The Case For and Cases From Low Vision Rehabilitation

David Lewerenz, OD, FAAO

Learning Objectives

1. Describe the relationship between aging and visual impairment
2. List the most common causes of visual impairment and describe how they affect vision
3. Explain five strategies used to assist visually impaired individuals live independently

Disclosures

- I have no financial interests or conflicts of interest from which I can benefit from giving this presentation

Definition of Visual Impairment

- Based on visual acuity and/or visual field
  - Visual acuity of 20/40 to 20/70 or worse in the better eye with best optical correction
  - Restricted visual field
- Statutory “blindness” in U.S.
  - Visual acuity in better eye with best optical correction of 20/200 or worse
  - Visual field of 20 degrees or less in better eye
- NEI: "Low vision means that even with regular glasses, contact lenses, medicine, or surgery, people find everyday tasks difficult to do."\(^1\)

Disease, Impairment, Handicap, Disability

<table>
<thead>
<tr>
<th>Disease</th>
<th>Impairment</th>
<th>Handicap</th>
<th>Disability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomical change in tissue (e.g. AMD)</td>
<td>Loss of function (e.g. loss of visual acuity, central scotoma)</td>
<td>Inability to accomplish a task (e.g. inability to read)</td>
<td>The affect on one’s life (e.g. loss of financial independence, because can’t read bank statements, pay bills &amp; identify currency)</td>
</tr>
</tbody>
</table>

Visual Impaired Per 1,000\(^2,3,4\)

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-39</td>
<td>2</td>
</tr>
<tr>
<td>40-49</td>
<td>3</td>
</tr>
<tr>
<td>50-59</td>
<td>4</td>
</tr>
<tr>
<td>60-69</td>
<td>12</td>
</tr>
<tr>
<td>70-79</td>
<td>38</td>
</tr>
<tr>
<td>80+</td>
<td>237</td>
</tr>
</tbody>
</table>
Aging Population Trends

By 2030, state Medicaid costs for seniors are expected to more than double from $1.64 billion to $3.232 billion, according to the Colorado Futures Center.

Aging Population Trends

Economic Impact of Visual Impairment

- Estimated cost to US economy is $51.4 billion per year\(^5\)\(^6\)
- Of ~2 million surveyed in the 16-64 age group who reported "blindness or extreme difficulty seeing" 57% were not in the labor force.\(^7\)
  - "Unemployment" statistics can be misleading because they only include those who are in the labor force or looking for a job

Diagnoses

Very unscientific analysis of patients I've seen in last 6 months

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age-Related Macular Degeneration</td>
<td>27.0%</td>
</tr>
<tr>
<td>Optic Neuritis</td>
<td>15.1%</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>14.3%</td>
</tr>
<tr>
<td>Hemianopsia</td>
<td>7.2%</td>
</tr>
<tr>
<td>Diabetic Retinopathy</td>
<td>5.6%</td>
</tr>
<tr>
<td>Enucleation</td>
<td>2.4%</td>
</tr>
<tr>
<td>Macular Hole</td>
<td>2.4%</td>
</tr>
<tr>
<td>Other Retinopathy</td>
<td>2.4%</td>
</tr>
<tr>
<td>Traumatic Brain Injury</td>
<td>2.4%</td>
</tr>
<tr>
<td>Dry Eye Syndrome</td>
<td>1.6%</td>
</tr>
<tr>
<td>Graves Disease</td>
<td>1.6%</td>
</tr>
<tr>
<td>Retinal Detachments</td>
<td>1.6%</td>
</tr>
<tr>
<td>Central Serous CR</td>
<td>0.8%</td>
</tr>
<tr>
<td>Choroiditis</td>
<td>0.8%</td>
</tr>
<tr>
<td>Central Retinal Vein Occlusion</td>
<td>0.8%</td>
</tr>
<tr>
<td>Cortical/Visual Impairment</td>
<td>0.8%</td>
</tr>
<tr>
<td>Non-Organic Vision Loss</td>
<td>0.8%</td>
</tr>
<tr>
<td>Retinopathy of prematurity</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

88% Not Hereditary

Diagnosis, Adaptation and Psychology

Achromatopsia
- Lack of functioning cones
- Present at birth
- Normal vision never experienced
- Not progressive

Retinitis Pigmentosa
- Degeneration of rods > cones
- Emerges as teen
- Normal vision known
- Has seen family members with RP

AMD
- Degeneration of central retina
- Normal vision for multiple decades
- Develops at a time when adaptation is difficult

Case Report 1 - AMD

- Hx – 78 year old female
  - Began developing exudative AMD 2013
  - Received anti-VEGF injections since 2014
  - Had cataract surgery 2011
  - CC: Difficulty reading and shopping
  - No distance glasses since cataract surgery
  - Wears OTC reading glasses
  - Children gave her magnifier they bought at a store but she is not successful using it
- Vision findings
  - Distance visual acuity R 20/100, L 20/250
  - Contrast sensitivity 1.00 log (moderate loss)
  - Visual field full peripherally, central scotoma L > R

Case Report 1 – AMD

- Refraction
  - R +1.25 -1.00 x 090  20/80
  - L +1.75 -1.50 x 080  20/200
  - MNRead\(^7\) critical print size = .40/2.0M predicts +6.00 D add for reading

- Recommendations
  - Multifocal glasses for general purpose
  - Reading glasses with +6.00 D add and base-in prism for reading at 17 cm
  - +10 D illuminated hand held magnifier for spot reading prices, labels, menus, etc.
  - Referral to OT for filters, lighting, ADLs
Case Report 1 – AMD

- **Refraction**
  - Refractive methods are different from those used in normally sighted
  - About 1 in 6 low vision patients are helped significantly with refraction

- **At follow up**
  - Consider spectacle mounted telescope for faces, music, computer

Case Report 2 – AMD

- **Hx** – 72 year old male
  - Non-exudative AMD since 2008
  - Has early cataracts and dry eye syndrome
  - Can read newspaper text in bright sunlight, otherwise can’t read at all

- **Vision findings**
  - Visual acuity with current glasses
    - R 20/40, L 20/640
  - Contrast sensitivity 0.75 (Severe loss)
  - MNRead: medium size print read faster than large print

Case Report 2 – AMD

- **Recommendations**
  - Moderate magnification with lots of light
  - Work on eccentric viewing training with OT
  - Refer to A3 for training and environmental modifications in the home
  - May require large amounts of electronic magnification with fixation outside the scotoma

Case Report 3 – Diabetic Retinopathy

- **Hx** – 67 year old female
  - Type 2 DM diagnosed 2010
  - Poorly controlled blood glucose until recently
  - Left eye had hemorrhage and retinal detachment with profound vision loss
  - CC: Needs to be able to read and write in multiple settings
  - Uses public transportation
  - Can’t read bus numbers

- **Vision findings**
  - Distance visual acuity R 20/160, L LPO
  - Contrast sensitivity – 0.60 (severe loss)
  - Visual field is restricted peripherally

Case Report 3 – Diabetic Retinopathy

- **Refraction** – RE can be improved to 20/125+
- **Reading evaluation**
  - MNRead CPS : .33/2.0M
  - Optical magnification is disappointing and requires stronger lenses than predicted
  - Much better performance with electronic magnification with reverse contrast

- **Recommendations**
  - New glasses
  - Portable electronic magnification device
  - Monocular telescope for bus numbers
  - OT referral for filters, lighting, ADLs
Case Report 4 – RE CRVO, LE NAION

- **Hx** – 59 year old male
  - RE developed central retinal vein occlusion 2004
  - LE developed non-arteritic ischemic optic neuropathy in 2016
  - CC: Wants to continue driving. Is currently driving but has difficulty reading signs.
- **CC2:** Difficulty to read and spot read
- **Vision findings**
  - Visual acuity R 20/100+, L 20/200-
  - Contrast sensitivity 1.35 (mild to moderate loss)
  - Visual field mostly full peripherally, R has relative loss in temporal field, L has cecocentral scotoma

- **Refraction and magnification**
  - No improvement with refraction
  - Responds well to telescope – 20/32 with 3X
  - Yellow filter is very helpful for glare
  - Can read .33/0.5M letters with 16 D illuminated hand held magnifier
  - Can read .33/0.8M continuous text with 4X illuminated stand magnifier

**Recommendations**

- 3X biotic telescope for RE: 20/32 vision
- Evaluation and training in use of biotic with OT
- Yellow and amber slip-in filters provided for biotic
- Evaluation and behind the wheel evaluation and training by Adaptive Driving Solutions – special emphasis on visual fields
- +16 D illuminated hand held magnifier for spot reading
- Will wait on illuminated stand magnifier

Case Report 5 – Glaucoma

- **Hx** – 54 year old male
  - Glaucoma diagnosed 2012, but extensive vision loss by then
  - Has struggled with mobility, reading, employment
- **Vision findings**
  - Visual acuity R LPO, L 20/80
  - Contrast sensitivity 0.60 (severe loss)
  - Visual field shows no useful field in right eye and greatly reduced peripheral field in left

- **Recommendations**
  - Referral to OT for illumination, filters, ADLs
  - Referral to Colorado Division of Vocational Rehabilitation for
    - Job skills training
    - Orientation and mobility training
    - Additional ADL training
    - Electronic magnification
  - **Orientation and mobility considerations**
    - Usually involves long cane training
    - Difficult for patients to accept many times
    - Assists patient in mobility directly and indirectly through what it communicates to others around them

Case 6 – CVA → Hemianopia

- **Hx** – 76 year old female
  - CVA in posterior cerebral artery 6 months previously
  - Stroke resulted in permanent complete right hemianopia
  - Had speech problems at first, but after 6 months and following SLP therapy now only minimal speech impairment
  - CC: Reading and mobility (objects on right)
Low Vision Rehabilitation
David Lewerenz, OD, FAAO
12/15/2016

Case 6 – CVA → Hemianopia

- **Prevalence of stroke**\(^\text{12}\):
  - 2.9% in 45-65 yo
  - 8.3% in >65 yo
- **Hemianopia occurs in**:
  - 30% of all stroke victims\(^\text{13}\)
  - 70% of strokes involving posterior circulation\(^\text{13}\)
- **CVA responsible for 70% of hemianopia**\(^\text{14}\)

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Case 6 – CVA → Hemianopia

- **Vision findings**:
  - Visual acuity 20/25 each eye with correction
  - Complete right hemianopia w/o hemispatial neglect
  - Contrast sensitivity 1.65 (mild reduction)
- **Reading English, and other L → R languages**:
  - Left hemianopia – problem finding next line\(^\text{15}\)
  - Right hemianopia – Next word is missing\(^\text{15}\)
- **Strategies**:
  - Consider single vision reading glasses to simplify
  - Refer to OT for training in page navigation and how to use tablet reading apps that display scrolling text or one word at a time

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Case 6 – CVA → Hemianopia

- **Mobility**:
  - Problems encountered in tripping or bumping into things on the blind (right) side
  - Peli prism method expands vision in upper & lower fields\(^\text{16-20}\)
  - OT referral for scanning training
  - Possible O&M?
    - Driving??

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Case 7 – Visual Rivalry

- **Hx** – 75 year old male
  - Strongly left eye dominant his whole life
  - Developed NAION secondary to obstructive sleep apnea, resulting in sudden loss of vision in the left eye
  - CC: Wants to close the left eye, especially with detail vision, and has fatigue with reading and computer
- **Vision findings**:
  - Visual acuity RE 20/25, LE 20/100 with best lenses
  - Contrast sensitivity 1.35 (mild to moderate loss)
  - Visual field RE normal, LE cecocentral scotoma

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Case 7 – Visual Rivalry

- **Occlusion as therapy?**:
  - Partial
  - Total
- **Reading and other detailed tasks**:
  - Could have reading glasses with black occlusion on left lens
  - Could have Bangerter foil on left lens
    - Entire lens
    - Just on bifocal area
- **General vision**:
  - Some people benefit from partial occlusion such as Bangerter foil on entire left lens

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Effect of 0.2 “20/100” Bangerter foil
**Low Vision Rehabilitation**

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12/15/2016

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### Case 8 – Diplopia

- **Hx** – 68 year old female
  - Graves’ disease with exophthalmos
  - Had orbital decompression surgery
  - Exophthalmos is better
  - CC: Has diplopia and confusion

- **Vision findings**
  - Visual acuity RE 20/30, LE 20/50 (cataract)
  - Contrast sensitivity 1.20 (mild to moderate loss)
  - Visual fields full
  - 25° left exotropia and 12° left hypertropia

### Case 8 – Diplopia

- **Recommendations**
  - Temporary Fresnel prism
    - If successful, consider ground-in prism or strabismus surgery
  - If unsuccessful, consider occlusion
  - Comitant vs. non-comitant deviations

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### Case 9 – Acute Monocular Blindness

- **Hx** – 59 year old female
  - Chorioretinal melanoma diagnosed in left eye two months previously
  - Left eye enucleated one month previously

- **Vision findings**
  - Visual acuity RE 20/20, LE No light perception
  - Contrast sensitivity 1.80 (normal)
  - Visual fields full to right, slightly reduced to left

### Case 9 – Acute Monocular Blindness

- **CC:**
  - Reduced visual field in right eye
  - Poor depth perception
  - Reading fatigue
  - Glare and photophobia

- **Recommendations**
  - Complete the monocular vision function questionnaire
  - Training with our OT

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### The Case for Low Vision Rehab

- Low Vision Intervention Trial (LOVIT)
  - Multicenter randomized clinical trial
  - Studied change in reading ability, mobility, overall visual ability of 126 veterans (64 treatment group, 62 control group)
  - “Treatment group demonstrated significant improvement in all aspects of visual function compared to the control group.”
  - Amount of improvement was far beyond expectation

### The Case for LV Rehab

- LOVIT
  - Compared multidisciplinary x 4 months (N=44) to “standard” (N=56) low vision care after 4 months
  - Both groups improved, the multidisciplinary group more
  - “Visual ability improved significantly in both groups from baseline to 1 year. The LOVIT treatment effect is robust and well maintained for patients with macular diseases.”
The Case for Low Vision Rehab

- Video from American Academy of Ophthalmology – October 2016


References


Thanks!