American Optometric Association
Vision Rehabilitation Section

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Disclosures

The presenters have nothing to disclose that would constitute a conflict of interest in this presentation.

Populations Needing Rehabilitation

• Brain Insult
  – Trauma
  – CVA
  – Autism
  – Cerebral Palsy

• Vision Impaired
  – Macular Degeneration
  – Advanced Glaucoma
  – Congenital Disorders
  – Trauma
Rehabilitation

- **Neuro-Optometric**
  - Optometric Vision Therapy
  - Collaborate with Rehab team
  - Specialty Rx

- **Low Vision**
  - Functional assessment
  - Specialty Aids
  - Mobility
  - Collaborate with Rehab

AOA VRS

- **Brain Injury Manual**
  - Assessment
  - Treatment

- **Low Vision Tool Kit**
  - Current Assessment tools
  - Devices

AOA VRS Needs You

- **Become a Member**
  - Advocate
  - Educate
  - #1 Resource

- **You Never Know Who You Might Help.**
Spatial Egocentric Shift After Neurological Insult

Brenda H. Montecalvo, OD,FCOVD, FAAO

Egocentric Localization

- Reinforces the basic coordinate system
- Allows computation of spatial position of visual objects with respect to the observer
- Coordinates by integration of multiple sensory inputs

- Veer to one side when walking
- Reach to the side of object viewed
- Asymmetrical head position
- Asymmetrical body position
Patient Veers right

2 PD Yoked Base Left

Assessment of Egocentric Shift

- Observe
  - Natural head position
  - Body position
- Streff Ball-Cap
- Egocentric Localization of Moving Target
Veering & Postual Shift

Streff Ball Cap Test

Treatment of Egocentric Shift
• Bi-nasal occlusion
• Microprism
• Eye movement and localization activities
Bi-nasal Occlusion

Optometric Vision Rehabilitation

- Double Pursuits
- Monocular Pen / Cap
- Monocular Pinch Pursuits
Visual Tracking and Locating

Jason Clopton, OD, FCOVD

It's Past, our present, and the FUTURE ...
Visual Tracking and Locating

• Visual tracking in the past and up to the present
  — Observations/EOMs
  — Tracking with devices
    • Coil Eye movement trackers
      — Research only
      — Direct measuring
      — Invasive
      — Exact...ish
      — Not even close to real life
      — monocular

Visual Tracking and Locating

• Visual tracking in the past and present
  — Observations/EOMs
  — Tracking with devices
    • Coil Eye movement trackers
      — Fixation
      — Saccades
        » acceleration
      — Micro-saccades
      — Pursuits
        » acceleration
      — Glissades
      — MONOCULAR research

Visual Tracking and Locating

• Visual tracking in the present
  — Tracking with video devices
    • Video Eye trackers
      — Research and some ADL
      — Indirect measuring
      — Non-invasive...ish
      — Exact
      — Closer to real life
      — Monocular and rare binocular
      — Very bulky
Visual Tracking and Locating

- Visual tracking in the present
  - Tracking with devices
    - Video Gaze trackers
      - Bulky and mostly not portable, but getting there
      - ADIs as long as you are still, then some portable
      - Indirect measuring and at a distance
      - Non-invasive
    - Gaze tracking measures the scene (camera or video monitors) and correlates it to a general area of gaze – not even close to exact
    - Xbox Kinects
      - Used by marketing, research, workplace to see what you are looking at
    - Monocular and binocular
Visual Tracking and Locating

• Visual Eye Tracking in the FUTURE
  – Tracking and treating with devices
    • Video Binocular Eye trackers with therapeutic abilities
      – ADLs and very portable
      – Indirect measuring
      – Non-invasive
      – Accurate eye tracking with real time intervention
      – Implications
      – Clinical applications

Visual Tracking and Locating

What else will we do? Where is this all going?
• New diagnosis, instant results, pathologies/diseases, functional vision, telemedicine, monitoring and treatment

Why will we do this (why do you care clinically?)
• New diagnosis abilities
• BINOCULAR reading studies
• Fall risks in elderly
• Return to play decisions
• Real time functional vision – accommodation, binocularity, etc...
• Psychology
• Military applications
Visual Tracking and Locating

Why will we do this (why do you care clinically?)
- Visual training
- Schizophrenia
- Alzheimer’s
- Pathologies
  - Peripheral
  - Central
  - Blood
- What happens when we apply lenses and how does it affect the patient
  - “It is not what the lens does to the patient, it is what the patient does with the lens”

• Comments, criticisms, complaints, confusion, or $$...
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iPad for Vision Impairment Assessment

John Rundquist, OD, FAAO
Why use an iPad?

• Pros
  – Multiple tests on one device
  – Portability
  – Introduces technology to the patient

• Cons
  – Limited availability of tests
  – Limit of test itself
  – Patients touch screen and change settings

logMar Visual Acuity Chart by Ridgevue

Word Reading Chart by Ridgevue
vision Pad: Contrast Sensitivity Test by eye Technologies

vision Pad: Eccentric Viewing Training by eye Technologies

MNRead app-University of Minnesota
Everyone wanted to go outside when the rain finally stopped
How Visual Acuity Can Lead You Astray

David Lewerenz, OD, FAAO
Importance of Visual Acuity

- Visual acuity is arguably the most important test done in any ophthalmic clinical encounter
  - Eye health diagnostic determination
  - Monitor progression
  - Determining statutory blindness or other disability
  - Legally – the most important part of the chart?
  - Predicting magnification for a visually impaired patient
    - Kestenbaum’s Rule – more on this later

When Visual Acuity Fails Us

- Presence of paracentral scotomas
  - Ring scotoma, etc.
- Peripheral field loss
- Contrast sensitivity loss

Microperimetry

- Microperimetry, aka “fundus-guided” or “fundus-correlated” perimetry
  - Tests specific retinal points selected from imaging
  - Monitors and corrects for eye movements
  - Evaluates fixation location and stability
  - Standard perimetry, such as the example here, could indicate a true superior scotoma, or a central scotoma with superior PRL
**Microperimetry**

- Original, manual Rodenstock scanning laser ophthalmoscope
  - Not originally designed for microperimetry
  - $100,000+
  - Not currently manufactured
  - Still used a lot in research

**Microperimetry**

- Nidek MP-1, 2003
  - Original automated microperimeter
  - An adapted retinal camera, not a scanning laser
  - Able to take color photos of the retina
  - Able to analyze fixation
  - Able to train fixation

**Microperimetry**

- Optos OCT SLO, 2006
  - Can do microperimetry and OCT scans, showing the layers of the retina
  - Combines structure and function
  - Fixation analysis is not as sophisticated as other instruments
Microperimetry

- CenterVue MAIA, 2009
  - Automated scanning laser instrument
  - Able to analyze fixation
  - Able to train fixation

MAIA - Normal

Central Scotoma
Management Without Microperimetry

- California Central Visual Fields Test
  - A near (57 cm) tangent screen test
  - Don Fletcher, MD
  - Mattingly Low Vision

- Tangent screen test can compare with microperimetry1,2


Management Without Microperimetry

- Compare performance with single letters (Kestenbaum’s Rule) to continuous text (MNRead)
- Kestenbaum’s Rule1
  - Add needed to read 1.0M print is reciprocal of visual acuity
  - Example: VA = 20/100, 100/20 = +5.00 D
  - Example: VA = 10/80, 80/10 = +8.00 D
  - Example: VA = 3/36M, 36/3 = +12.00 D
  - Example: VA = .35/3.2M, 3.2/.35 = +9.14 D


Management Without Microperimetry

- Because Kestenbaum’s Rule is based on a threshold measurement (visual acuity), it seriously underestimates add power
- A reserve must be factored in
  - Evidence that in most cases the finding from Kestenbaum’s Rule should be doubled (or more)1-4
    - Example: VA = 20/80, 80/20 = +4.00 D, doubled to +8.00 D

The MNRead Test

My father takes me to school every day in his big green car

Everyone wanted to go outside when the rain finally stopped

They were not able to finish playing the game before dinner

MNRead Outcomes

- Critical Print Size (CPS) = smallest print that can be read at the maximum reading speed
  - Not a threshold test, so adding a reserve is not so critical
  - May adjust for contrast, etc., and add 20%??
  - Example: CPS = .30/2.4M, 2.4/.3 = +8.00 D, +20% = +9.60 D
Management Without Microperimetry

- Comparing Kestenbaum's Rule (doubled) to MNRead can provide very good information about whether ring or other troubling scotomas exist

- Example: Paracentral scotomas **not** likely
  - Example: VA = 20/100, 100/20 = +5.00 D, doubled to **+10.00 D**
  - MNRead CPS = .28/2.5M, 2.5/.28 = 8.90 D, +20% = **+10.71 D**

- Example: Paracentral scotomas **likely**
  - Example: VA = 20/100, 100/20 = +5.00 D, doubled to **+10.00 D**
  - MNRead CPS = .28/6.4M, 6.4/.28 = +22.86 D, +20% = **+27.43 D**

Summary

- Visual acuity, although a very valuable test, can be a **very** inaccurate indicator of visual function

- Microperimetry can provide very good information about paracentral scotomas that explain this discrepancy

- Without microperimetry, the presence of paracentral scotomas can be postulated if the add predicted by the MNRead is a lot higher (e.g. 2X higher) than Kestenbaum's Rule doubled

Thanks!

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Low Vision Evaluation of the Visually Impaired Child

- Dr. Maria Santullo Richman, OD, FAAO

Case History

- Age of onset of symptoms/signs
  - congenital
  - acquired
- History of symptoms/signs
  - stable
  - progressive

Case History

- Family Pedigree
  - autosomal dominant
  - autosomal recessive
  - x-linked recessive
- Other associated conditions
  - hearing impairment
  - Cerebral Palsy
Case History

• Educational Information
  – Grade Level
  – Literacy Medium
  – Use of Low Vision Aids
  – Educational Modifications

• Goals for the Exam
  – Parents
  – Institution
  – Child

The Low Vision Exam

• Visual Acuity
  – Use the most sophisticated test the child can complete
    • Response to light
    • Preferential Looking
    • Symbol Matching
    • Number or Letter Identification

• Visual Field Assessment
  – Blink Reflex
  – Confrontation Fields
    • Flicker Light
    • Toys
    • Fingers
  – Threshold Fields
The Low Vision Exam

• Binocularity
  – Hirschberg
  – Cover Test
  – Stereopsis
• Color Vision
  – Ishihara
  – Farnsworth D-15

The Low Vision Exam

• Other Preliminary Tests
  – Accommodative Amplitudes
  – Near Point of Convergence
  – Null Point of Nystagmus

The Low Vision Exam

• Refractive Data
  – Retinoscopy
  – Refraction
  – Cycloplegic Retinoscopy
The Low Vision Exam

- Eye Health
  - Anterior Segment
  - Posterior Segment

Low Vision Considerations

- Magnification
- Visual Fields
- Lighting/Glare
- Educational Assets

Magnification

- Relative Distance Magnification
  - Hold the material closer to the eye
- Relative Size Magnification
  - Enlarge the print
- Angular Magnification
  - Low Vision Devices
- Electronic Magnification
  - CCTV/Software Enhancement
Determining Magnification

- Magnification = reference VA/Goal VA
- Young patients can and should use adds or accommodation

Device Selection

- Task
- Target Acuity
- Cost
- Cosmesis

Spectacles

- Patients with Visual Impairment may not appreciate subjective improvement
  - Should trial frame to determine usefulness
  - Always Polycarbonate
  - Consider for Protection
Glare Control Filters

- Glare can be disabling
- Tints are often disease-specific but are always person-specific

Literacy Medium Recommendations

- Must be based on objective testing
- Large print does not fix all problems
  - Limited availability
  - Very costly
  - Often does not increase reading rate or comfort
- When to consider Braille

Recommendations to the Classroom Teacher

- Allow closer working distances
- Be conscious of glare sources/lighting
- Don’t expect child to read at their VA threshold for long periods of time
- Allow frequent breaks
- Decrease workload or increase time allotted to task
The Optometrist’s Role

• The Eye Disease
  – Diagnosis, etiology, treatment, prognosis and genetic counseling if indicated

• The Visual Status
  – Visual acuity at distance and at near
  – Devices used to obtain threshold acuity AND threshold for fluency

The Optometrist’s Role

• Other Pertinent Findings
  – Visual fields, binocularity, color vision, glare response, and refractive error

• Low Vision Device Recommendations
• Orientation & Mobility Training
• Occupational or Physical Therapy
• Lighting
• Seating in Classroom
• Adaptive Technology Assessment

Thanks for helping the kids

For additional information
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Vision Rehabilitation Section
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Through the Eye of an IMT

Background

- End-Stage AMD
- Disciform Scar or GA
- No Active CNV
- 20/160 – 20/800 BCVA
- Age 65 or older
- Phakic in prospective telescope implant eye

Technology

- Wide-angle micro-optics
- Sits in capsular bag after lens extraction
  - 2.7X has 4.4mm length
  - Provides 20 degree field
- Focused for distance
  - Standard spectacle Rx
  - Enables refined distance and near
Advantages

- Magnification always available
- Better cosmesis
- Better patient acceptance
- Improved face recognition
- Impact on ADLs, hobbies

Challenges

- Magnification of 24/7 in one eye
- Reading- need for additional mag
- Depth perception
- Diplopia- one clear peripheral image and one magnified central image with 60% contrast
- Ambulation- loss of peripheral vision
- ADLs
- Contrast loss
Case History

- 82 yrs old male with h/o ARMD.
- Difficulty with near and far, reading books, mail, bills and statements, Computers/IPAD, painting, missing when shaving- has cut himself, missing lines when signing documents
- Medical History: HTN-Controlled; Colon cancer
- Surgical History: Dental Surgery, Tonsils, colon sx

BCVA:
- OD: -0.75 +1.00 x180 (20/640)
- OS: Plano (20/400)
- GDS: 1/15
- External Telescopic Simulator: w/ filter
  - OD: 20/200;
  - OS: 20/120; able to recognize faces.
- Near: 6.3M with OS at 20cms
  - W/ ETS and +5DS cap: 3.2M
  - W/ETS and +1.50Ds cap and CCTV: 1.0M

OS -implant eye

- walked with OS patched and OD open- a little diff with depth but was able to adjust;
- walked with ETS over OS and OD open; a little woozy; some adjustment time; able to cope overall;
- Very good cognitive skills; willing to cope and work to adjust. Disc contrast issues that can happen;
- OS seems to be the choice of eye for implant.