LOW VISION EVALUATION AND MANAGEMENT OF CHILDREN WITH VISUAL IMPAIRMENT

Susan A. Primo, O.D., M.P.H.
Director, Optometry and Low Vision Services
Professor of Ophthalmology
Emory Eye Center
The lecturer has no financial interest in any of the companies or products mentioned in this presentation.

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Goals and Objectives

- To define vision impairment and levels of problem/disability for kids
- To give overview of LV evaluation/techniques to better understand what we do
- To briefly describe management strategies/devices
UNMET NEED: Prevalence of Visually Impaired People in US

“Rates of visual impairment were highest among

• Hispanics
• Other ethnicities
• The poor
• Diabetes patients
• Those without private health insurance
• The less educated”

14 million people in the U.S. are visually impaired. Of these...

11 million have visual impairment that CAN be corrected with glasses/contact lenses

3 million have visual impairment that CANNOT be corrected with glasses/contact lenses

JAMA.2006;295:2158-2163.
Statistics

- 1.4 million blind children in the world (WHO)
- ~ 55,200 legally blind children in US
- ~ 93,600 visually impaired or blind students are in special education programs
5,500 legally blind children use braille as their primary reading medium

~ 45% of individuals with severe visual impairment or blindness have a high school diploma

In Georgia, approx 2700 children are visually impaired or legally blind
Among high school graduates, those with severe visual impairment or blindness are about as likely to have taken some college courses as those who were sighted, but they are less likely to have graduated.
Financial Burden

$139 billion
DEFINITIONS

- Visual impairment
- Legal blindness (+/-)
- Functional blindness
- Vision rehabilitation
Vision Impairment Definition

- Significant limitation of visual capability that is the result of disease, trauma, or a congenital condition; that cannot be ameliorated by standard refractive correction, medication, or surgery; and that is manifest by one or more of the following:
  
  1. Insufficient visual resolution (worse than 20/60 in the better eye with best correction)
  2. Inadequate field of vision (worse than 20 degrees along the widest meridian in the eye with more intact central field, or homonymous hemianopsia)
  3. Reduced peak contrast sensitivity (less than 1.7 log CS binocularly)
Definition of Legal Blindness

- 20/200 or worse best corrected in the better eye
- Visual field of 20° or less in the widest diameter of vision.
Vision Rehabilitation

- Functional Blindness
- Multidisciplinary approach!
## "THE BIG VISION REHABILITATION PICTURE"

<table>
<thead>
<tr>
<th>Level of Problem</th>
<th>Service</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual system disorders (disease)</td>
<td>Primary Care Medical Surgical</td>
<td>Optometrist (OD) ↔ Ophthalmologist (MD, DO) Medical Specialists</td>
</tr>
<tr>
<td>Visual impairment ↓</td>
<td>Vision Rehabilitation</td>
<td>Vision Rehabilitation Physician (OD, MD, DO)</td>
</tr>
<tr>
<td>Visual disabilities ↓</td>
<td>Daily Living Activities Mobility Independence Vocational/Social Services Accommodations</td>
<td>Orientation/Mobility Rehabilitation Teacher Occupational Therapist (CLVT/COMS/CVRT) Educational Specialists Vocational Counseling Social Worker Other Professionals</td>
</tr>
<tr>
<td>Visual handicaps ↓</td>
<td></td>
<td></td>
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<tr>
<td>Altered quality of life</td>
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</tbody>
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(courtesy of Dr. Roy Cole)
Child is identified as legally blind or visually impaired

Teacher for the Visually Impaired

Low Vision Evaluation

Vision Rehabilitation Therapist

O&M Training

After school Programs

Rehabilitation Counselor

Occupational Therapist

Braille

School for the Blind

IEP

Parent/Guardian
The Individuals with Disabilities Education Act (IDEA) requires state public schools to make available to all eligible children with disabilities a free appropriate public education in the least restrictive environment to their individual needs.
IDEA (1975)

- IDEA requires public school systems to develop an appropriate Individualized Education Program (IEP) for each child.
Individualized Education Program (IEP)

- Goals
- Assistive technology service
- Orientation and mobility services
- Transition Services
- Evaluation and reevaluation of disability by the public agency
- Accommodations (test time/LP, etc.)
- Special factors: Need for Accessible educational material
TYPICAL LV EVALUATION

- Extensive case history with understanding specific needs and goals
- Distance evaluation with scrupulous refraction/contrast sensitivity
- Near evaluation/add determination with functional reading text (spectacles and magnifiers)
Examination: History

- Ocular history
- Medical History
- Onset of Vision Loss
- Stability of Vision
- Goals
- Past/Current LV Devices

Areas of Disability:
- ADL
- Reading
- Driving
- Personal Finance
- TV Viewing
- Ambulation, etc

Psychosocial Issues
Examination: Acuity

- **Acuity:**
  - ETDRS chart, 1 or 2 meter distance, Recorded as 5/ , or 10/
  - Feinbloom Chart: tests poorer acuity (20/2800 @ 5ft.)
  - Near Acuity:
    - Miniature ETDRS letter chart
    - MN Read Word Chart
Distance Acuity Measurement

- Charts
- Test distance
- Illumination
- Eccentric viewing or Preferred Retinal Locus
Distance Evaluation

- acuity testing/eccentric view
- keratometry/retinoscopy/auto-refraction
- trial frame refraction - appropriate bracketing technique
Contrast Sensitivity: Pelli-Robson

- Test distance: 1 meter
- Single 20/60 letter size with decreasing contrast
- 3 letters of each contrast level
- Test monocular and binocular
- Level of score sheet for last 2 or 3 correct is patients score
- Score 2: normal, less than 1.5 signifies visual impairment, score of 1.0 equals 10 fold loss of sensitivity
Mars
Near Acuity Measurement

- Charts/cards
- Test distance
  Kids use angular magnification, but need intermediate VA as well
- Functional reading text (speed, accuracy, comprehension and endurance)
Near Acuity Charts
Once in a long while, as a great treat, he took me down to his office. This could happen only on a Saturday morning when there was no school.
Spectacles

- primary device for correction of refractive error/protection
- Kids often reject reading glasses, but need prism > +6.00D OU (half-eyes)
- consider telemicroscope, loupe, etc.
Handheld Magnifiers

- inexpensive
- variety of powers
- consider illuminated for higher powers
Stand Magnifiers

- great for kids/hand tremors
- variety of powers
- increased working distance
TYPICAL LV EVALUATION

- Telescopic evaluation (potential for driving)
- Absorptive lens evaluation
- Electronic device evaluation
- Non-optical devices
- Discussion and recommendations
- Training, training, training!!
Telescopic Evaluation

- use appropriate power for desired activity
- consider binocular system
- driving law
Devices: Telescopes

- Hand Held
- Monocular
- Variable Focus
- Spotting tasks
Devices: Telescopes

- **Spectacle Mounted**
  - Fixed or Variable Focus
  - Monocular or Binocular
  - Spotting or Driving
GA Driving Requirements

- 20/60 or better: unrestricted license
- Bioptic Telescope
  - 20/70 to 20/200 and achieve VA ≥ 20/60 with up to 4x Telescope
  - 140 ° combined peripheral field
Ocutech VES Sport
Absorptive Lens Evaluation

- contrast enhancers
- glare reducers
Electro-Magnetic Spectrum

- Various wavelengths of the spectrum
- Visible light covers portion between 380 and 780nm
- Blue light is region between 380 and 500nm
- UVB (290-315nm) is most biologically active in sunlight and cause of sunburn
Corning® GlareControl™ Family

CPF® 550

CPF® 527

CPF® 450

CPF® 511

CPF® GLARECUTTER™
Electronic Devices

- Videomagnifiers (desktop and portable)
- handheld electronics
Devices: Videomagnifiers

- Increased Magnification up to 60x
- Contrast Control
  - Enhanced Contrast
  - Reverse Polarity
- Stationary or Portable
- Mobile Camera or X – Y table
DaVinci

Crystal clear picture and text-to-speech
Devices: Virtual Reality

- **Jordy**
  - Head Mounted Video Display
  - Portable
  - 30x Magnification in Distance
  - Auto Focus

- **CCTV**
  - Docking Station
  - X- Y Table
  - Viewing Modes: Color, B/W, Positive and Reverse High Contrast
iPad and iPhone!
Non-optical Devices

- large-print text, syringe, etc.
- talking watch, books, etc.
- Cooking, crafts/hobbies
- lighting - preferably halogen bulb
- reading stand
Field Enhancement/Analyzers

- Hemianopic/altitudinal field loss
- Constricted loss
- Useful Field of View software
Technical data
Magnification: 0.5X
Opening-angel: 54°
Correction-limit: +/- 8 4-
Weight: 4gr
Management of visually-impaired children

- determination of legal blindness
- goal-orientated approach
- consider stability of disorder/patient’s motivation
- optical and non-optical devices
- orientation and mobility concerns
- educational concerns
- multidisciplinary approach