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?

<table>
<thead>
<tr>
<th>Level Of Impairment</th>
<th>American Optometric Association</th>
<th>International Council of Ophthalmology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Vision</td>
<td>20/25 or better</td>
<td>20/25 or better</td>
</tr>
<tr>
<td>Mild Visual Impairment</td>
<td>20/20 to 20/60</td>
<td>20/33 to 20/63</td>
</tr>
<tr>
<td>Moderate Low Vision</td>
<td>20/70 to 20/160</td>
<td>20/80 to 20/160</td>
</tr>
<tr>
<td>Severe Low Vision</td>
<td>20/200 or worse</td>
<td>20/200 to 20/400</td>
</tr>
<tr>
<td>Profound Low Vision</td>
<td>20/500 to 20/1000</td>
<td>20/500 to 20/1000</td>
</tr>
<tr>
<td>Near Total Low Vision / Near Blindness</td>
<td>20/1000 or worse</td>
<td>20/1250 to 20/2000</td>
</tr>
<tr>
<td>Total Blindness</td>
<td>No Light Perception</td>
<td>No Light Perception</td>
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</tbody>
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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
- Albaniism
- 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 visual and systemic health conditions
    - Does the patient have a progressive ocular condition?
    - Does the patient have any systemic conditions that lead to difficulty with 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 patients 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 daughter's 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, this looks like cars disappear into the ditch.
  - When laying in bed he will see flowers 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 = Snellen Denominator
  - Example:
    - 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 flipper aligned with dot at the handle

EXAMINATION ADAPTATIONS - ADDITIONAL TESTING

- Contrast Sensitivity
- Visual Fields
- Perimetric Visual Fields
- Kinetic Visual Fields

DEVICE DETERMINATION & DEMONSTRATION
### Advantages and Disadvantages of Low Vision Devices

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

**Telescopes**

- **Galilean**
  - Narrow FOV
  - Smaller
  - Lighter Weight
  - Fixed or focusable image
  - Brighter image
  - Edge Blur
- **Keplerian**
  - Wider FOV
  - Larger
  - Heavier (due to reorienting prism)
  - Focusable image
  - Dimmer image
  - Sharp edges

### Determine the Power of a Telescope

**Option 1:** Calculate the angular magnification

\[ M = \frac{I_m}{I_e} \]

- \( I_m \) = Retinal Image Size with TS
- \( I_e \) = Retinal image size directly viewed

**Option 2:** Calculate the Ratio

\[ M = \frac{\text{distance acuity}}{\text{goal}} \]

- Measure the distance VA
- Determine the goal VA (20/40)
- Calculate the ratio

**Example:**

- DVA: 20/200
- Goal VA: 20/40
- \( \frac{200}{40} = 5 \times \)

### Non-Traditional Telescopes

**Spectacles Binoculars:** All of these devices have 20 degree FOV, optional focus of +/-3DS

- **MaxTV:**
  - Magnification: 2.1x
  - Working Distance: 2m to infinity
- **MaxDetail:**
  - Magnification: 2x
  - Working Distance: 40cm
- **MaxEvent:**
  - Magnification: 2.1x
  - Working Distance: 2m to infinity
  - Extra: Mirrored coating to reduce glare / improve cosmesis
NEAR MAGNIFIERS

MAGNIFICATION DETERMINATION

Example:

NEAR MAGNIFICATION DETERMINATION:

▪ Patient’s preferred working distance(cm): 33
▪ Add for preferred working distance (RDM): 3.03 D
▪ Near Acuity: __M Goal Acuity: 1M
▪ Magnification to goal (RSM): __x
▪ Total Near Magnification (RDM x RSM): __D

SPECTACLE MAGNIFIERS

HAND HELD MAGNIFIERS

STAND MAGNIFIERS

ELECTRONIC MAGNIFICATION
**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.

\[
\frac{\text{Object height}}{\text{Image height}} = \frac{\text{Object distance}}{\text{Image distance}}
\]

\[
0.193m = 0.031m
\]

\[
\frac{2m}{0.321} = 6.246
\]

\[
P = \frac{1}{0.321} = 3.11D
\]

---

**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
- TapTopSee – Identifying objects through photos
- Ariadne GPS – Navigation using non-visual direction cues
- ColorID – Distinguishes names of colors

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**NEW TECHNOLOGY IN LOW VISION**

- Iris Vision - $2950
- OR Cam MyEye - $ 4050
- NuEyes
- e2 - $2795
- eSight - $5950

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**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.
GREEN LENSES
- Transmission: Max in green portion of the spectrum
- Absorption: Blue and Red end of the spectrum
- Best in tropical climates

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

BROWN LENSES
- Transmission: Long wavelengths
- Absorption: in Blue region

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

BRONZED LENSES
- Transmission: Longer wavelengths
- Absorption: All blue and green

GRAY (ND) LENSES
- Transmission dependent on level of gray tint

OTHER LENS FILTERS
- CPF:
  - 450, 450X
  - Best for patients with: optic atrophy, albinism, pseudophakes
- 511
  - Best for patients with: ARMD, CATs, GLC, Aphakia, pseudophake, optic atrophy
- 527, 527X
  - Best for patients with: DR, Photophobia, RP
- 550
  - Best for patients with: RP, albinism
- 550 XD
  - Achromatopsia, reduces blue light

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 M
  - 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 that since then he has never had a pair of glasses that improved his vision in a measurable way. This is the best Rx he has ever had and at 79 years old he can see clearer than ever before."

LIGHTING EVALUATION

CASE #4: LIGHTING EVALUATION
- 64 yrs. 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, he can’t see it to be useful.
NON-OPTICAL LOW VISION ADAPTATIONS

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

NON-OPTICAL LOW VISION ADAPTATIONS

• Household Adaptations
  • Bump Dots
  • Alert Tape
  • Mobility Assistance
  • Blackout
  • Bump Taps
  • Night Lights
  • Household Lighting
  • Rerouting roads

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
      • MD offers to veterans to maintain independence for as long as possible with adaptive equipment and training along with life time case management.
      • MDA

NON-OPTICAL LOW VISION ADAPTATIONS

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

ADDITIONAL RESOURCES FOR PROVIDERS

<table>
<thead>
<tr>
<th>Low Vision Supplies and Resources</th>
<th>Non-Optical Low vision devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Eschenbach</td>
<td>1. Maxi-Aids</td>
</tr>
<tr>
<td>2. Mattingly</td>
<td>2. LS&amp;S</td>
</tr>
<tr>
<td>3. Walters</td>
<td></td>
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<tr>
<td>4. Optelec</td>
<td></td>
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</tbody>
</table>
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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Low Vision Aids

Visual Acuity

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