



1

## Learning Objectives

- Recognize the need for specialty contact lens eval to optimize vision, prior to LV exam
- Understand contact lens options and prescribe and/or refer to co-manage
- Understand how CL enhances low vision devices



2

## Conditions

- Corneal irregularity
  - Transplant – KCN, Fuch's, HSV
  - Irregular astigmatism / cornea – RK, PRK, LASIK
  - Trauma – perforation, scar
  - Ocular surface – GVHD, SJS
- High refractive error / astigmatism / aphakia
  - High myopia – CL reduces lens thickness/weight, increases peripheral vision
  - High hyperopia – CL reduces lens thickness, bowl-effect/aberration, cosmesis
  - High astigmatism



3

## Conditions

- Glare control
  - IRD – ocular albinism, achromatopsia
  - Mydriasis – trauma, congenital, coloboma
- Diplopia or monocular
  - CVA
  - Trauma



4

## CL Options

- Custom soft contact lens
- Gas Permeable Lenses
- Hybrid Lenses
- Scleral Lenses



5

## Benefits of CL

- Reduce lens thickness
  - Allows LV telescope (exit pupil) to get closer to eye to maximize field of view
  - Reduces aberration/distortion
- Increase peripheral vision
  - Especially high myopes
  - Enhances field expanders and reverse telescopes



6

## Benefits of CL

- Provide best corrected vision
  - Eliminates aniseikonia from spectacles
  - Optimal optical image to retina
  - Masks corneal irregularities
- Reduces glare to achieve best correction
- Ultimate goals:
  - improve accuracy of calculations for magnification
  - prescribe appropriate LV devices to maximize functional vision



7

## Study Design

- Retrospective chart review (n=31)
- Inclusion criteria:
  - LV patients of any age
  - BCVA better eye was 20/60 or worse and who
  - Wore contact lenses regularly
- Exclusion criteria
  - CL patients corrected to BCVA 20/50 or better

8

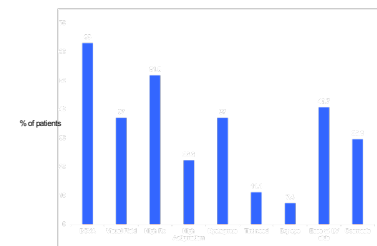
## Results:

Patient population (n=31)

- Ages 7 to 94 (average 49.1)
- BCVA with CLs: 0.48 to 1.4 logMAR (20/60 to 20/500)
- High refractive error, 17 pts: -27.50 to +22.50 (average absolute value 15.1)
- High astigmatism, 7 pts: 3.00 to 10.75 (average 5.79)
- BCVA improved with CLs, 19 pts: 0.07 to 0.5 logMAR (average 0.19 logMar improvement)
- Contact Lens type:
  - Soft CLs (14 patients, 45.1%)
  - RGP CLs (12, 39.7%)
  - Scleral lenses (5, 16.1%)

9

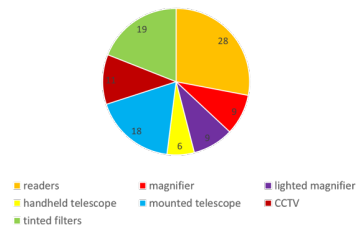
## Benefits of Contact Lenses



10

## LV Devices Used With CL

% of patients using devices



11

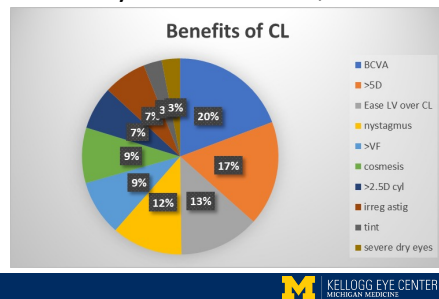
## Primary Diagnosis List

Myopic degeneration 4	Uveitis 1
Keratoconus 1	Corneal dystrophy 2
Achromatopsia 2	Glaucoma 4
Albinism 3	Cone rod dystrophy 1
Retinopathy of Prematurity 2	Stargardt's disease 3
Retinitis Pigmentosa 1	Blue monochromacy 1
Optic neuropathy 1	Corneal transplant 1
Dry Eye (SJS) 1	Macular dystrophy 1
Aniridia 1	Nanophthalmos 1

Many patients had several diagnoses along with high refractive errors

12

### Study: Benefits of CL, n=31



13

### Contraindications to CL

- Lack of dexterity – i.e. neck, fingers, arms, lids
- Unable to maintain hygiene – environmental, i.e. bed bugs
- Patient decline – hassle, cost
- Active inflammation or infection

14

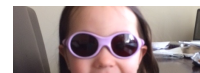
### Insurance Coverage

- Medicare
  - CL – aphakia (new: KCN?)
  - LV devices – none
- Medicaid – *know your state benefits*
  - CL – state dependent – coverage in MI
  - LV – state dependent – coverage in MI: non-electronic, bioptic (case by case)

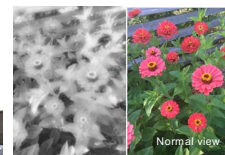
15

### Achromatopsia

- Non- progressive
- Inherited Retinal Disease
- Rods, no cones



7 year-old girl  
- Wears red sunglasses indoors  
- Darker sunglasses with a hat outdoors  
*CL benefit: reduced photophobia*



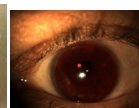
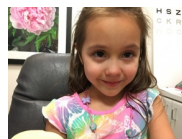
Refraction:  
OD +2.00 sph 20/250  
OS +2.00 sph 20/200  
Near acuity 3M  
- 2.8x handheld TS (20/80)  
- 4x/65 mm dome magnifier (0.8M)

*Used in effectively*

16

### Photophobia/glare symptoms improved with tinted lenses

Mother emailed: "I cannot tell you how amazing the contact lenses have been for her and changed the way the other children and adults interact with her."



Contact lens Rx:  
Kontur 7.80/+2.00/13.5,  
8mm magenta center  
(color options: light red, dark red, magenta)

17

### High and Irregular Astigmatism

18 year-old female  
Dx: endothelial corneal dystrophy, nystagmus, irregular astigmatism  
- DSEK age 7  
- Cataract surgery age 12

Refraction:  
OD -3.00+7.00x100 20/80  
OS -0.25+6.00x95 20/100



Zenlens MF  
OD 7.6/16.0/-3.75/+2.00 add  
OS 7.6/16.0/+2.50/+2.50 add  
Sag 4500, APS flat 2 OU  
BCVA w/ scleral lenses:  
OD 20/60  
OS 20/80 Near 0.8M

*Reduced peripheral distortion with CL*

18

## Aphakia, Glaucoma, PKP

82 y.o. female with 29-yr history  
RGP OS

Dx: aphakia, uveitis, secondary  
glaucoma, aphakic bullous  
keratopathy requiring PKP OU

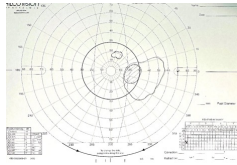
Refraction:

OD NLP

OS +17.50 (20/500), +5.00 add  
(8M)

Boston EO 6.7/+19.50/9.6

CL benefit: VF improvement over  
aphakia SRx; wears GP by feel



19

## Aphakia, Glaucoma, PKP

LV devices:

- Desktop CCTV with 32" monitor
- 12x/+44 lighted handheld mag 0.8M

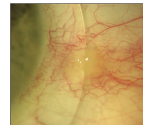
*She can access her  
island of visual field  
better with GP and use  
CCTV more effectively*



20

## Corneal Irregularity

- Ocular History 61 yo WM
  - Degenerative Myopia with RK (1993/1994), pseudophakia (2014)
  - Severe POAG (OS>OD), trabeculectomy and bleb (2014)
  - Choroidal folds
  - R hypertropia
  - Dry eyes
- Contact Lens with 5 BD prism OD
  - DynaIntralimbal Reverse Geom OD 20/40, 20/150
  - Scleral lens with microvault over bleb, OD 20/20-3, 20/250
  - BCVA OD 20/50, OS no lens CF @ 2 ft



21

## Corneal Irregularity

LV Goals

- a. Glare – Eschenbach gray and yellow Solarshields
- b. Computer – Max Detail, accessibility functions, enhanced contrast, large print keyboard
- c. Reading
  - I. +5.00 add (0.8M at 20cm)
  - II. +20 D illuminated hand-held magnifier (0.6+ M)
- d. TV – Max TV 20/30
- e. Street signs – 4x focusable monocular TS (OD 20/25)
- f. Phone – accessibility functions, voice over, contrast
- g. Cooking – adaptive markings, high contrast cutting board

22

## High Refractive Error

- Ocular history 55 yo female
  - myopic degeneration
  - glaucoma
- Best corrected Visual Acuity, glasses
  - OD -23.00+2.00x 160 20/250
  - OS -21.50+1.50x 070 20/200
- Contrast Sensitivity 0.60 (w CL)
- Visual Field Goldmann V4e 130 OD, 90 OS, 145 OU

23

## High Refractive Error

1. Best corrected Visual Acuity, RGP contact lenses, full-time wear
  - a. OD Boston EO 7.40 BC/-18.25/9.8 diameter 20/125
  - b. OS Boston EO 7.40 BC/-17.50/9.8 diameter 20/100
  - c. Near 3.2M
2. Low vision devices used with glasses and/or contacts
  - a. 3x focusable Galilean telescope OS glasses (uses w CL) 20/40 w TS
  - b. +6.00 prism readers (uses w CL) 0.6M
  - c. Solarshields Haven yellow (uses w CL)
  - d. +20 pockette pocket magnifier (uses w glasses and w CL)

24

## Etiology of LSCD?

12 yo referred to UM Feb 2022 for poor vision and facial rash, Iqarus Health 1/21/2022

Diagnoses: Bilateral eye vision due to infectious etiology.

Medications/Procedures: Clindamycin

Orbit and Brain MRI findings:  
No acute intracranial abnormality found.  
Hypogenesis / dysgenesis of the corpus callosum

Cultures findings: Negative for Bacteria  
HIV 1 and 2: Negative  
Syphilis: Negative

Brief Medical Summary:

11 year old female with history of vision loss hospitalized, on 9/19/2021-9/24/2021, for evaluation and treatment after referral was made by Pediatrics provider in our clinic for vision loss and facial rash onset 10 days prior; concerns for further evaluation, imaging and cultures workup were in place. It was determined vision loss due to infectious agent etiology, treated with antibiotics.

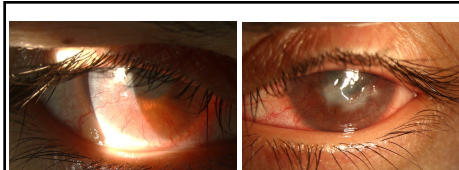
Immediate Medical Needs Upon Resettlement (including special housing, transport, special equipment, required specialist oversight, testing, treatment requirements): Optometrist for glasses and Primary Care Physician for close monitoring.

25

Hx:

- (-) Congenital, anterior seg anomalies, nystagmus
  - (-) SIS or BMT or symblepharon formation
  - (-) Atopic conj or GPC
  - (-) Bitot spots (vitamin A def?)
  - (-) pregnancy
  - (?) toxicity reaction to clindamycin drops x 1 mo v nutritional?
  - (+++) photosensitivity OU
- VA sc: (cornea)
- OD LP, OS CF 1'
  - BScan: optic drusen OU otherwise normal

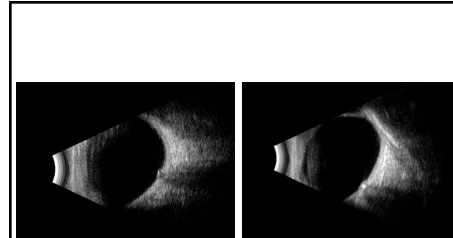
26



Plan

- May benefit from CL fitting
- PF QID, consider vitamin A drops
- PFATs
- Lab orders for gonorrhea, chlamydia

27



28

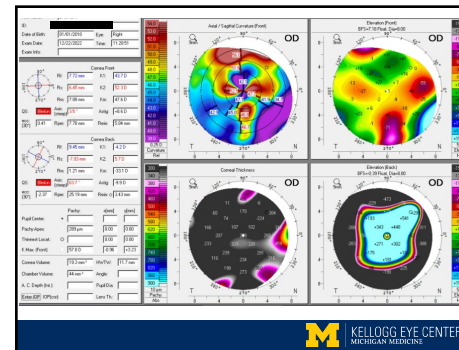
2 months later in cornea (July 2022)

- no improvement, taper & d/c PF
- Plan (May 2023): OS Amniotic membrane transplant + Superficial keratectomy + central tarsorrhaphy under general anesthesia

Referral to CL Clinic (Dec 2022):

- VA: OD CF @ 3 ft, LP w movement
- Zen  
OD 20/200  
OS 20/800
- Medicaid & CSHS: denies coverage
- Refer to SW for Guest Asst Program

29



30

POM1 OS (June 2023)  
 • Tar opened

RTC CL clinic to proceed with Zen lenses (Aug 2023)  
 • OD 7.3/17.0/-1.50-0.75x075/5.300/std (20/200)  
 • OS 7.3/17.0/-2.00-1.00x090/5.300/std (20/500)  
 (Nov 2023)  
 • OD 7.3/17.0/-0.50-0.75x075/5.400/std (20/300)  
 • OS 7.3/17.0/+1.00-1.00x090/5.500/std (20/600)

Plan: LV Services



31

## LV Exam Dec 2023

Functional vision goals:

1. Pt was referred to this provider for vision. Was told to come here.
2. Detroit Public Schools, International Academy for Young Women

ADLs:

Driving: No  
 Living Situation: With parents  
 Kitchen safety/meal prep/eating: Parents cook, Independent with eating  
 Self-care/grooming/dressing: Independent  
 Computer: Yes at school and at home with difficulty  
 Telephone: No telephone  
 Television: No issues, sits very close  
 Occupation and hobbies: In middle school

Contrast/Lighting:

Pelli-Robson contrast Sensitivity: 0.60  
 LUX IQ (task lighting diagnostic):  
 1000 lux  
 5000 K



32

### Visual Acuity (Snellen - Linear)

	Right	Left	Both
Dist cc	20/400	20/1000	
Dist ph cc	NI	NI	
Near cc			4.0M

Correction: Contacts

Final Contact Lens Rx	Brand	Base Curve	Diameter	Sphere	Cylinder	Axis	Addl. Specs
Right	210	7.3	17.0	-4.50	-0.75	075	5.400 std
Left	210	7.3	17.0	+1.00	-1.00	090	5.500 std

### Near Device Testing

+ 10 add  
 + 16 D illum HH mag  
 7x Mobilent

1.5 M

0.8 M

### Distance Device Testing

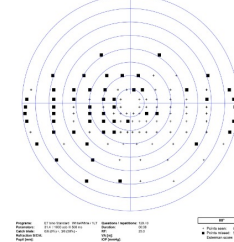
Max TV 20  
 4 x telescope OD 20/70



33

Ref: 12/06/2023 11:28:16

Visual



Visual field test results showing various parameters and a legend for fixation point, blind spot, and visual field.

OCTOPUS



34

### Plan:

LV:

- Discussed all findings and options with patient and dad (interpreter assisted via phone call during entire exam)
- Discussed contrast, illumination (LUX IQ bulb selection)
- MDCH prior auth for devices:
  - +10 prism readers
  - CCTV (portable), such as Explorer 12 or Connect 12
  - 6x focusable bioptic telescope OD to see the board, faces across the room
  - Max TV for television and facial recognition
  - Max Detail or Eschenbach clips for computer/intermediate
- Refer to Low Vision Occupational Therapist for: activities of daily living, device training, technology accessibility, adaptive markings, contrast/lighting
- Refer to social worker for GAP services
- Refer to Youth Low Vision Services of BSBP for orientation and mobility training with white cane, TCVI in Detroit Public Schools, accommodations, IEP, vision enhancing devices, ADL
- Return to low vision clinic when vision changes and new functional visual needs arise
- Continue ophthalmologic care with Dr. Mian



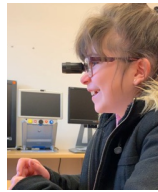
35

- MDCH prior auth for devices:
  - +10 prism readers
  - CCTV (portable), such as Explorer 12 or Connect 12
  - 6x focusable bioptic telescope OD to see the board, faces across the room
  - Max TV for television and facial recognition
  - Max Detail or Eschenbach clips for computer/intermediate



36

### Bioptic Telescope



37

### Orcam v. eSight

- eSight
  - primarily for patients with a large central scotoma, and BCVA of 20/60-20/800
  - projects a camera around a central scotoma, into areas of functioning retina
- Orcam
  - Profound vision loss
  - Point and read
  - Facial recognition, object detection



38

### What Next?



39

### Teacher Consultant for the Visually Impaired

- Services provided by school district
- Instruction in reading and writing of Braille codes, if appropriate
- Instruction of skills outlined in the Expanded Core Curriculum
- Consultation with educational staff and families regarding accommodations and assistive technology
- Training and support regarding use of assistive technology
- Evaluation for eligibility in collaboration with local district staff
- Liaison to Bureau of Services for Blind Persons

40

### Individualized Education Program

IEP is a legally required document for any child who has special education needs, meets every 6 months, includes:

- Primary teacher
- TCVI
- Braille teacher
- O&M instructor
- Parents/Guardians
- The most recent eye report is reviewed at this meeting

41

### Other Resources

- Guide Dogs (Leader Dog, Rochester, MI)
  - At least 16 y.o.
  - Legally blind
  - Orientation and mobility with white cane, proficiency
- Guide Horse Foundation (NC)
  - guidehorse.com
- Family Connect – American Federation for the Blind
- Support groups



42

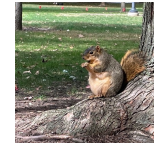
### Take Home

- Arrive at BCVA beyond glasses to enhance use and effectiveness of LV devices
- Early LVR referral is crucial to children staying competitive in school, building a career, and staying independent
- LVR is a parallel, ongoing treatment modality, not an end-stage referral
- LVR addresses the life of the patient – of all ages



43

Thank you!  
Questions?



44