - Presbyopia
 - High performance (sports vision)



The Scleral Lens

Not without complications...



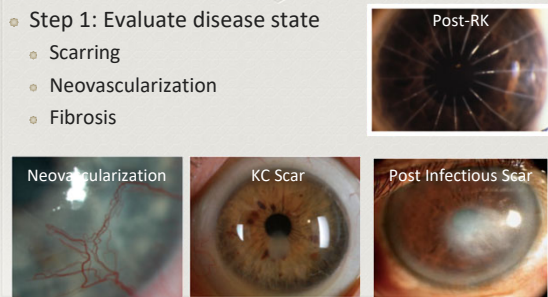
Scleral Lens Exam Sequence

- Visit 1: Baseline testing
- Visit 2: Dispense
- Follow-up: 1 week, 1 month, 6 months (year 1)
- 6mo - 1 year f/u on all pts



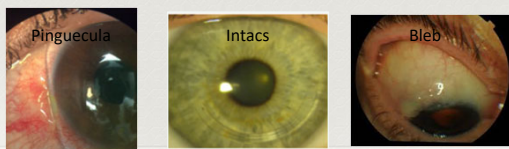
Baseline Exam

- Step 1: Evaluate disease state
 - Scarring
 - Neovascularization
 - Fibrosis

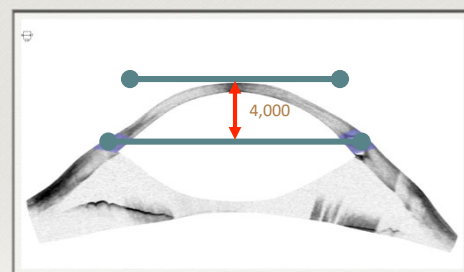


Baseline Exam

- Step 1: Evaluate disease state
 - Staining: Cornea & Conjunctiva
 - Eyelid health
 - Other: glaucoma? cataracts?



Diagnostic Fitting



My Best Fitting Tips for Solving Scleral Lens Fitting Problems

Scleral Topography

This slide features a collage of images illustrating scleral topography. It includes a photograph of a clinician examining a patient's eye, a circular topographic map showing color-coded curvature, and several line graphs and charts representing different topographic data sets.

OCT

- (Optional) for SAG measurements when fitting
- Nice for monitoring hot spots of corneal ectasia (ie. Kc apex, proud grafts)
- Corneal edema with SL

This slide displays two OCT (Optical Coherence Tomography) images. The left image shows a cross-section of the cornea and sclera with a vertical line indicating a measurement. The right image shows a similar cross-section with a different measurement line. The text provides clinical context for when and why to use OCT in scleral lens fitting.

Slit Lamp Evaluation of Lenses

This slide shows a photograph of a clinician in a white lab coat using a slit lamp to evaluate a scleral lens on a patient's eye. The patient is seated and looking into the instrument.

White light
Optic section
45 degree angle

This slide shows a close-up photograph of a scleral lens being evaluated with a slit lamp. The lens is illuminated with white light, and a green optic section is visible. The text indicates the angle of the optic section is 45 degrees.

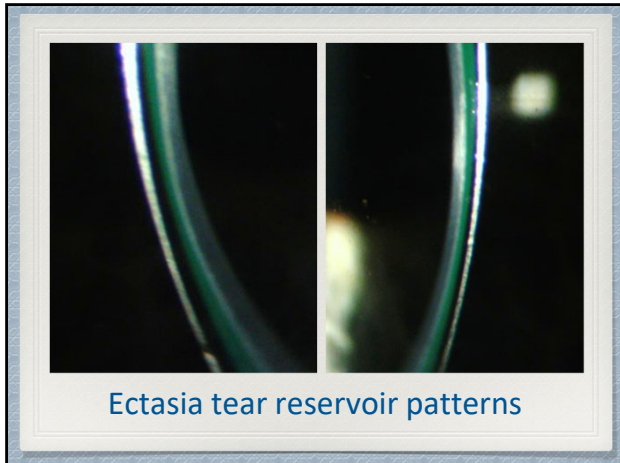
Do we need NaFI?

This slide shows two side-by-side photographs of a scleral lens being evaluated with a slit lamp. The left image shows a close-up of the lens edge, and the right image shows a different view of the lens. The text asks if NaFI (Nonaqueous Fluorescein In Situ) is needed.

Ectasia tear reservoir patterns

This slide shows two side-by-side photographs of a scleral lens being evaluated with a slit lamp. The left image shows a close-up of the lens edge, and the right image shows a different view of the lens. The text identifies the patterns as ectasia tear reservoir patterns.

My Best Fitting Tips for Solving Scleral Lens Fitting Problems



Ideal Clearance:

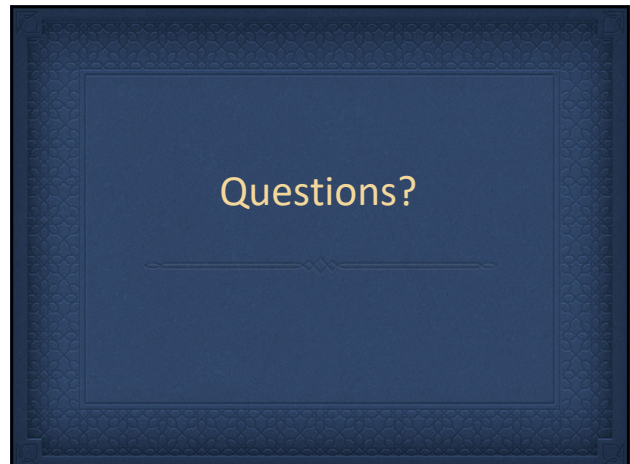
- 100-200um over highest corneal area
- Expect ~150um settling effect
- 250-300um at dispense

Image courtesy of Patrick Caroline

Easy and Common Complications

Application bubble

Lens non-wetting



Easy and Common Complications

Lens deposits

Use of Progent cleaner

Excessive Apical Clearance

>400um

Problems:

- Blurry vision & visual distortion
- Lens discomfort
- Midday fogging (debris accumulation)
- Increased swelling

My Best Fitting Tips for Solving Scleral Lens Fitting Problems

Complex Corneal Touch

Touch*

Too much clearance*

What to do?

Keratoconus apex

Transplant G/H interface

Corneal Staining

Causes:

- Lens touch (focal)
- Toxicity (diffuse)
- Disease state (remember to compare to baseline!)

Management:

- Determine cause
- Manage lens fit
- Change application solution

The Tear Film Reservoir

Function of Tear Film:

- Lubrication
- Smooth refraction
- Microbial protection...
- Corneal nourishment and O₂ delivery

Normal tear film

Epithelial Bogging

Epithelial Bogging

- Cause unknown
- Occurs commonly
- Potential etiologies:
 - Loss of glycocalyx
 - Epithelial edema
 - Osmotic imbalance
 - Lack of epi sloughing

Management:

- Monitor
- Differentiate from staining
- Can change application solution

Epithelial Toxicity

- Does not occur in most patients.
- Cause:
 - (1) Preservative Toxicity
 - (2) Tear Stagnation (metabolic waste buildup)
- Management:
 - (1) Education patient, change application solution
 - (2) Increase tear exchange
 - Increase diameter
 - Toric periphery

My Best Fitting Tips for Solving Scleral Lens Fitting Problems

Application Solutions

- Several FDA approved saline solutions
- One approved saline with metabolites (Ca, K, Mg)
- Preservative Free artificial tears
- Autologous serum drops
- Mixed "cocktail": Tears/serum + saline

Corneal Health during 3 Month SL Wear

OVS 2020
Tse V, Zhou Y, Truong T, Lin K, Tan B, Lin M.

Compared 2 salines and found no difference in corneal health

ties of dendritic and endothelial cells. The results of this study suggested that 3 months of scleral lens wear had no subclinical effects on the healthy corneas of young subjects. In addition, there was no significant difference in the effects on the corneal health between the saline solutions (PuriLens Plus vs. Addipak).

Location	Visit	ln(P _{ep}), Mean (95% CI; mm)
Center	Baseline	-3.6 (-3.9 to -3.3)
	1 mo	-3.4 (-3.6 to -3.2)
	3 mo	-3.6 (-3.9 to -3.3)
Temporal periphery	Baseline	-3.1 (-3.4 to -2.7)
	1 mo	-3.3 (-3.6 to -3.0)
	3 mo	-3.0 (-3.2 to -2.8)

CI = confidence interval; ln = natural logarithm-transformed; P_{ep} = corneal epithelial permeability.

Changes in symptoms of MDF with Novel SL solution

OVS 2020
Fogt J, Karres M, Barr JT

Results:

- Significant improvement in subjective symptoms
- No change in MDF
- No change in ocular surface health

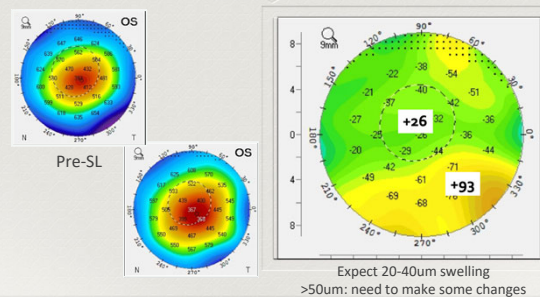
Conclusion:

Safe to use and may improve subjective satisfaction with SL

What about corneal edema?



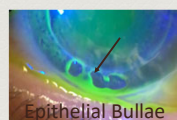
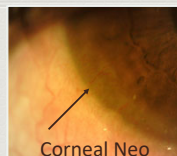
Measuring Hypoxia



Consequences of Hypoxia

Epithelial changes

- decreased metabolic rate
- morphologic changes
- microcysts
- Bullous keratopathy
- changes in junctional integrity
- decreased corneal sensation
- pannus formation.



Consequences of Hypoxia

Stromal changes

- Edema
- Acidosis
- Neovascularization
- Changes in corneal shape
- Can lead to corneal thinning



Image courtesy of Dr. Karen Carrasquillo

My Best Fitting Tips for Solving Scleral Lens Fitting Problems

Consequences of Hypoxia

Endothelial changes

- Bleb formation
- Polymegethism
- Changes in endothelial cell density
- Possible changes in endothelial function.

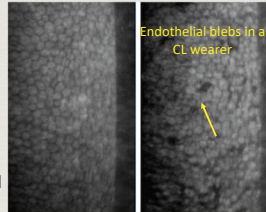
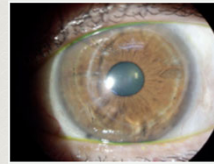
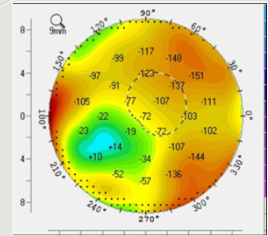


Photo courtesy of Dr. Langis Michaud

High Risk Patients



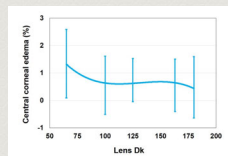
Transplant patients
Compromised endothelium



+72um central
+136um inferior

Management of Edema with SL

- Diffusion through lens and tears
- Lens thickness (SAM/FAP)
- Lens Dk (lost ROI after 100?)
- Tear reservoir thickness (Fisher 2020)
- Application solution?



Dhallu et al 2020

Increase Dk 100 to 200
CT: 350; FR: 325

Management of Edema with SL

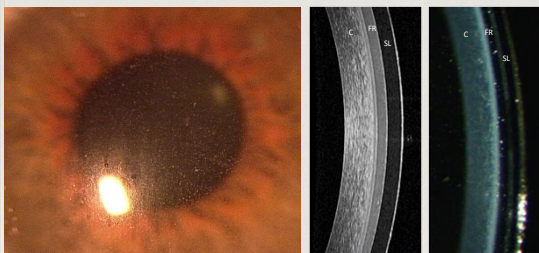
Does increasing tear exchange help?

- Maybe, not tested experimentally
- Lens diameter
- Lens haptic toricity
- Channels



Image courtesy of Dr. Karen Carrasquillo

Midday Fogging (MDF)



Questions?

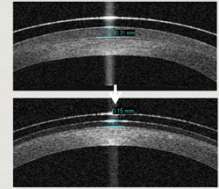
My Best Fitting Tips for Solving Scleral Lens Fitting Problems

Current Thinking on MDF

- Sequestered lipids, cells (white blood cells), make-up, mixture of all these components (variable)
- Can mostly be managed by lens fit and hygiene
- No apparent increase in inflammation
- Visual frustrating!
 - Necessitates removal and refreshing of solution 2-5+ times per day
 - Most often affects people with ocular surface disease (ie. MGD)

Reducing MDF

- Reduce apical clearance
- Lipophilic PFAT
- Manage patient-specific hygiene

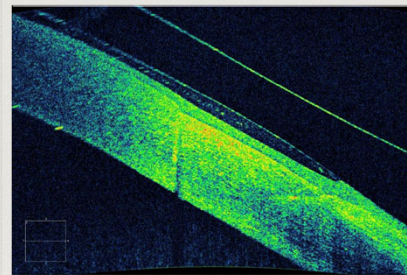


Reducing MDF

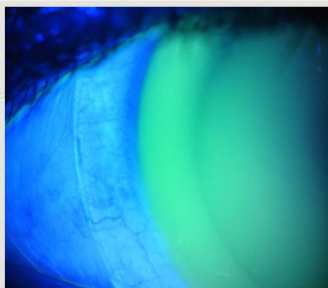
- Personal hygiene therapies**
 - Eyelid health
 - Treatment of allergies/dry eye
 - Eyewash
 - Waiting to apply lenses in AM



The Transition (Limbal) Zone

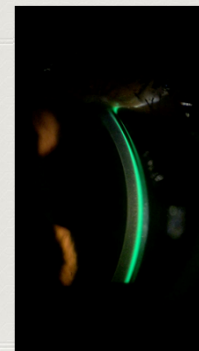


Fitting Goal: Alignment without bearing



NaFl most helpful at limbus (and edge)

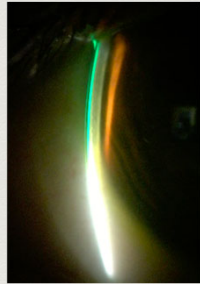
Evaluating the Limbus



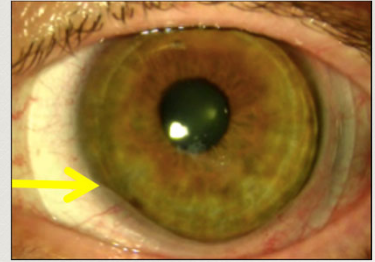
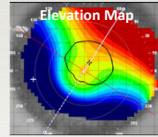
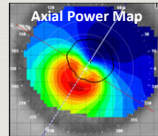
My Best Fitting Tips for Solving Scleral Lens Fitting Problems

Evaluating the Limbus

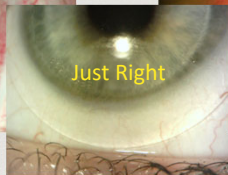
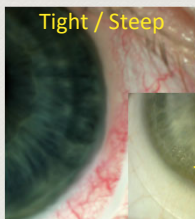
- NaFl pattern over the limbus
- Will be affected by lens decentration
 - Evaluate all gazes for limbal touch



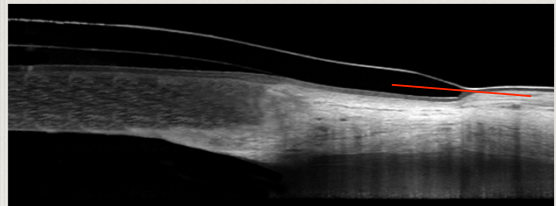
Conjunctival Prolapse



Landing Zone

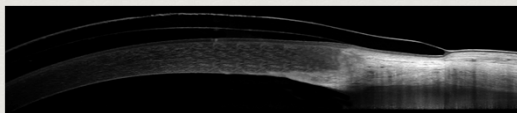


Using OCT to evaluate SLZ

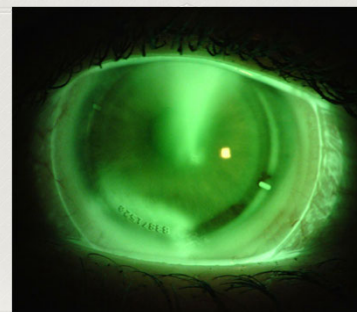


Fitting Goal: Smooth and even landing

The Landing Zone



Using NaFl for Landing Zone Evaluation



My Best Fitting Tips for Solving Scleral Lens Fitting Problems

Using NaFl for Landing Zone Evaluation



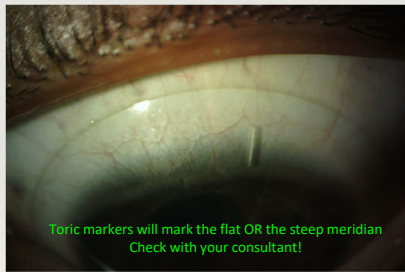
Impression Rings



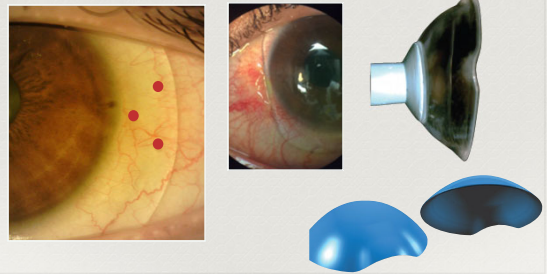
Are they always bad?
Can we eliminate them?

Conjunctival Roadblocks

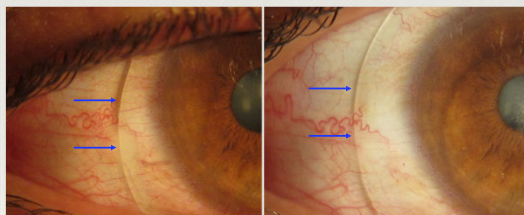
Minor: toric haptic zone



Customized lens designs



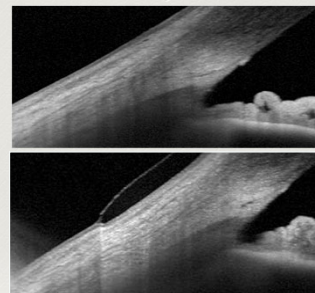
Customized lens designs



Without custom edge

With custom edge

What About IOP?



My Best Fitting Tips for Solving Scleral Lens Fitting Problems

Aqueous Humor Outflow

Measuring IOP in SL wear

Evaluating the ONH in scleral lens wear?

Metric	OD	OS
Average RNFL Thickness	100	100
Min RNFL	20	20
Max RNFL	180	180
Average IOP	12.0 mmHg	12.0 mmHg
Max IOP	18.0 mmHg	18.0 mmHg
Min IOP	6.0 mmHg	6.0 mmHg

OCT and IOP

- Bruch's Membrane Opening (BMO): termination of Bruch's membrane at the optic nerve head
- Minimum Rim Width (MRW): shortest distance from the BMO to the inner limiting lamina (also termed BMO-MRW)
- Two studies, variable results

Over-Refraction

- Be careful not to over-minus
 - Max plus to max VA & duochrome test
- Sphero - cylinder
 - ~30% will need toric power
 - First lens: only Rx toric power if >0.75D
 - Stabilized with prism ballast (spherical haptic) or toric haptic zone

Tip: If Rx'ing toric power, put on a toric haptic trial lens

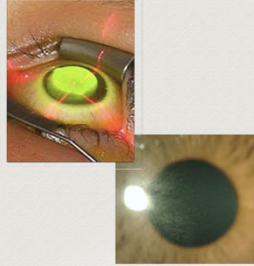
Managing the Disease State

- Keratoconus**
 - Inflammation, atopy, eye rubbing
- Post-transplant**
 - Transplant rejection, endothelial loss
- Ocular Surface Disease**
 - Risk of infection

My Best Fitting Tips for Solving Scleral Lens Fitting Problems

Post CXL SL Considerations

- Recommend 6-8 weeks post-procedure (or more)
- Monitor and document haze (usually present)
- Patients still on steroids?
 - Can they still wear a SL?



Initial Follow-Up Exam: 1-3 weeks

- 1) Evaluation of lenses on eye
 - SCOR
 - Fit evaluation (OCT, imaging optional)
- 2) Removal of lenses
 - Cornea: check IOP, edema, staining, scarring
 - Conjunctiva: monitor impression rings, hyperemia, staining
- 3) F/U on patient education

Concluding remarks

- Scleral lenses have revolutionized specialty contact lens management.
- Like all specialty lens management, it is a balancing act of risks and benefits.
- Important to understand the positive impact...while being aware of potential limitations.
- Use cautious optimism when fitting SL patients!

ABB Delivers Greater Value

- ✓ **Consultation efficiency**
 - Call one consultant for access to specialty soft, Hybrids, and an extensive portfolio of multifocals, torics, sclerals, and irregular corneal lenses.
- ✓ **Order Consolidation**
 - Ordering all lenses from one company via website or phone ordering.
- ✓ **Shipping efficiencies**
 - One bundled shipment means time and money saved!
- ✓ **Accounting efficiencies**
 - One statement and one payment means easy reconciliation
- ✓ **Business Review**
 - Measure your specialty portfolio growth in one simplified report
- ✓ **Education**
 - Lunch and Learns, staff trainings, live webinars, wet labs, and scleral boot camps

Specialty Vision Products

The largest portfolio and educational resource for specialty lenses in the industry.

- Scleral
- Ortho K
- Irregular Cornea
- Bifocal/Multifocal
- Spherical
- Hybrids
- Custom Soft

Prime Warranty Program

NEW

GAS PERMEABLE LENS PRIME WARRANTY:

- Single Vision**
- 90 day Warranty Program
 - Unlimited exchanges at N/C within 90 day period
 - No need to return lenses unless patient cancellation
- Irregular Cornea, Multifocal, Toric**
- 120 day Warranty Program
 - Unlimited exchanges at N/C within 120 day period
 - No need to return lenses unless patient cancellation

Prime Warranty Program ABB Manufactured Specialty Lenses

SCLERAL LENS PRIME WARRANTY:

- ICD FLEX, ICD Family, Infinity, Dyna Scleral & Dyna Semi Scleral**
- 120 day Warranty Program
 - Unlimited exchanges at N/C within 120 day period
 - No need to return lenses unless patient cancellation

Maria K. Walker, OD, MS

University of Houston, College of Optometry

January 13, 2021

Page # 12

My Best Fitting Tips for Solving Scleral Lens Fitting Problems

Educational Opportunities

Virtual Learning Topics Available

- **Specialty Lens Products Catalog**
 - In depth look at available Specialty lens products, Sclerals, GP lenses and custom soft
- **Getting Started with Scleral or Specialty Lenses**
- **Scleral Lenses Product Specific Education**
 - ICD Flex
 - Europa
 - Jupiter
 - Boston Sight
 - Allstars
 - Ampleye
- **Basic Scleral Education**
- **Basic Scleral Lens Troubleshooting**
- **Product Specific Troubleshooting**
- **Basic Scleral Staff Education** - Can be provided in a series for your staff separately
 - Educating Patients with Care and Handling Sclerals
 - Increasing Patient and Practice Success
 - Instrumentation for Scleral Lens Fitting
- **Dry Eye Education**

Coming Soon

Scleral Starter Kits

NEW

Ships with new scleral lens orders

The starter kits contain:

- 2 - 5ml, 6 vial boxes of Vibrant Vue Sterile saline
- 1 - 3.4 oz Tangible Clean MPS solution
- 1 - lg DMV inserter
- 1 - sm DMV remover
- 1 - contact lens case
- Convenient on-the-go pouch

Exclusive NEW products AVAILABLE NOW!

The **VibrantVue® Product Line** offers high-quality, cost-effective products for your patients; available only through eye care practitioners and designed to assist in revenue generation for your practice.

HIGHER PATIENT SATISFACTION	INCREASE YOUR PROFITABILITY	EXCLUSIVE PRODUCT EXPANSION
<p>FILL</p> <p>Filling Solution for Scleral Contact Lens Wearers</p> <p>Our VibrantVue® Scleral Saline is a premium, FDA-approved scleral saline rinse and insertion solution for your patients offered in a convenient & cost-effective 3-month supply box.</p> <ul style="list-style-type: none"> • 0.9% saline (unbuffered) • Single use, sterile 5 mL vials • Travel-Ready • Preservative-free 	<p>PROTECT</p> <p>Hand Cleanser for all Contact Lens Wearers</p> <p>Our Contact Len Hand Prep by VibrantVue® offers your patients an extra layer of protection when handling their contact lenses.</p> <ul style="list-style-type: none"> • Highly effective: Hypochlorous Acid (HOCl) active ingredients • No rinse formula, hydrates and freshens • All natural, non-irritating, alcohol free • Available in both 'at home' and 'on the go' sizes 	<p>TREAT</p> <p>Lid & Lash Care for Contact Lens Comfort & Dry Eye</p> <p>Our VibrantVue® Lid Care system offers both in-office and at home maintenance to help your patients with contact lens intolerance and dry eye (MGD, Blepharitis, etc).</p> <ul style="list-style-type: none"> • Highly effective: Hypochlorous Acid (HOCl) (active ingredient) • Most concentrated HOCl product available • Non-toxic, non-irritating, non-sterilizing (hypochlorite) • Cost effective & value saving for your patients

New Product

NEW

- **Featuring**
- **Tangible® Boost**
- **Monthly treatment to restore Tangible Hydra-PEG coating**

New Dry Eye Product

NEW

- **Featuring**
- **Regener-Eyes®**
- **the first and only sterile biological eye drop**

Made-to-Order Soft Custom Lenses

Have patients outside of the available parameter ranges for standard soft lenses?

Need an alternative for Hydra-Soft Lenses?

Need Custom Made Soft Therapeutic Lenses?

CONCISE Custom

- Methafilcon A 55%
- Benz 49%
- Polymacon 38%

DEFINITIVE

Silicone Hydrogel

Fastest Turnaround Times!

My Best Fitting Tips for Solving Scleral Lens Fitting Problems



ABB Business Solutions

- ABB Analyze**
Practice Performance Optimization Platform
- ABB AutoShip**
Automated Soft Contact Lens Re-Order Platform
- ABB Verify**
Vision Care Benefits Automation and Optimization Platform
- ABB Educate**
Clinical & Practice Training Platform
- ABB Connect**
Optical Marketplace Platform

ABB



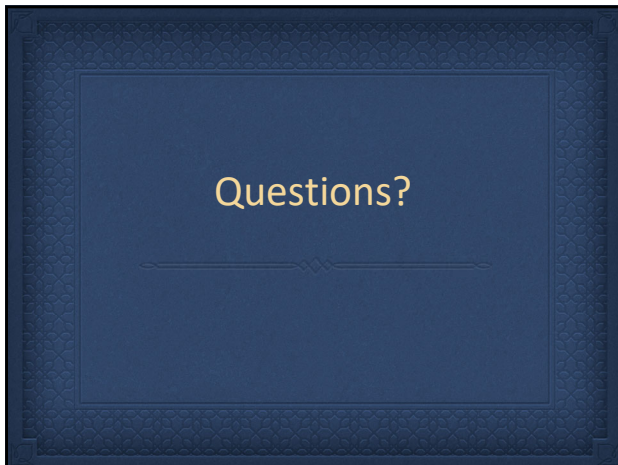
ABB Business Solutions

ABB Verify

Powered by AffinityAnalytics

ABB Verify, powered by AffinityAnalytics, is a tool that helps drive patients to return to your practice and maximize their current vision care benefits. By reaching out to your patients via email and text message, it brings back not only patients who have exam and material benefits but also those who had an exam and still have unused material benefits.

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Questions?



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