

Specialty Lens Fitting

Grand Rounds



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UMSL Optometry

Course Objectives

- Hybrid lenses
- Review of Specialty Lens GP design
 - Initial lens selection, troubleshooting
- Review of Prosthetic Lenses
- Piggybacking (yes, I still do this)
- Unusual presentations

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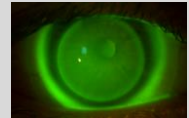
Gathering patient data

- History
 - Why need
 - What previous worn
- Examination
- Special testing
 - Topography, anterior segment OCT

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Hybrid lenses

- Hybrid Contact Lenses
 - GP central button
 - Soft surrounding Skirt
 - Provide the optical quality of a GP lens with the comfort of a soft lens
 - Should be considered for patient with:
 - High amount of astigmatism
 - No or minimal residual astigmatism
 - Regular and Irregular Corneas

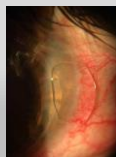


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Hybrid lenses

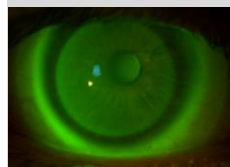
- Duette (Synergeyes)
 - Base curve selected from flat K value
 - www.duettecalculator.com
 - Tips
 - Insert like a scleral lens
 - Flatten the skirt to increase lens movement
 - Steepen the skirt if there is fluting or excessive movement
 - Lens to cornea relationship should be 0.50 to 0.75D steeper than flat K

Conversion Chart	
mm	Diopters
7.1	47.50
7.2	46.87
7.3	46.25
7.4	45.62
7.5	45.00
7.6	44.37
7.7	43.75
7.8	43.25
7.9	42.75
8.0	42.25
8.1	41.75
8.2	41.25
8.3	40.75

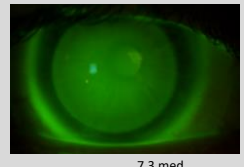


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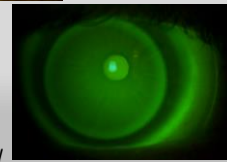
Hybrid lenses - Duette



7.9 med



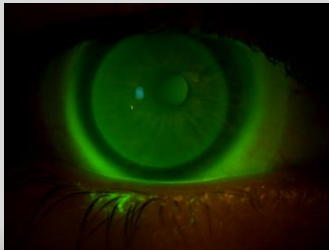
7.3 med



7.7 med

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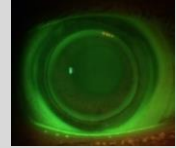
Hybrid lenses – Duette Video



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Hybrid Fit

- 24 yo female, new patient
- Presents wearing soft toric CL and complaints of redness and irritation.
 - MR: OD: pl -4.75 x 010
 - OS: -1.25 -4.25 x 005
 - Fit into Hybrid Lens
 - Rx'd Clear Care
 - Improved end of day comfort and vision



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Hybrid Lenses

- Synergeyes iD (individually designed)
 - Single Vision and Multifocal (EDOF)
 - Keratometric readings and corneal diameter
 - New precision skirt – which has a linear shape that mimics the scleral anatomy and is based on the HVID
 - High number is steeper or tighter
 - Low number is flatter or looser
 - Empirical Fitting



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Hybrid lenses

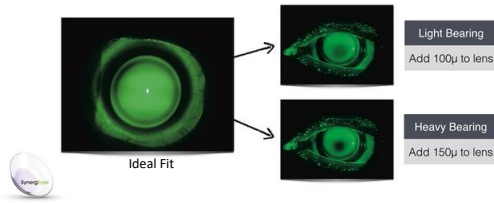
- Ultrahealth (Synergeyes)
 - Initial lens: 250 vault; 8.4 flat skirt; wait 5 minutes
 - Bearing – increase vault 100 microns
 - Pooling – decrease vault 100 microns
 - Tips
 - Make sure you see touch/bearing, then go back up
 - Use NaFl
 - Use tissue to aid in removal



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1 Central Vault Determination

Start with the 250μ vault and 8.4 radius (flat skirt) diagnostic lens

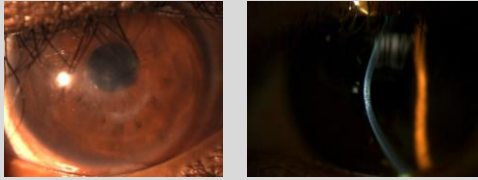


Hybrid Pros/Cons

- Pros
 - Empirically fit all designs
 - Improved comfort for the patient
- Cons
 - Lens movement
 - Lens removal

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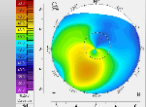
Corneal GP Specialty Lenses -For Keratoconus



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Corneal GP Specialty Lenses -For Keratoconus

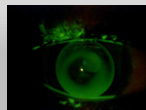
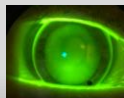
- Provide improved vision by correcting irregular astigmatism and masking HOA that are induced from the irregular astigmatism
 - Challenges:
 - Steep to Flat difference on topography
 - Decentration of cone apex
 - Vision is improved with GP lenses, but visual function or performance is still decreased for KCN patients
 - Contrast threshold measurements show a vision loss at low spatial frequencies



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Corneal GP Specialty Lenses -For Keratoconus

- Three common GP lens fitting relationships for KCN
 - Apical Bearing
 - Previously thought to slow down or halt the progression; this is incorrect.
 - This fitting method should not be used, if at all possible
 - Apical Clearance
 - Three-point touch



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Corneal GP Specialty Lenses -For Keratoconus

- Small Diameter Designs
 - OAD 8.0 to 9.8
 - Initial lens selection equal to steep keratometry value
 - If apical clearance is noted
 - Flatten the lens base curve 0.5 to 1.00D until bearing is noted.
 - If bearing is minimal and the NaFL pattern is “three-point touch”
 - Use this base curve
 - If bearing is frank, steepen base curve 0.50D.
 - If lens is decentered
 - Try a larger diameter lens design

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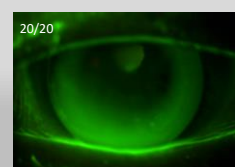
Corneal GP Specialty Lenses -For Keratoconus

- Small Diameter Designs
 - *It's not always a perfect or pretty fit.*
 - 72 year old female presents wearing 10 year old PMMA lenses, fit excessively flat, with central corneal abrasions, photophobia, and watering.
 - PMMA lenses
 - OD: 7.21mm/8.2 diameter 20/40- (46.75D)
 - OS: 7.80 mm/8.2 diameter 20/25 (43.25D)

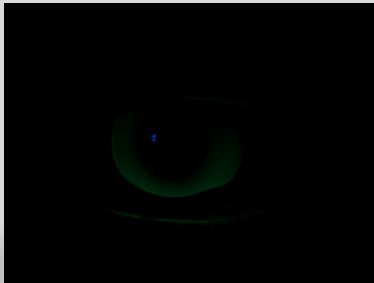
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Corneal GP Specialty Lenses -For Keratoconus

- Small Diameter Designs
 - Specialty Design, lens with 2D inferior peripheral steepening
 - OD: 6.00mm/8.7 diameter (52.75D) 6 D steeper than habitual lens
 - OS: 6.4 mm/ 8.7 diameter (56.25D) 13D steeper than habitual lens
 - VA outcome limited my ability to steepen the lenses

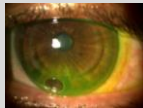


video



Corneal GP Specialty Lenses -For Keratoconus

- Large diameter design/Intralimbal
 - Center better than small diameter lenses
 - Distributes lens pressure across greater area of cornea
 - More comfortable than small diameter lenses
 - Large optic zone
 - More forgiving if lens does decenter
 - Concerns about mid-peripheral bubbles with the steeper base curves
 - Initial lens selection: median or average K



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Corneal GP Specialty Lenses -For Keratoconus

ACT ASYMMETRIC CORNEAL TECHNOLOGY

By nature, the keratoconic cornea is asymmetric, where the inferior quadrant is frequently significantly steeper than the superior portion, causing the GP lens to tilt off at 6 o'clock (see Illustration E). FROSE K2 lenses incorporating ACT are designed to accommodate this asymmetry (spread edge 16 at 9 and 12 o'clock but 18 at 6 o'clock). The inferior quadrant of the lens is steeper than the superior quadrant, providing a more accurate fit at 6 o'clock making the lens more comfortable and stable (see Illustration F) and often preventing superior decent. ACT is independent of the primary base curve and Edge Lift value and is available for FROSE K2, FROSE K2 KC, FROSE K2 ProGraft lens designs.

ACT K2 ProGraft lens design

ACT K2 ProGraft lens design allows for the correction of the inferior quadrant only.

ACT GRADE #1 (0.7 mm)
Slight edge spread off with spreading 6 o'clock between 6 and 7 o'clock. Identify ACT grade #1.

ACT GRADE #2 (0.5 mm)
Moderate edge spread off with spreading 6 o'clock between 6 and 7 o'clock. The tear meniscus may appear to break up midline. Identify ACT grade #2.

ACT GRADE #3 (0.3 mm)
Significant edge spread off at all four quadrants (spread 6 o'clock at around 6 o'clock. Identify ACT grade #3.

Note: other grades of ACT are available (0.4 mm to 1.5 mm), please call us for further information on +4922 (06) 940270.

Corneal GP Specialty Lenses -For Keratoconus

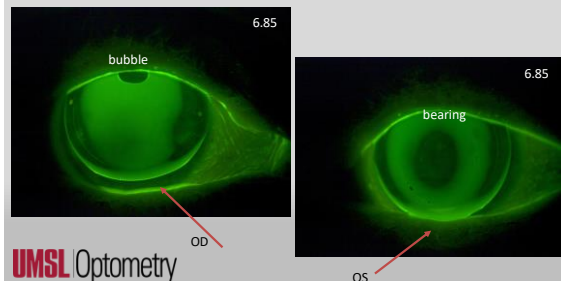
- KCN OU, 81 yo Female -Currently wears GP lenses OU with bifocal glasses.

81 year old female complains of difficulty seeing well (lost as contact lens) in OS Cl. lost for spring of 2019. Context is reported as currently wears gas perm lenses with bifocals over them. Relief is experienced from wearing old contact lens to replace lost lens os. Patient described the following signs and symptoms: blurred vision, squinting. Additional Notes: Tried scleral lenses (but did not like size) Hydrogen peroxide cleaner

Visual Acuties				Method			
SC Dist	OU	RH	SC Near	OU	RH		
OD			OD				
OS			OS				
SC Dist	OU	RH	SC Near	OU	RH		
OD	20/60-2		OD	20/45+			
OS	20/70-1		OS	20/25-2			

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Corneal GP Specialty Lenses -For Keratoconus Intralimbal OU, OD current, OS old lens

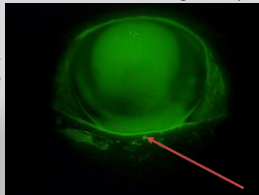


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Corneal GP Specialty Lenses -For Keratoconus

- Fitting OD:
 - OD good fit; base curve is a 6.85 and diameter is 11.2
 - Rose K2 IC – same diameter; likely to have a similar fit with the same base curve
 - Fit: 6.89 bc/11.2 diameter/-8.00 diagnostic power

Edge Lift inferiorly
Slightly steep
overall fit



Order with
ACT 2; inferior
quadrant

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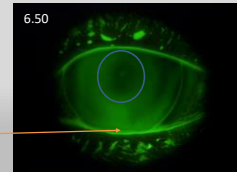
Corneal GP Specialty Lenses -For Keratoconus

- Fitting OS:
 - OS too flat (6.85 bc); Rose K2 IC – same diameter
 - Fit: 6.5 bc/11.2 diameter/-11.00 diagnostic power
 - apical touch and inferior edge lift



~2.5D steeper

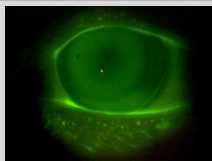
- order $\frac{3}{4}$ D steeper
with 1 step
ACT inferior quadrant



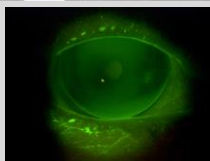
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Corneal GP Specialty Lenses -For Keratoconus

ses Diagnostic And Prescribed										Fit Type (Per Billing)									
Name	Type	BC1	BC2	BC3	BC4	Sphere	Cyl	Axis	Add	Add Desc	Seg	Seg	Color	DNA	MVA				
Rose K2 IC	Specialty Lens	6.90				11.2	+4.25	0	0.00	0	0	0	0	0	0	0	0	0	0
Rose K2 IC	Specialty Lens	6.41				11.2	+0.25	0	0.00	0	0	0	0	0	0	0	0	0	0



OD: standard
edge lift; 2.00
ACT

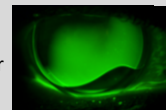


OS: standard
edge lift; 1.00
ACT

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Peripheral Curves changes

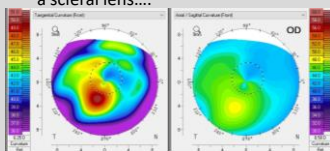
- How did I determine the amount of change to make to the peripheral curves?
 - This is the most difficult part of fitting specialty lenses
 - Minimal edge lift: 1 step steeper
 - Moderate edge lift: 2 steps steeper
 - Excessive edge lift: 3 steps steeper
 - Quadrant specific edge lift – modify the specific quadrant.



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You don't always need a specialty lens

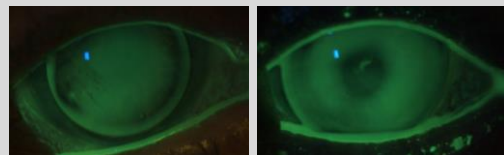
- Patient called me because he was told he could only be fit into a scleral lens....



Keratometry Values
OD: 44.00/45.3
OS: 48.2/51.8

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You don't always need a specialty lens



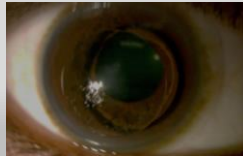
ses Diagnostic And Prescribed										Fit Type (Per Billing)									
Name	Type	BC1	BC2	BC3	BC4	Sphere	Cyl	Axis	Add	Add Desc	Seg	Seg	Color	DNA	MVA				
Rose K2 IC	Specialty Lens	6.90				11.2	+4.25	0	0.00	0	0	0	0	0	0	0	0	0	0
Rose K2 IC	Specialty Lens	6.41				11.2	+0.25	0	0.00	0	0	0	0	0	0	0	0	0	0

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Scleral lenses are NOT always the answer

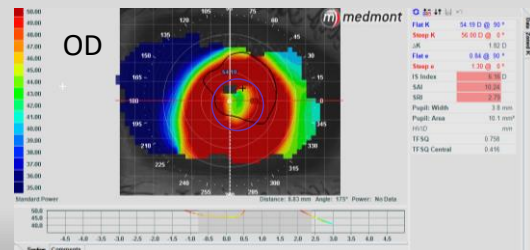
- Patient presents wearing old lens OD
 - Did not like scleral lenses, went back to old lens OD; no lens OS.
 - KCN OD/PKP OS
- Currently wears a piggy-back lens system OD
- -19.00 Accucon; **5.65 bc**; 1 step flat PC; **8.0 diameter**.
- Acuvue Vita soft lens for piggy back 20/20

- **5.65 mm = 59.73D lens**



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Scleral lenses are NOT always the answer



Central area of flattening from current lens

Steep K value: **56.00D = 6.03 mm**

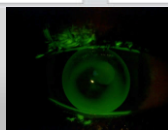
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Scleral lenses are NOT always the answer

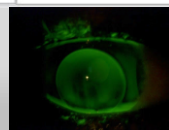
Tried: 5.7 (59.21D), 5.6 and 5.5 (61.63D) – all had central apical bearing

Manufacturer	Name	Type	BC1	BC2	BC3	OSA	Sphere	Cyl	Axis	ADD	ADD Desc	Seg	Seg Color	DNA	Notes
Truliner	Truliner	Specialty lens	5.45	5.7	5.85	0	0.00	0	0	0	0				
Over Refraction	OD	2.50													
Over Refraction	OS														

Continue with
Piggyback
system



5.6 bc
(60.27D)



5.4 bc
(62.5D)

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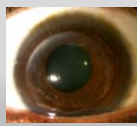
Quick comments on piggybacking

- High Dk lens material
 - Think Silicon Hydrogel
 - Monthly or Daily Disposable
- One Care System
 - Clear Care
- Don't plan on soft lens helping much with vision
 - Soft lens only provides ~20% of its power
 - Use a low minus or low plus power (+/- 0.50)

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Scleral lenses are NOT always the answer

OS fitting:
Rose K2 IC
Initial Lens Selection:
Base curve: ~45D to
46 D
Diameter: 11.2mm



Post Front

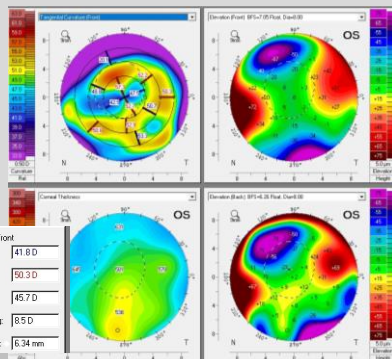
K1: 41.8 D

K2: 50.3 D

Km: 45.7 D

Autg: 8.5 D

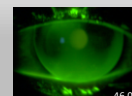
Rmin: 6.34 mm



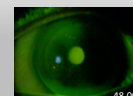
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Scleral lenses are NOT always the answer

- Rose K2 IC 46.00D bc/11.2 diameter
 - Horizontal bow-tie pattern of touch, excessive inferior edge lift (edge resting on inferior lid margin)
- Rose K2 IC 48.00D bc/11.2 diameter
 - Bow-tie pattern light touch paracentrally, apical clearance without bubble; small inferior bubbles, touch along inferior lid margin, sufficient movement with blink – patient reports good comfort.



46.00



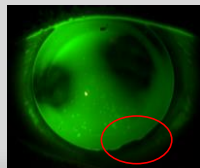
48.00

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Scleral lenses are NOT always the answer

– Initial Order OS:

- Rose K2 IC 48.00D (7.03) bc/ 11.2 diameter / -9.50
1 ACT 20/20



Immediately after insertion



~20 minutes after insertion

Final Lens Order: 48.00D (7.03) bc/ 11.2 diameter / -9.50 **3 ACT**
Clear Care solution, build up wear time

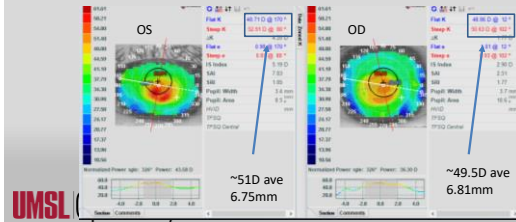
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Scleral lenses are NOT always the answer

- Previous GP lens wearer followed by Scleral lens wear, would like to return to GP lenses

– Chief complaint: 56 year old male complains of blurry vision. Has not been wearing scleral lenses since patient received them, was not able to handle I&R. Has been wearing old corneal GP lens instead. Needs new lenses to pass driving requirement. No issues with comfort.

- Presenting Vas: 20/60+ 20/70+



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Scleral lenses are NOT always the answer

ses Diagnostic And Prescribed									
Name	Type	BC1	BC2	BC3	OSA	Sphere	Cyl	Axis	Add
Rose K2	Specialty Lens	6.68	9.0	7.62	0.00	0	0.00	0	0.00
Rose K2	Specialty Lens	6.70	9.3	6.62	0.00	0	0.00	0	0.00

Adaptation and movement:

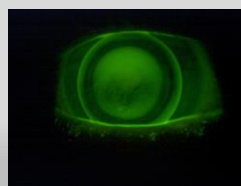
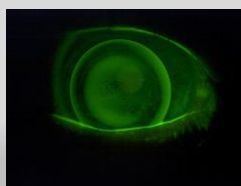
Slight apical clearance over cone, light

red peripheral touch 360

Adaptation and movement:

Slight apical clearance over cone, light

red peripheral touch 360



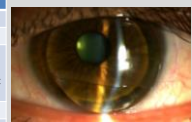
UMSL Optometry 6.68mm=50.50D

6.7mm=50.25D

Gas Permeable lens Design

- 51 yo male; KCN diagnosis 1987 OU; PKP OS 1989
- Prescribed a scleral CL OU, but developed edema OS – referred for a corneal GP fit OS

	OD	OS
BCVA (CLs)	20/25	20/40
Conj	WNL	WNL
Cornea	Subtle apical thinning	s/p PKP, clear graft, no NaFl staining, no opacities, no MCE
Lens	Clear	Clear
Post Seg	unremarkable	unremarkable



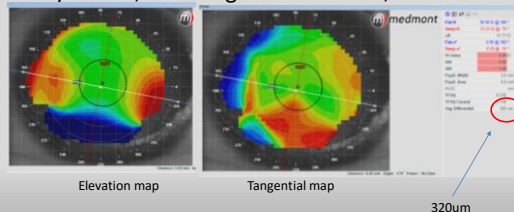
Presenting cGP OS (Synergies II 7.6/9.6-8.00DS) with piggyback CL; significant inferior edge lift

OS Specular microscopy: ~1008 – frank polymegathism

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Gas Permeable lens Design

- 51 yo male; KCN diagnosis 1987 OU; PKP OS



Elevation map

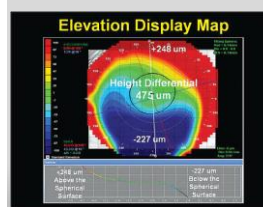
Tangential map

320um

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Gas Permeable lens Design

- <https://www.clspectrum.com/issues/2015/april-2015/contact-lens-case-reports>



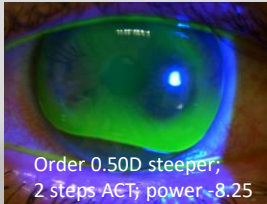
If a patient has less than 350 um differential between the highest and lowest points along the greatest meridian of change – there is a 88.2% chance of the patient being successful with a corneal GP lens.

350 um elevation difference is the guideline when determining between a corneal GP and a scleral lens in HEALTHY cornea.

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Gas Permeable lens Design

- The theme of this case: Don't be afraid to be aggressive in your lens modifications
 - Trial Lens: 7.67 (44D) / 11.2 / -3.00 OR: -5.00 20/40



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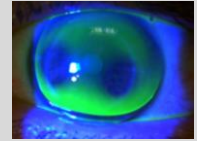
Gas Permeable lens Design

- Dispense: 20/40
 - OR: +0.50 -1.25 x 125 20/20-

Modifications:

- OS: steepen BC 0.75 D, **decrease OAD 0.3 mm**, adding SE OR.

- Parameters 7.45 BC, -9.25 DS, 10.9 OAD



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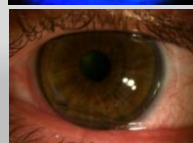
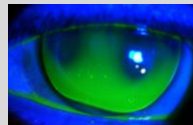
Gas Permeable lens Design

- Dispense: 20/20; 2 steps ACT, standard edge lift

- dumbbell NaFL pattern, 3 & 9 mid-periph bearing, slightly improved
- flat markers rotating from 3 & 9 030 degrees R & L
- moderate inf edge lift, slightly improved
- Added piggyback** to improve comfort and fit

Modifications:

- Increase ACT,
- reduce OAD 10.6 mm**,
- steepen BC to 7.29 mm (1D steeper),
- 10.25 DS Power



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Gas Permeable lens Design

- Finalized:
- Rose K2 IC lens
- 7.29 / 10.6 / -10.25
- 20/20

- 4 steps ACT, standard edge lift
 - Piggyback with Night and Day -0.50 / 8.4



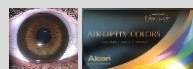
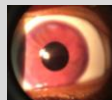
During the fitting process: 44.0D to 46.30D; decreased 0.6mm in diameter

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Prosthetic Lens Fitting

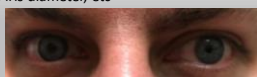
Cosmetic SCL

- Used to cosmetically enhance the iris color
- Available in HEMA or SiHy materials (Alcon)
- Rarely a viable option as a prosthetic



Prosthetic SCL

- Used to mask a disfigurement or improve an ocular visual symptom
- Can be translucent or opaque
- Can have a clear pupil or a black/occluded pupil
- Can vary the pupil diameter, iris diameter, etc
- HEMA materials, only



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Iris and Pupil occlusion

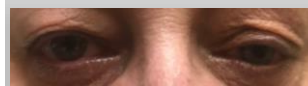
Iris occlusion

- Have an annular, ring-shaped dye or color.


Pupil Occlusion

- Usually have a black-tinted region occluding central vision
- Or they can be tinted a special color to act as a filter

- Combination of the two

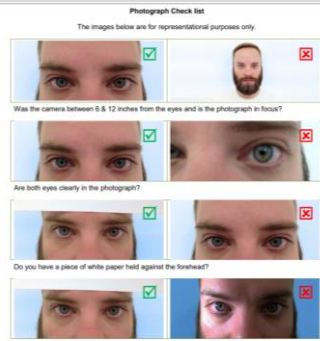


Iris and pupil occlusion

- Black pupil; Black underprint; Brown Iris color
 - Matched pupil size in normal illumination
 - Other options:
hand-painted lens
with displaced printing
to improve eye alignment
- 



Color matching



“Nonprosthetic” Uses

- Changing the size of the black pupil and the pattern of the iris print on colored lenses allows customization of visual penalization and leaves the peripheral fusion intact during amblyopia treatment.
 - The larger the opaque pupil the greater the visual penalization



Nonprosthetic uses of prosthetic cl

Prim Date	Comment	Location	Quality	Severity	Duration	Timing	Context	Signs	Aggravating	Relieving
03/04/18	Left sensitivity	OU		severe		all day		Headache		
03/04/18	○ Flap by iris sensitivity									
04/05/18	○ Flap, it did not fix the difference I OU									
05/02/18	○ Flap, it no longer worked and it OU									
04/10/18	Left sensitivity	OU	improving	Significant	1 year		Indoor lighting	sensitivity to LED		contact lens

36 year old female complains of left sensitivity in OU. Onset date is 10/10/17. The timing is described as all day. Severity is described as severe. Interest described the following signs and symptoms: Headache. Ever since after October - started after surgery in September. Relieved by avoidance of irritation from trigger Cornea; only headache when she has been on steroids. Probable history in the left eye vision is reduced right or flares out or flares out. Worsens when driving at night, bright light, bad weather. She will sometimes shut her left eye when she is talking to other people and wears a hat and sunglasses most of the time.

Size Parameters

Size / Pupil Diameter

- ±2% - Edge to Edge
- ±1.5 mm with clear 4.0 pupil
- ±1.5 mm with clear 6.0 pupil
- ±2.0 mm
- ±1.5 mm
- ±0.5 mm
- ±7.0 mm
- ±6.0 mm
- ±4.0 mm

Tint Parameters

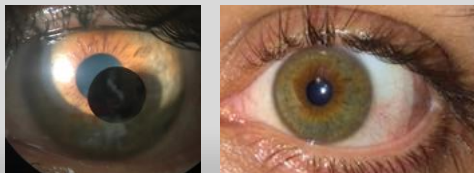
- Luminoid
- Maligne 55
- Blue Blocker
- Cobalt
- Teal
- Red

Helping Your Life with our Contacts

Lavender

Prosthetic lens fitting

- Confirm that lens will cover pupil

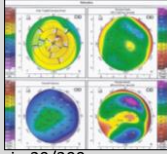


Prosthetic lens fitting

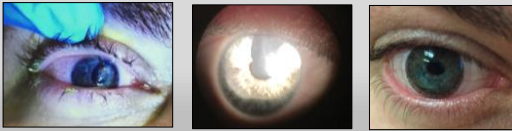
- Pupil only lens did not alleviate diplopia



Piggyback Prosthetic



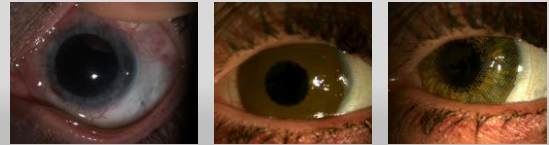
- Ruptured globe, hyphema – successful globe repair 20/200
- 20/25 with spherical GP lens
- Added piggyback; Alcon Air Optix Color to address comfort and light sensitivity complaints



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Piggyback prosthetic

- Female patient presents s/p PKP from a penetrating fungal ulcer
 - PKP, aphakia, and no iris
 - Esotropia had developed do the aphakia



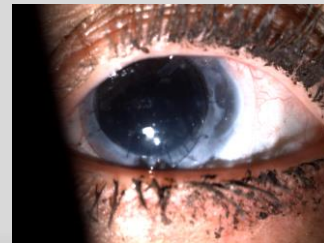
Piggyback prosthetic



Female patient presents s/p PKP from a penetrating fungal ulcer



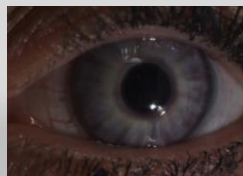
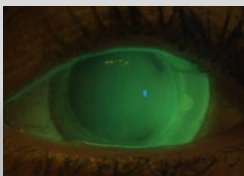
Piggyback prosthetic



Video

Piggyback prosthetic

- Resulting Va 20/40-
- Dyna Intralimbal 8.44/11.2 +17.87 power
- Nissel Prosthetic pl/8.80/14.5 N26; 12.0 Iris Diameter and 4.5 mm clear Pupil



Specialty Lens Fitting microcornea

- Microcornea is a rare corneal condition characterized by a horizontal visible iris diameter (HVID) of less than 10 mm.



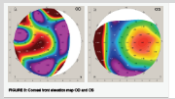
- Special considerations when fitting.

- Use topography to guide initial lens selection. Use a soft lens if vision is acceptable with refraction
- Small diameter GP lens or mini-scleral are also viable options.



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Specialty Lens Fitting Microcornea

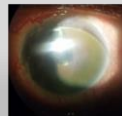
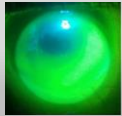


OD	OS
Conj. 3+ bulbar injection, Baerveldt valve implant sup-temp 72 mm from limbus	3+ bulbar injection, Baerveldt valve implant sup-temp
AC Tube present	ACIO, tube
Iris Irregular 2' 2x, HVID 8.5 mm	Inferior located pupil 2' 5x
Lens PCIOs	
Cornea Anterior stromal opacity and pannus superior, neovascularization, 2+ guttas, Microcornea	s/p DSAEK, microcornea

CC (spectacles) OD -7.75-1.25 x 175
OS +2.00-3.25 x 045

20/300 PHNI
20/40+2

Lens fitting OS only
Rose K2 post-surgical GP
BC 8.91, OAD 10.0 mm,
Power +0.25 DS



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Specialty Lens Fitting Megalocornea

- 22 yo M – presents to clinic for a CL fitting.
 - Has attempted to wear previously, but would see “edges of a circular object in vision” and CL had tendency to “pop off”
 - Was told; no CL would “work well” with his eye
 - Ocular Hx: **monitored at birth for some ocular condition**, but later told he was “ok”

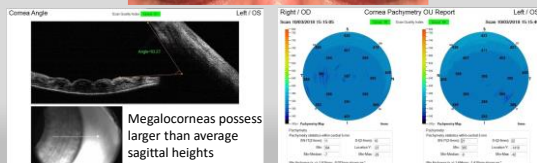
Exam findings: HVID 14.5mm OD/OS

OD: 43.00@006/45.00@096 -5.00-3.00x011 20/25 PHNI
OS: 45.75@177/45.25@087 -4.75-3.25x165 20/25 PHNI

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Specialty Lens Fitting Megalocornea

Simple megalocornea presents without additional ocular and systemic abnormalities.



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Specialty Lens Fitting Megalocornea



8.40/8.50 mm BC, 16.0 mm OAD Art Optical
Intelliwave toric CL. Made in Definitive SiHy
material

- OD lens: -4.75-2.75x011 20/25
- OS lens: -4.50-3.00x165 20/25 20/20 OU



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K-Pro

- Alcon Night and Day 8.4; -7.50 20/100



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Wrap Up

- Specialty fitting changes lives
- Every patient is different and has unique needs
- When one lens does not work out like you think – don't give up, try a different lens.
- Have Fun.

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