

LOW VISION IN PRIMARY CARE: PROVIDING PATIENTS WITH A NEW VIEW ON LIFE

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DISCLOSURES

The Presenter and Organizers for

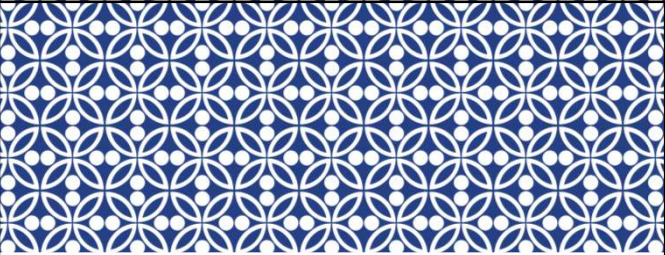
"Low Vision in Primary Care: Providing patients with a new view on life"

By Dr. Kiana Saqr has no financial relationship with any company or products mentioned in this presentation.

COURSE OBJECTIVES

By the end of this course, participants will be able to:

1. Define Low Vision and Legal Blindness.
2. Provide guided assistance techniques.
3. Determine appropriate distance and near magnification for patients.
4. Calculate the power of an unknown magnifier.
5. Provide low vision patients assistance with non-optical resources.



INTRODUCTION

What is low vision and legal blindness?

WHAT IS LOW VISION?

Level Of Impairment	American Optometric Association	International Council of Ophthalmology
Normal Vision	20/25 or better	20/25 or better
Mild Visual Impairment	20/30 to 20/60	20/32 to 20/63
Moderate Low Vision	20/70 to 20/160	20/80 to 20/160
Severe Low Vision	20/200 or worse	20/200 to 20/400
Profound Low Vision	20/500 to 20/1000	20/500 to 20/1000
Near Total Low Vision / Near Blindness	20/1000 or worse	20/1250 to 20/2000
Total Blindness	No Light Perception	No Light Perception

WHAT IS LEGAL BLINDNESS?

- Social Security: § 404.1581. **Meaning of blindness as defined in the law**
 - Central visual acuity of 20/200 or less in the better eye with the use of correcting lenses
 - Limited field of vision so that the widest diameter subtends no greater than 20 degrees is considered to have a central visual acuity of 20/200 or less.

COMMON CONDITIONS CAUSING LOW VISION

- Age Related Macular Degeneration
- Glaucoma
- Diabetic Retinopathy
- Retinitis Pigmentosa
- Albinism
- Other Retinopathies / Maculopathies
- Trauma

Prevalence in the USA

- Age Related Macular Degeneration:
 - 1.47%, 1.75 million citizens in 2011
 - Estimated to increase by 50% to 2.95 million in 2020
- Glaucoma
 - 2.1% or 2.9 million Americans
- Vision threatening diabetic retinopathy
 - 4.4% of diabetics in 2008
 - Higher risk in those > 65 years old

THE LOW VISION EXAMINATION

GREETING THE PATIENT

- Does the patient use any physical or visual support aids?
- Did they come alone or bring a support system?
- Offer assisted guidance as indicated



GUIDED ASSISTANCE

- Ask before offering any assistance
- Give precise instructions and descriptions of your surroundings
- Guiding techniques
 - Hand to Arm
 - Single File Line
 - Doorways
 - Seating

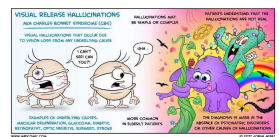
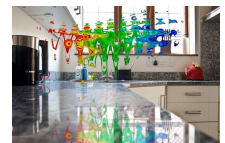


CASE HISTORY

- Extended and Functional case history
 - Changes to vision?
 - Review current devices
 - Review household lighting
 - Mobility issues in familiar and Non-familiar locations
 - Glare and/or light sensitivity
 - Charles Bonnet Syndrome
 - Review of ocular and systemic health conditions
 - Does the patient have a progressive ocular condition?
 - Does the patient have any systemic conditions that limit mobility or require self-administration of medications?

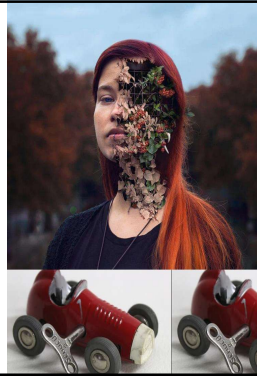
CHARLES BONNET SYNDROME

- What is it?
 - Visual hallucinations in those with sight loss from any cause without a psychiatric component or cognitive impairment.
- What do patient's see?
 - Simple geometric shapes / patterns
 - Complex visualizations of people, objects or landscapes
- Why does it happen?
 - Deafferentation of the visual cortex and cortical hyperexcitability.
- How common is it?
 - From 0.4 to 30% of patients with sight loss.
 - Underreported!



CASE 1: CHARLES BONNET SYNDROME

- 89 year old White Male
- Legally Blind secondary to non-exudative ARMD and Advanced POAG OD, exudative ARMD and End Stage POAG OS
- Patient reports:
 - Seeing plants growing on his wife and daughters head, always on the left side
 - When he is a passenger in the car he will see the left side of the road disappear into a ditch, also looks like cars disappear into the ditch
 - When laying in bed he will see flower vine wind up his bed frame and will see flowers, flashing lights and wind up toys that will walk across the bar of his bed frame.



EXAMINATION ADAPTATIONS — ACUITY

- Distance:
 - Bailey-Lovey, EDTRS, Feinbloom
- Near:
 - EDTRS, Lighthouse near acuity cards, Berkeley Rudimentary Vision Test



EXAMINATION ADAPTATIONS — REFRACTION

- Retinoscopy
- Trial Frame & Janelli Clip Refraction
- Eccentric Viewing
- Just Noticeable Difference
- Spherical Equivalent

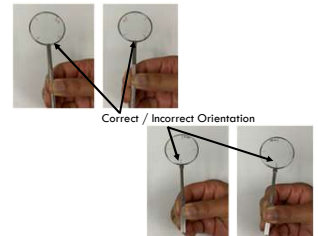
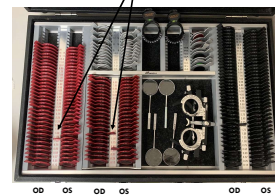


$JND = \frac{\text{Snellen Denominator}}{100}$

Example:
Acuity: 5/140 (Feinbloom)
Acuity: 20/560 (Snellen)
 $JND = 560/100 = 5.6D$

EXAMINATION ADAPTATIONS — REFRACTION TIPS

- Turn the handle of the appreciated lens in the opposite direction
- Have your JCC flippers aligned with dot at the handle



EXAMINATION ADAPTATIONS - ADDITIONAL TESTING

- Contrast Sensitivity
- Visual Fields
 - Functional Visual Fields
 - Kinetic Visual Fields



DEVICE DETERMINATION
& DEMONSTRATION

ADVANTAGES AND DISADVANTAGES OF LOW VISION DEVICES

Low Vision Aids	Advantages	Disadvantages
Distance Telescopes	- Monocular and Binocular systems - Hand-held or spectacle mounted - Adjustable to close distances	- Cosmetically displeasing - Bulky / Heavy - Small FOV - Difficulty with alignment - Relatively expensive
Spectacle Magnifiers	- Cosmetically normal - Wide FOV - Hands free for long term tasks - Binocularity under +10D	- Close working distance - Limited depth of field - No Astigmatism correction - No binocularity above +12D
Hand Held Magnifiers	- Flexible working distance - Relatively inexpensive - Portable for spot reading - Inconspicuous - Many are illuminated	- Patient needs good hand/arm mobility for control - One hand is free - Smaller FOV with increased working distance
Stand Magnifiers	- No need for good hand control - Some versatility in eye-to-magnifier distance in younger patients with accommodation - Available in high powers (<+80D) - Many are illuminated - Relatively easy to train - Some with variable focus	- Accommodation needed or appropriate add. - Bulky / Less portable - May have difficulty with lighting - Difficult to use when writing or manipulative tasks - May need support for reading material

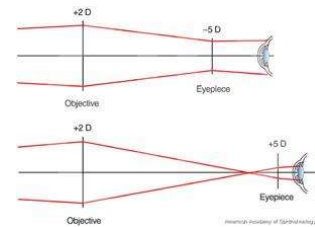
ADVANTAGES AND DISADVANTAGES OF LOW VISION DEVICES

Low Vision Aids	Advantages	Disadvantages
Head Mounted Loops	- Binocularity (<+10D) - Small increase in working distance - Easy to go with or without headset - Can wear over spectacles	- Potentially cosmetically displeasing - Bulky - FOV slightly smaller than with glass
Near Telescopes	- Farther working distance - Focusable	- Small FOV - Limited depth of field - Potentially cosmetically displeasing - Bulky / Heavy - Relatively expensive
CCTVs	- High magnification (<60D) - Wide range of magnification - Variable contrast and brightness settings - Comfortable posture - Variable viewing distance / focusable - Writing, typing, computers and hobbies are possible	- Expensive - Most are not portable (*) - Requires coordination - Difficulties with manipulative tasks (knitting) - Problems with search and location of reading material

DISTANCE MAGNIFIERS

TELESCOPES

- Galilean
 - Diverging Lens
 - Narrow FOV
 - Smaller
 - Lighter Weight
 - Fixed or focusable image
 - Brighter image
 - Edge blur
- Keplerian
 - Converging Lens
 - Wider FOV
 - Larger
 - Heavier (d/t reorienting prism)
 - Focusable image
 - Dimmer image
 - Sharp edges



DETERMINE THE POWER OF A TELESCOPE

- Option 1: Calculate the angular magnification
 - * $(M = I_o / I_e)$
 - I_o = Retinal Image Size with TS
 - I_e = Retinal Image size directly viewed
- Option 2: Calculate the Ratio
 - * $(M = \text{distance acuity} / \text{goal})$
 - Measure the distance VA
 - Determine the goal VA (20/40)
 - Calculate the ratio
- Example:
 - DVA: 20/200
 - Goal VA: 20/40
 - Ratio: $200/40 = 5x$

NON-TRADITIONAL TELESCOPES

- Spectacle Binoculars: All of these devices have 20 degree FOV, optional focus of +/-3DS
- MaxTV:
 - Mag: 2.1x
 - Working Distance: 3m to infinity
 - MaxDetail:
 - Magnification: 2x
 - Working Distance: 40cm
 - MaxEvent:
 - Magnification: 2.1x
 - Working Distance: 3m to infinity
 - Extras: Mirrored coating to reduce glare / improve cosmesis

NEAR MAGNIFIERS

MAGNIFICATION DETERMINATION

NEAR MAGNIFICATION DETERMINATION:

- Patient's preferred working distance(cm):
___D
- Add for preferred working distance (RDM):
___D
- Near Acuity: ___M Goal Acuity: 1M
- Magnification to goal(RSM):___x
- Total Near Magnification (RDM x RSM): ___D

Example:

NEAR MAGNIFICATION DETERMINATION:

- Patient's preferred working distance(cm): **33**
- Add for preferred working distance (RDM):
3.03 D
- Near Acuity: **5M** Goal Acuity: 1M
- Magnification to goal(RSM): **5x**
- Total Near Magnification (RDM x RSM):
15.15D

SPECTACLE MAGNIFIERS



HAND HELD MAGNIFIERS



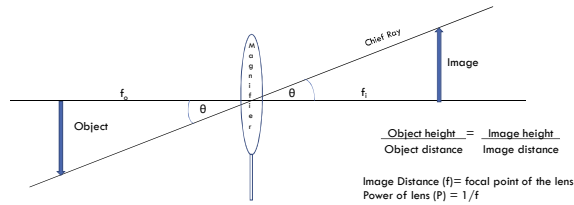
STAND MAGNIFIERS



ELECTRONIC MAGNIFICATION



MEASURING AN UNKNOWN MAGNIFIER



MEASURING AN UNKNOWN MAGNIFIER

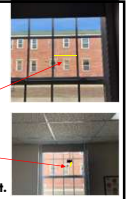
1. Measure the size of your object, this is your **object height**.
2. Measure the distance from your object to your magnifier, this is your **object distance**.
3. Measure the size of the object through the magnifier, this is your **image height**.
4. Calculate the **image distance**, then invert this number to find the **power** of the device.

$$\frac{\text{Object height}}{\text{Object distance}} = \frac{\text{Image height}}{\text{Image distance}}$$

$$\frac{0.193\text{m}}{2\text{m}} = \frac{0.031\text{m}}{\text{Image distance}}$$

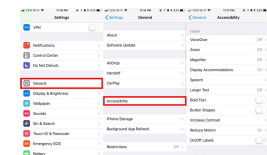
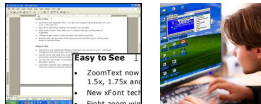
$$\text{Image distance} = 2(0.031)/0.193 = 0.321$$

$$P = 1/0.321 = 3.11\text{D}$$



TECHNOLOGY IN LOW VISION

- Computer Technology
- ZoomText
- JAWS
- OCR Technology
- Smart Phones



Low Vision Apps:

- Be My Eyes – sighted individuals help the visually impaired
- LookTel – Money Identifier App
- TapTapSee – Identifying objects through photos
- Ariadne GPS – Navigation using non-visual direction cues
- ColorID – Distinguishes names of colors

NEW TECHNOLOGY IN LOW VISION

Iris Vision - \$2950



OR Cam MyEye - \$4050



eSight - \$5950



NuEyes
Pro - \$5995
e2 - \$2795



CASE # 2: VIRTUAL REALITY IN LOW VISION

- 83 yo White Male
- Legally Blind 2/2 Exudative ARMD OU

Patient reports:

- Would like to be able to read the equations in his physics books and be hands free to solve the problems.
- Was told about Iris Vision by a friend, interested in trying the device
- Highly motivated, brings wife as support system to training sessions, good dexterity of the right hand.



ABSORPTIVE FILTER EVALUATION



ABSORPTIVE LENSES

Green Lenses

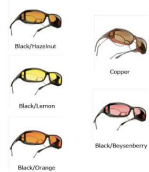
- Transmission: max in green portion of the spectrum
- Absorption: Blue and Red end of the spectrum
- Best in tropical climates (T)

Yellow Lenses

- Transmission: Longer wavelengths
- Absorption: All blue region
- Reduction of scattered light, veiling glare and increase in contrast

Red Lenses

- Transmission: in Red region
- Absorption: in Blue region



Brown Lenses

- Transmission: Longer wavelengths
- Absorption: All blue and green
- Preferences in cloudy or hazy conditions

Gray (ND) Lenses

- Absorption: Equally across spectrum, non-selective
- Transmission dependent on level of gray tint

OTHER LENS FILTERS

CPF:

- 450, 450X
 - Best for patients with: optic atrophy, albinism, pseudophakia
- 511
 - Best for patients with: ARMD, CATs, GLC, Aphakia, pseudophakia, optic atrophy
- 527, 527X
 - Best for patients with: DR, Photophobia, RP
- 550
 - Best for patients with: RP, albinism
- 550 XD
 - Achromatopsia, Reduces blue light



Suggested Applications			
Post-Operative Cataract, DR and Lens		Pre-Cataract	
For maximum glare control and greatest contrast		For increased brightness and glare control	
CPF 450	CPF 511	CPF 527	CPF 550
450 - 10% Yellow	511 - 10% Yellow	527 - 10% Yellow	550 - 10% Yellow
450 - 20% Yellow	511 - 20% Yellow	527 - 20% Yellow	550 - 20% Yellow
450 - 30% Yellow	511 - 30% Yellow	527 - 30% Yellow	550 - 30% Yellow
450 - 40% Yellow	511 - 40% Yellow	527 - 40% Yellow	550 - 40% Yellow
450 - 50% Yellow	511 - 50% Yellow	527 - 50% Yellow	550 - 50% Yellow
450 - 60% Yellow	511 - 60% Yellow	527 - 60% Yellow	550 - 60% Yellow
450 - 70% Yellow	511 - 70% Yellow	527 - 70% Yellow	550 - 70% Yellow
450 - 80% Yellow	511 - 80% Yellow	527 - 80% Yellow	550 - 80% Yellow
450 - 90% Yellow	511 - 90% Yellow	527 - 90% Yellow	550 - 90% Yellow
450 - 100% Yellow	511 - 100% Yellow	527 - 100% Yellow	550 - 100% Yellow

NoIR Filters:

- Variety of colors
- Provides various functions from contrast enhancement, glare relief and reduction of eye strain

CASE # 3 : YELLOW TINTED LENSES

- 79 yo WM
- Low Vision Category 1 secondary to Penetrating FB injury OS and POAG OU
- Patient reports:
 - glare sensitivity both indoors and outdoors, patient does not have tint on his lenses nor does he wear sun protection.
 - Prescribed Yellow Indoor tint and gray outdoor tint on BF Rx.
 - Chart note from Optician: "Pt wants to let it be known that his left eye was injured when he was 17 years old and since that time he has never had a pair of glasses that improved his vision in a measurable way. Pt states this is the best Rx he has ever had and at 79 years old he can see clearer than ever before."



LIGHTING EVALUATION

LIGHTING EVALUATION

- Why is it important to have appropriate lighting for low vision patients?
- Testing Acuity with Low Luminance VA testing
 - NoIR U23 fit overs - 4% gray transmission
 - Expected 8-10 letters (2 lines) loss, any more than 2 lines = patient may benefit from task lighting
- Always have the light directed behind the better seeing eye.

CASE #4: LIGHTING EVALUATION

- 64 yo. BM
- Legally Blind 2/2 Advanced POAG OU
- Patient Reports:
 - New inpatient to VA SORCC rehab program having difficulty seeing at night and dim situations in his dorm room.
 - Current light is difficult to turn on as he can't see the knob and when light is on, its too dim to be useful.





NON-OPTICAL LOW VISION ADAPTATIONS

- Lifestyle Adaptations
- Blind Rehabilitation Centers
 - Schools for the Blind
 - Veterans Affairs BRCs
 - Lighthouse for the Blind
- Orientation and Mobility
 - Braille
 - Talking Books

State Library of Oregon
Talking Book and Braille Library

That All May Read
NLS NATIONAL LIBRARY SERVICE FOR THE盲 AND VISUALLY IMPAIRED
LIBRARY OF CONGRESS

NON-OPTICAL LOW VISION ADAPTATIONS

- Household Adaptations
 - Bump Dots
 - Alert Tape
 - Mobility Assistance
 - Stairs/Ramp
 - Shower/Tub
 - Night Lights
 - Household Lighting
 - Removing rugs

NON-OPTICAL LOW VISION ADAPTATIONS

- Resources / Organizations
 - Schools for the Blind
 - Lighthouse for the Blind
 - Guide dogs of America
 - Guide dogs for the Blind
 - Department of Rehabilitation
 - Veterans
 - Low Vision Services
 - VIST: offers to Veterans to maintain independence for as long as possible with adaptive equipment and training along with life time case management.
 - BRCs

NON-OPTICAL LOW VISION ADAPTATIONS

- Additional Health Care Providers
 - Occupational Therapists
 - Physical Therapists
 - Social Workers

ADDITIONAL RESOURCES FOR PROVIDERS

Low Vision Supplies and Resources	Non-Optical Low vision devices
1. Eschenbach	1. Maxi-Aids
2. Mattingly	2. LS&S
3. Walters	
4. Optelec	

BILLING AND CODING OF LOW VISION EXAMS

New Patient

- 99201 – 10 min
- 99202 – 20 min
- 99203 – 30 min
- 99204 – 45 min
- 99205 – 60 min

Established Patient

- 99211 – 5 minutes
- 99212 – 10 minutes
- 99213 – 15 minutes
- 99214 – 25 minutes
- 99215 – 40 minutes

Document the start and end time as well as time spent counseling the patient!



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REFERENCES:

- [illegible]