GRAND ROUNDS-MEDICAL USE OF CONTACT LENSES

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NO FINANCIAL DISCLOSURES

IN COMPLIANCE WITH HIPAA, PLEASE REFRAIN FROM TAKING PICTURES OF PATIENTS USED IN THIS PRESENTATION AND USING THEM ON ANY SOCIAL MEDIA PLATFORM

THEY ARE USED SOLELY BY DR. CHANDRASEKARAN FOR THE PURPOSES OF WRITING CASE REPORTS AND FOR PRESENTATIONS ONLY

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Types of cases to be discussed

- Soft
  - Aphakia
  - Therapeutic/Prosthetic
- Rigid corneal lens aka RGP
  - Bitoric
  - Multifocal (MF)
- Hybrid
- Scleral

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Case #1 (Aphakic Soft)

- 57 YOCM referred to the CL clinic by the Retina specialist for aphakic CL fitting OS in 2016 after RD repair ~2000s & S/P PPV/SS IOL removal in 2016; S/P RD surgery X 2 OD in 2006 with SSIOL OD
- Pt f/u by the Glaucoma dept for Pigmentary glaucoma OU (h/o laser peripheral iridectomy and trabeculectomy OD in 1999 and h/o trabeculectomy OS in 2014; no e/d) and by the Retina dept for h/o RD OU
- Pt had never worn CLs before
- Entering VA in 2016 with current spec Rx, OD: 20/20; OS: 5/200 E
  - OD: -1.00+0.75 X 085; -0.25-0.75 X 175 (converting to –cyl)
  - OS: -0.75+0.75 X 060; PL-0.75 X 150 (converting to -cyl)
  - Add: +2.25
- MR
  - OD: -1.00+1.00 X 075 (20/20); PL-1.00 X 165 (converting to –cyl)
  - OS: +5.25+0.50 X 135 (20/50+2); +5.75-0.50 X 045 (converting to –cyl); +5.50 (sph equivalent); +6.00 (after vertexing)
  - Add: +2.50 (20/20 binoc)
- Tomography was performed to assess the corneal curvature; HVID: 12.3 mm OS

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Oculus Pentacam Corneal Tomography

- **Axial/Sagittal Map**
  - 2D image showing dioptric power (D/mm) of cornea centrally, paracentrally, and peripherally up to 9 mm
  - Warm colors-steeper; cool colors-flatter
  - Central data is more accurate than peripheral
  - Ideal for selecting BC of corneal GP/soft CLs
- **Tangential Map**
  - Measures power/curvature of individual points accurately
  - Ideal for orthokeratology/changes in K due to distortions or warpage caused by CL wear
- **Corneal thickness/Relative Pachymetry**
  - Thickness measurement up to 9 mm
  - Warm colors-thin; cool colors-thick
  - Ideal for monitoring scleral CL wearers (for the presence of K edema)
- **Elevation Map**
  - The difference between the examined anterior or posterior corneal surface and a standard reference shape 8 mm best-fit sphere (BFS) or best-fit toric ellipsoid (BFTE)
  - Warm colors-areas above; cool colors-areas below
  - A difference in corneal elevation between the highest peak and lowest point of elevation >~325µm will lead to limited success with corneal GP fit stability, these patients do well with scleral lenses as they vault the cornea

https://www.pentacam.com/fileadmin/user_upload/pentacam.de/downloads/interpretations-leitfaden/interpretation_guideline_3rd_edition_0915.pdf

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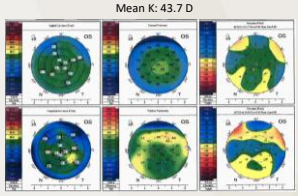
Case #1 (Aphakic Soft) contd

Pentacam 2016
Regular corneal curvature
Mean K: 43.7 D



- Based on tomography, given the regular anterior corneal curvature and no prior CL wearing history, a soft CL fitting was performed for easier adaptation
- CL fitting
  - 1st trial: Proclear 8.6/14.2/+6.00 (lens was not comfortable; excessive movement and superior decentration)
  - 2nd trial: AV Oasys 8.4/14.0/+6.00 (this lens was a lot more comfortable per pt; GCAM; 20/50-2)
  - 1-week f/u: pt happy with CL.
  - Spec Rx over CL OS (Polycarbonate lenses)
    - OD: -1.00+1.00 X 075
    - OS: Plano
    - Add: +2.50
- RTC 1 yr for f/u

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Case #1 (Aphakic Soft) contd

- After 1 yr, pt was still happy with AV Oasys 8.4/14.0/+6.00 with stable VA; F/u by Glaucoma dept and Retina dept for eye exams
- Found slight astigmatism in the left eye on MR, tried AV Oasys for Astigmatism CL OS but pt did not like the feel of the CL OS, advised to continue with current spherical CL OS for 1 more year as VA was still OK per pt
- In 2018, the patient returned to the CL clinic and was interested in trying dailies CLs due to allergies
  - VA with spec Rx (over CL OS), OD: 20/20; OS: 20/80
  - MR
    - OD: -0.50+0.50 X 090 (20/20); PL-0.50 X 180 (converting to –cyl)
    - OS: +5.50+1.00 X 180 (20/40); +6.50-1.00 X 090 (converting to –cyl); +6.00 (sph equivalent); +6.50 (after vertexing)
    - Add: +2.50 (20/20 binoc)
  - Soft dailies CL fitting performed
    - DACP 8.7/14.0/+6.50 (pt very uncomfortable with the CL); ordered trials of 1 Day AV Oasys
    - 1 Day AV Oasys 8.5/14.3/+6.50 (20/40); GCAM; pt happy

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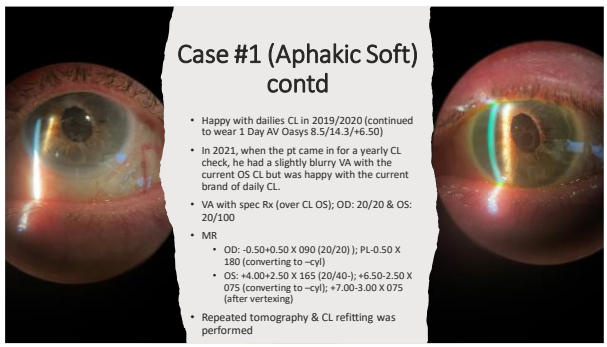

Case #1 (Aphakic Soft) contd

- Happy with dailies CL in 2019/2020 (continued to wear 1 Day AV Oasys 8.5/14.3/+6.50)
- In 2021, when the pt came in for a yearly CL check, he had a slightly blurry VA with the current OS CL but was happy with the current brand of daily CL.
- VA with spec Rx (over CL OS); OD: 20/20 & OS: 20/100
- MR
  - OD: -0.50+0.50 X 090 (20/20)); PL-0.50 X 180 (converting to –cyl)
  - OS: +4.00+2.50 X 165 (20/40-); +6.50-2.50 X 075 (converting to –cyl); +7.00-3.00 X 075 (after vertexing)
- Repeated tomography & CL refitting was performed

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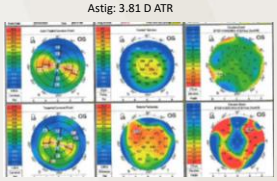
Case #1 (Aphakic Soft) contd

Pentacam in 2021
Mean K: 43.85 D
Astig: 3.81 D ATR



- Based on tomography, given the ATR astigmatism, soft toric CL fitting or RGP CL fitting was suggested to pt; pt wanted to continue wearing soft spherical CL only
- Was not interested in trying soft toric CLs either due to prior failure to adapt
- OK wearing spec Rx over CL due to prior adaptation
- CL refitting
  - 1st trial: 1 Day AV Oasys 8.5/14.3/+4.00 (SCOR: +1.00+2.50 X 165, 20/40+2)
  - 2nd trial: 1 Day AV Oasys 8.5/14.3/+5.00 (SCOR: PL+2.50 X 165, 20/40+2)
  - Spec Rx over CL OS (Polycarbonate lenses)
    - OD: -0.50+0.50 X 090
    - OS: Plano+2.50 X 165
    - Add: +2.50
- RTC 1 yr for f/u

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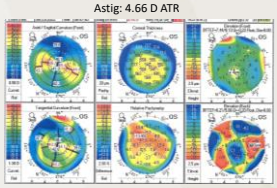
Case #1 (Aphakic Soft) contd

Pentacam in 2022
Mean K: 44.07 D
Astig: 4.66 D ATR



- Happy with current CL OS (1 Day AV Oasys 8.5/14.3/+5.00) and spec Rx over CL
- Entering VA, OD: 20/20; OS: 20/40-2
- MR
  - OD: -0.75+0.75 X 077 (20/15-2)
  - OS: +4.50+3.25 X 165 (20/40+)
  - Add: +2.50
- Released spec Rx over CL with Rx above OD and cyl Rx above OS with add in both eyes
- RTC 1 yr for f/u

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Cosmetic/Therapeutic/Prosthetic tinted contact lenses

(Jacobs SD et al. CLEAR-Medical use of contact lenses. Contact lens and anterior eye. 2021;44:289-329)

- Cosmetic tinted lenses (most common)
  - Designed to change eye color
  - Considered a fashion accessory
- Therapeutic tinted lenses
  - Used to treat ocular disease or defect
  - Reduce glare/photophobia/enhance color vision/occlusion therapy for amblyopia
- Prosthetic tinted lenses
  - Used to improve cosmesis of cosmetically abnormal eyes (i.e. congenital abnormalities/disfiguring disease/penetrating trauma)

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Cosmetic tinted CL

- Different contact lens manufacturers have various color options for patients to change their eye color for cosmetic purposes
- Replacement schedule (different options from daily to conventional) is crucial and is dependent upon the patient's expectations
- Proper instructions need to be provided regarding the care of the CL
- Rah MJ et al. A meta-analysis of studies on cosmetic tinted soft contact lenses. Clin Ophthalmol. 2013;7:2037-2042
- Spiteri N et al. Pigmentation of the cornea secondary to tinted soft contact lens wear. Case Rep Ophthalmol Med. 2012;852304

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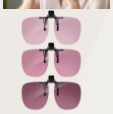
Case #2 (Therapeutic tinted CL)

- 44 YOCF was referred to CL clinic as she was interested in wearing contact lenses to help with photophobia, if possible; she recently consulted a low vision specialist to see if glasses would help with photophobia; she was prescribed wrap-around filters for indoors and outdoors
  - 10% transmission gray for outdoor use and 10% transmission FL-41 for indoor use
- Ocular history was significant for extreme photophobia since childhood with unknown etiology
- Medical history was significant for juvenile rheumatoid arthritis (JRA)
- Current medications: hydroxychloroquine (HCQ) 200 mg every day for JRA (which she has been taking for 15 years), Vit D3 50K units once a week, and multivitamin tablet daily with iron and folic acid
- Patient never got any relief from glare/light sensitivity for almost 15 years even after seeing multiple providers in Retina and Neuro-ophthalmology



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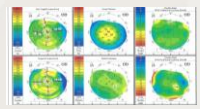
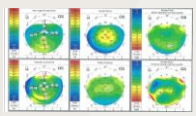
Case #2 (Therapeutic tinted CL) contd

- Entering VA (w/o Rx; reverse background)
  - OD & OS: 20/20; Near VA: 1.25M binoc
- Manifest refraction
  - OD: +0.75 DS (20/20 clearer)
  - OS: +0.50 DS (20/20 clearer)
  - Add: +1.00 DS (0.40M binoc)
- Corneal tomography
  - OD & OS: No apparent irregularities
  - HVID: 11.6 mm OD & OS
  - Mean K, OD: 41.02 D & OS: 41.23 D
- Macula OCT OD & OS: No disruption in the parafoveal ellipsoid zone; (-) flying saucer sign
- HVF 10-2 testing OD & OS: Full without paracentral scotoma or ring defects





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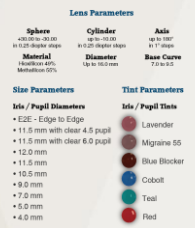
Case #2 (Therapeutic tinted CL) contd

- Contact lens fitting was performed based on corneal tomography and patient symptoms
  - OD: Migraine 55% E2E (edge-to-edge) 8.6/14.3/+0.75
  - OS: Migraine 55% E2E (edge-to-edge) 8.6/14.3 /+0.50
- Commercially available therapeutic tinted lenses for photophobia/eye strain relief (lavender tint/migraine 55% tint/blue blocker tint)
- The patient preferred Migraine 55% tint with noticeable improvement in photophobia (indoors & outdoors)

https://orionvision.net/tinted-lenses



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Case #2 (Therapeutic tinted CL) contd

- Four specific types of symptoms of photophobia experienced by individuals with specific conditions are abnormal sensitivity to light, ocular discomfort, exacerbation of headache by light, and general aversion to light (Burstein R, Noseda R, Fulton AB. Neurobiology of Photophobia. J Neuro-Ophthalmol. 2019;39:94-102)
- Keratopathy and retinopathy secondary to ocular toxicity of hydroxychloroquine could cause glare symptoms (Yam JCS, Kwok AKH. Ocular toxicity of hydroxychloroquine. Hong Kong Med J. 2006;12:294-304)
- Patients with cone dystrophies are likely to suffer from photophobia that can be alleviated by using red or brown tinted contact lenses (Park WL, Sunness JS. Red contact lenses for alleviation of photophobia in patients with cone disorders. Am J Ophthalmol. 2004;137:774-5)
- Other companies that manufacture prosthetic contact lenses for photophobia with different color options that can be fitted depending on the severity of patient symptoms are Concise Colors by ABB, Alden prosthetic by B & L, ComforTints by Specialty Tint, Cantor prosthetic by Cantor & Nissel, etc.
- Three patients with photosensitivity due to different conditions (migraine, & post-concussion) benefited from using ALTIUS (amber and grey-green) performance-tinted contact lenses (Citek K. Use of Performance-Tinted Contact Lenses in Patients with Photosensitivity. Performance Vision Technologies, Inc. White Paper, March 2023)

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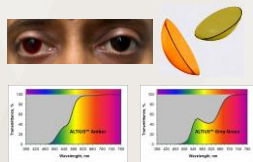
PERFORMANCE-TINTED CL

- Primarily used for sports
- Daily disposable; Ocufilcon D (55% water; Dk: 19.6); BC: 8.7 mm; OAD: 14.2 mm; Power: -0.50 to -6.00 D in 0.25 D steps
- Amber (50% visible light transmission) & Grey-green (38% visible light transmission)
- Off-label use for patients suffering from light sensitivity, migraines, post-TBI, and post-concussion



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Case #3 (Prosthetic tinted CL)

- 59 YO IM was referred to CL clinic for prosthetic CL fitting of the right eye after open globe repair in 2016 after a fist injury to the eye; Aphakic
- He had never worn CLs before
- He wanted a CL so that he could still have peripheral awareness, and improve cosmesis by masking his corneal scarring
- Entering VA (w/o Rx)
  - OD: Hand motion close to face w/PH NI further
  - OS: 20/30 w/PH 20/20
- HVID: OD & OS: 11.3 mm
- MR
  - OD: NI further with lenses (HMCF)
  - OS: -1.00+1.50 X 130 (20/20)
  - Add: +2.25 (20/20 OS)
- He continues to wear his right prosthetic CL and was last seen in our clinic in Spring 2024 with continued good VA in his left eye
- He is aware of monocular precautions

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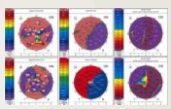
Case #3 (Prosthetic tinted CL) contd

External photo of the right eye showing inferiorly displaced pupil and extensive corneal scarring with inferior and inf nasal neovascularization after open globe repair



Pentacam 2016 of the right eye (not a reliable scan due to severe photophobia as complained by the pt)

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Case #3 (Prosthetic tinted CL) contd

- Prosthetic CL fitting was performed with diagnostic BioColors fitting set in-office
- BioColors CL (piggy-backing lens system)
  - 1st trial lens of choice has BC: 8.6 mm and OAD: 14.5 mm
  - Material: Polymacon 38% (Dk: 9) or Methafilcon 55% (Dk: 18) or Definitive 74% SiHy (only 1 color available; Dk: 60)
  - Insert the underprint lens 1st to match the other eye's iris color (to mask corneal opacities/scars)/insert the "iris pattern" lens to match the other eye's iris pattern/insert the "starburst" lens/insert the "limbal ring" lens
  - Range of lens base curves/lens powers/OAD/clear or black pupil
    - BC: 7.7 mm to 9.5 mm
    - Powers: +/- 20 D; toric powers available up to -10.00 D in all axes
    - OAD: 13.5 mm to 22 mm
    - Clear pupil: 2.8 mm to 6 mm
    - Black pupil: 3.0 mm to 6.3 mm

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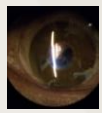
Case #3 (Prosthetic tinted CL) contd


External photo of the right eye without (left) & with the BioColors U2 8.6/PL/15.0/5 mm clear pupil CL (right)



Slit-lamp view of the BioColors U2 8.6/PL/15.0/5 mm clear pupil CL in the right eye using an optic section

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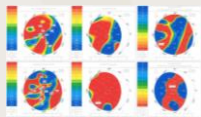
Case #3 (Prosthetic tinted CL) contd



Pentacam 2021 of the right eye showing irregular corneal surface secondary to scarring

External photo was taken in 2021 with the BioColors U2 8.6/PL/15.0/5 mm clear pupil CL OD & protective prescription glasses

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Case #4 (RGP bitoric)

- 36 YO CM was referred to the CL clinic for CL fitting by the low vision specialist
- Had bilateral degenerative progressive high myopia with astigmatism; current custom soft toric CL wearer (C-Vue Advanced 8.6/14.5/-19.50-1.50 X 160 OD & OS; Hioxifilcon D, 54% water content, Dk/t: 23; monthly or quarterly replacement; Group 2 FDA classification)
- Referred to try GP CL to see if the CL can improve his VA to be eligible to drive
  - To drive in Tennessee (for an unrestricted license), BCVA in one eye: 20/40 or better
- VA with current soft toric CLs, OD: 20/100-2 (NI further with PH) & OS: 20/70- (w/PH: 20/60-)
- MR
  - OD: -32.00+6.00 X 105 (20/150+2); -26.00-6.00 X 015 (converting to –cyl); -20.00-3.00 X 015 (after vertexing; soft toric CL Rx)
  - OS: -29.50+2.50 X 070 (20/70+); -27.00-2.50 X 160 (converting to –cyl); -20.50-1.50 X 160 (after vertexing soft toric CL Rx)
- GP CLs ordered (empirical fitting)
  - OD: Optimum Comfort 42.25/44.25/9.3/-20.00/-25.75 Green with dot (20/100)
  - OS: Optimum Comfort 42.87/44.37/9.3/-20.25/-22.75 Blue (20/40)
  - Both lenses not as comfortable per pt; VA comes and goes OD & OS
  - Steepened BC by 0.25 D and increased OAD to 9.5 mm of both lenses to make lenses more comfortable and improve centration

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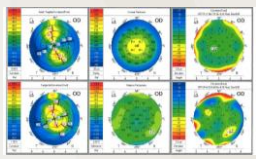
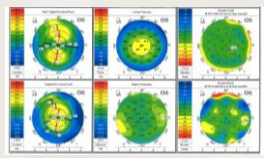
Case #4 (RGP bitoric) contd

Incomplete/central ~2 D WTR astigmatism with Mean K: 43.69 D (7.73 mm)



Incomplete/central ~3 D WTR astigmatism with Mean K: 43.85 D (7.69 mm)



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Bitoric RGP CL design

- Bennett et al; Silbert J; Bruce A [Bennett, Edward, and Vinita Henry. Clinical Manual of Contact Lenses. 3rd ed. Philadelphia: Lippincott, Williams & Wilkins, 2009. 336-344. Print; Silbert, Joel. "Optometric Management." Optometric Management (2007); Anderson, Bruce. "GP Lens Institute." GP Lens Institute (2012)]
  - Two front and two back surface curves; utilized when K cyl =>2.50 D
  - Uses "saddle principle" to maintain stability (full alignment to the two principal meridians eliminating K cyl)
  - 2 fit types (Spherical power effect {SPE} and Cylinder power effect {CPE})
- Mandell-Moore bitoric fitting guide (https://gpli.info/mandell-moore-bitoric-calculator)
  - Flatten flat K by 0.25 D and flatten steep K by 0.50 D or 0.75 D depending on the corneal cylinder (bitoric lens fit factor)
  - Make power adjustments to the lenses accordingly, after vertexing spec Rx
- ART Optical bitoric fitting guide
  - Initial lens selection given the pt's K cyl, Flat K -> On K; Steep K -> 1 D flatter
  - No power adjustments made after vertexing spec Rx
  - Best fitting success per consultant

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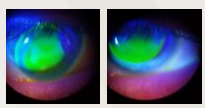
Case #4 (RGP bitoric) contd

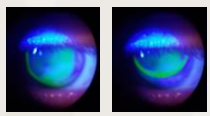


Slit lamp photo of the fluorescein pattern of the OD CL before and after a blink

Optimum Comfort 42.50/44.50/9.5/-20.25/-26.00 Green with dot (20/100)

Slit lamp photo of the fluorescein pattern of the OS CL before and after a blink

Optimum Comfort 43.12/44.62/9.5/-20.50/-23.00 Blue (20/50-)



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Case #4 (RGP bitoric) contd

- Pt decided to continue wearing his current custom soft toric CL due to comfort even though vision was slightly better with GP CLs
- It is possible that since the astigmatism was not limbus-to-limbus, using a bitoric lens design in this pt was not successful (a bitoric lens design works better in a limbus-to-limbus symmetric pattern of astigmatism; Bennett et al, 2009)
- VA with soft toric CL still fluctuated, OD: 20/100 & OS: 20/80
- Referred to LVR for acquiring a bioptic license, to be able to drive
- The patient did not qualify for the VF requirement (total horizontal visual field diameter of 150 degrees) for bioptic driving in Tennessee, which is one of the requirements to use a bioptic telescope to drive
- Pt decided to stay with custom soft toric CLs and use MHHT as need be

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Case #5 (RGP Multifocal)

- 67 YO IM interested in trying MF CLs; established monovision GP CL wearer (unknown parameters; fit by an outside provider)
- VA with current monovision GP CLs, 20/25+ binoc & 0.63M binoc
- OD dominant (eye dominance testing: triangle or hole-in-the-card method/sensory or plus lens blur method; Ferreira LD et al. Ocular dominance and visual function testing. Biomed Res Int 2013; 238943)
- HVID: OD & OS: 12 mm
- MR
  - OD: -8.75+0.50 X 180 (20/20-2)
  - OS: -9.50+1.00 X 085 (20/30+2; NI further with lenses or PH)
  - Add: +2.50 (20/20 binoc)

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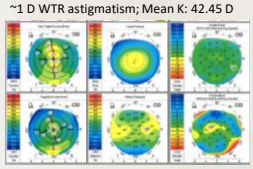
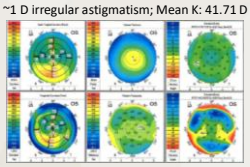
Case #5 (RGP Multifocal) contd

Pentacam in 2019

~1 D WTR astigmatism; Mean K: 42.45 D



~1 D irregular astigmatism; Mean K: 41.71 D



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Case #5 (RGP Multifocal) contd

- MF RGP CLs ordered (empirical fitting)
  - OD: Optimum Comfort Renovation MF 42.12/9.5/-7.50/+3.00 add Green with dot
  - OS: Optimum Comfort Renovation MF 41.25/9.5/-7.75/+3.00 add Blue
  - At dispense appt, VA with both lenses in, 20/20+2 binoc & 0.50M binoc; pt very happy with his computer vision through the CLs
  - Fit assessment:
    - Uniform NaFl clearance with adeq movt and good centration OD & OS
  - At f/u appt in 3 weeks, VA is still stable at a distance and near
  - Pt continues to wear the same design CL for 4 years now w/o difficulty
  - In 2021, he was diagnosed with having GPC in both eyes when he came in for his yearly CL exam

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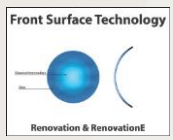
Case #5 (RGP Multifocal) contd

- Renovation MF design (manufactured by ART Optical)
  - Spherical BC, fit on K or slightly steeper than flat K depending on K cyl
  - Specifically for mature presbyopes (especially >+2.25 D add)
  - Flexible front-surface eccentricity control platform (correction for aberration)
  - Flexible center distance/intermediate zone control (accommodate small pupils for better near VA; 3.95 mm standard)
  - Flexible automated thickness control (enhances centration and wearing comfort at higher adds)



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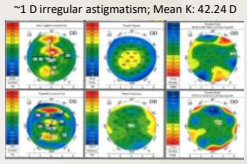
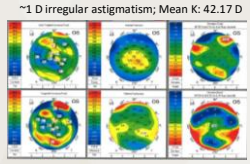
Case #5 (RGP Multifocal) contd

Pentacam in 2021

~1 D irregular astigmatism; Mean K: 42.24 D



~1 D irregular astigmatism; Mean K: 42.17 D



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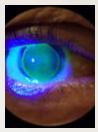
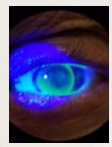
Case #5 (RGP Multifocal) contd



Slit lamp photo of the fluorescein pattern of the OD CL
Optimum Comfort Renovation MF 42.12/9.5/-7.50/+3.00 add Green with dot



Slit lamp photo of the fluorescein pattern of the OS CL
Optimum Comfort Renovation MF 41.25/9.5/-7.75/+3.00 add Blue

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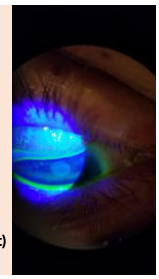
Slit lamp photo of the GPC under the upper lid OD (left)

Slit lamp photo of the GPC under the upper lid OS (right)



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Case #5 (RGP Multifocal) contd

- Decreased comfort with CL wear OU (OD>OS) in 2021
- GPC OU (OD>OS); D/C CL wear and wear spec Rx
- Rxed lotemax (loteprednol etabonate 0.5%) qid for 2 weeks and then bid for 2 weeks
- At 1-month f/u, pt was doing better; decreased lotemax to qd for 2 weeks and then stop
- Monitored IOP at every visit; GPC resolved OD & OS; pt comfortable with CL wear
- 2 yrs later, pt still happy with current CLs; slightly decreased VA OU due to advancing cataracts

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Case #6 (Hybrid)

- 29 YO AAM diagnosed with keratoconus (KCN) OU (OD>>OS) when he was 19 YO
- H/o penetrating keratoplasty OD for advanced KCN in early 2014
- Basketball injury OD causing prolapsed ocular tissue with NLP VA (aphakic) since late 2014
- Monocular precautions discussed with pt
- MR
  - OD: Blind eye sec injury (NLP)
  - OS: ~-19.00 DS (20/400 blurry; w/PH clearer but NI further)
- Tomography performed in late 2014 by the Corneal specialist and referred to CL clinic in early 2015
- Pt hasworn RGP CLs before but unhappy with the comfort
- Hybrid CL fitting performed in 2015
  - OS: SynergEyes ClearKone Vault 600/STP skirt/-17.00/14.5 (20/40-2)

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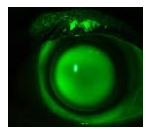
Case #6 (Hybrid) contd

- ClearKone (SynergEyes)
  - Hybrid CL with RG landing system
  - Paflufocon D center (Dk: 100) & hemiberfilcon A soft skirt (27%)
  - Vault evaluation (3 min after insertion)- based on apical clearance to clear the cone
  - Skirt evaluation (3 min after insertion)- NaFl thinning in the Inner Landing Zone (ILZ) and bearing in the Outer Landing Zone (OLZ)
  - 1st lens to choose from the diagnostic fitting set: SynergEyes ClearKone Vault 250/MED skirt/14.5



ClearKone®
Reverse curve lens design for decentered ectasia.

Vault Values	50-700 in 50µ steps
Skirt Curves	Flat, Medium, Steep, Steep2
Lens Powers	+10.00D to -20.00D
Materials	Hema skirt; 100 Dk GP center
Wear & Replacement	Daily Wear Replace at 6 months.

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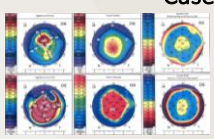
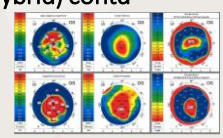
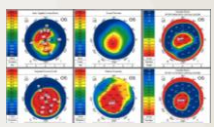
Case #6 (Hybrid) contd



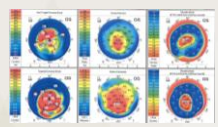
Pentacam 2014
3.4 D irregular astigmatism
262 um



Pentacam 2017
5.57 D irregular astigmatism
257 um



Pentacam 2018
3.94 D irregular astigmatism
282 um



Pentacam 2022
5.83 D irregular astigmatism
258 um

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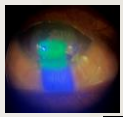
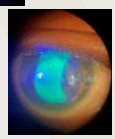
Case #6 (Hybrid) contd



Slit lamp photo of the fluorescein pattern of the OS hybrid CL when the patient is looking up



Slit lamp photo of the fluorescein pattern of the OS hybrid CL in straight-ahead gaze

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ABCD: A new classification of KCN (Belin et al, 2020)

- Parameter "A": Anterior Radius of Curvature in the 3.0 mm zone
- Parameter "B": Posterior Radius of Curvature in the 3.0 mm zone
- Parameter "C": Thinnest pachymetry in microns
- Parameter "D": Distance BCVA
- Progression of KCN requires a consistent change in at least 2 of the following:
  - Thinning of the cornea
  - Steepening of the anterior K curvature
  - Steepening of the posterior K curvature
  - Increase in the rate at which pachymetry is changing from the periphery to the thinnest point

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Case #6 (Hybrid) contd

- Based on the ABCD classification system
  - 2014: A4B2-3C4D2
  - 2022: A4B4C4D2
- Pt was last seen in Aug 2022; travels 2 hrs to come to the appt
- Happy with the current hybrid CL
- Had talked about switching to scleral lenses to help with cost and durability, he declined
- Monitored 1 to 2 years by the corneal specialist

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Case #7 (Scleral)

- 76 YO CF was referred to the CL clinic by an Oculoplastics specialist in 2019 for scleral CL fitting in the left eye after left brow/lid Merkel cell carcinoma excision and extensive radiation causing DED
- Pt had worn hard CLs many years back
- Entering VA with current glasses, OD: 20/40; OS: 20/100 (NI further with PH OD & OS)
  - OD: -2.00 +1.00 X 045
  - OS: -3.00 +0.25 X 130
  - Add: +2.50
- Pt interested in trying scleral CL OS to get the best visual potential and for better comfort due to DED
- MR
  - OD: -1.50+1.25 X 045 (20/30-)
  - OS: ~-2.50 DS (20/70- NI further with lenses/PH)
  - Add: +2.50 (20/30 binoc)

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Case #7 (Scleral) contd

- Merkel cell carcinoma (MCC)
  - Rare and aggressive neuroendocrine malignancy of the skin
  - Typically, asymptomatic solitary nodules with pink/red/violaceous coloring
  - Eyelids are common primary sites with incidence between 5% & 20 % of all head and neck MCC
  - Sentinal lymph node biopsy-appropriate method for detecting regional lymph node disease
  - Treatment
    - Surgical excision
    - Radiotherapy
    - Chemotherapy
    - Alternative therapy (somatostatin analogues, tyrosine kinase inhibitors, etc.)

External photo of the pt with MCC on the left upper lid/brow area

External photo of the pt five years post-MCC removal

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4074820/

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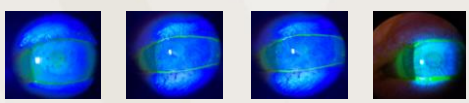
Case #7 (Scleral) contd



Slit lamp photo of the corneal surface of the left eye after applying fluorescein; note the whirl pattern of staining, thickened eyelid margins with sparse lashes especially in the UL

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Case #7 (Scleral) contd

- Scleral CL diagnostic fitting OS
  - HVID: 10 mm
  - 1st lens of choice as recommended by the manufacturer: SynergEyes VS 3600/36-42/PL/8.4/16.0 (diagnostic scleral CL in clinic; vault/SLZ flat meridian-SLZ steep meridian/power/base curve/OAD); where the hash (flat meridian) is, is mentioned in the order in case FST needs to be ordered for the pt
  - Uniform NaFl clearance with no conjunctival blanching/impingement with good comfort reported by pt
  - SOR, OS: +2.50 DS (20/40+)
  - ORDER
    - Menicon Z SynergEyes VS 3600/36-42/+2.50/8.4/16.0 hash @ 135
  - Insertion and removal training was performed when dispensing CL
  - Scleral CL material changed to Optimum Extreme with tangible hydrapeg (THP) in 2021 due to poor wetting on the CL surface
  - Pt comfortably wearing scleral CL with few changes in CL power due to cataract changes and is f/u every 3-6 months
  - Had cataract surgery OS in July 2022 and was refit in scleral CL post-cataract surgery; developed posterior capsular opacification and hence VA staying at 20/40-20/50 range

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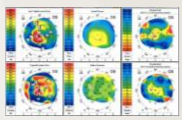
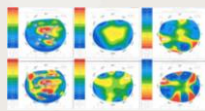
Case #7 (Scleral) contd



Pentacam 2019

1.5 D irregular astigmatism

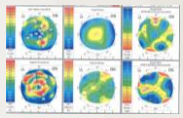
543 um



Pentacam 2021

~1.0 D irregular astigmatism

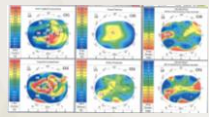
531 um



Pentacam 2022 (before cataract surgery)

1.4 D irregular astigmatism

531um



Pentacam 2023 (after cataract surgery)

~3.0 D irregular astigmatism

546 um

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Case #7 (Scleral) contd

- SynergEyes VS
  - Distinctive bi-tangential periphery
  - Available in Menicon Z or Optimum Extreme with THP
  - Assess lens fit 15-20 mins after insertion with NaFl in the bowl of the scleral lens
  - Adjust CL parameters based on sagittal depth, limbal clearance & scleral landing zone
  - Ideal fit
    - Apical corneal clearance of ~200 microns after settling
    - Limbal clearance of ~100 microns after settling
    - SLZ has edge alignment without conjunctival blanching/impingement

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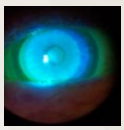
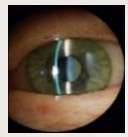
Case #7 (Scleral) contd



Slit lamp photo of the fluorescein pattern of the OS scleral CL showing uniform NaFl clearance centrally and in the limbal area

Slit lamp photo showing the thickness of the tear layer with fluorescein being almost to or a little less than the thickness of the CL



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Medical use of Scleral lenses (CLEAR)

(Jacobs SD et al. CLEAR-Medical use of contact lenses. Contact lens and anterior eye. 2021;44:289-329)

- Fluid reservoir filled with PF saline neutralizes majority of K aberrations/provides lubrication/protection from exposure and/or mechanical irritation from lids/lashes (Jacobs DS, 2008)
- Patients with SJS/DES fitted with scleral lenses had significant improvement in visual symptoms (decreased pain/photophobia) with better QoL (Romero-Rangel et al, 2000)
- Scleral lens wear improved vision and reduced corneal staining in patients with OSD (Schornack et al, 2019)
- Patients with distorted cornea, when fit with fluid-filled scleral lenses, after long-term wear, had significantly reduced basal tear production & increased corneal sensation (Wang et al, 2015)

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THANK YOU, ABO FOR THE OPPORTUNITY

ANY QUESTIONS?

Email: deepa.chandrasekaran@vumc.org

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