Visual Development & Rehabilitation Following Traumatic or Acquired Brain Injury

Michelle May, OD, FCOVD
Content Overview

- Behavioral Optometry
- Vision and Brain Injury
- Interconnectedness of Vision with Other Systems
- Treatment of Vision Dysfunction in Brain Injury
- Case studies
Who Am I?

- Michelle May, OD, FCOVD
- Maryland Native
- UMBC class of 2006 (go Retrievers!)
  - Vision therapist in Bethesda
- Southern College of Optometry
  - Memphis, TN - class of 2010
  - COVD president & national liaison
- Residency in Vision Therapy
  - with Leonard Press (Fair Lawn, NJ)
- Fellow of the College of Optometrists in Vision Development (COVD)
- Advanced Family Vision Care (Gambrills, MD)
What is an Optometrist?

- Diagnose and treat diseases and disorders of the eye and visual system
  - Medications
  - Low vision rehabilitation
  - Vision therapy
  - Spectacle lenses
  - Contact lenses

- Optometrist v. Ophthalmologist v. Optician
Behavioral Optometry

- A mode of practice based upon the core principle that vision is a learned process and can be developed or enhanced at any age.

- Education has continued beyond the basic Doctor of Optometry (O.D.) degree
  - Emphasizes the use of lenses, prisms, and vision therapy to enhance visual capabilities, reduce visual stress, and rehabilitate vision problems

Behavioral Optometrists consider visual function and its integration with other senses and the body as a whole.
What is Vision?

Vision vs. Eyesight

- **Vision** - The dominant sense with three areas of function
  - Visual pathway integrity
  - Visual skills
  - Visual information processing

Brain injury can affect all areas of visual function
Vision

70% of all sensory processing in the entire body is directly affected by information coming from the eyes.

**Ambient - Peripheral**
Derives information from the visual system plus information from other senses

**Focal - Central**
Responds to stationary small targets, detail, and color
How Does Brain Injury Affect Vision?

- Blurred vision and/or problems with focusing
- Sensitivity to light (esp fluorescent), glare sensitivity
- Reading difficulties; words appear to move
- Decreased reading comprehension
- Attention and concentration difficulty
- Problems with memory
- Eye Turns (strabismus) with or without double vision
- Headaches with visual tasks
- Inability to maintain visual contact
- Difficulties with eye movements
  - ocular pursuits (eye tracking ability)
  - saccades (shifting gaze quickly from one point to the other)
  - binocular vision (eye alignment, eye teaming)
    - Convergence insufficiency
- Visual field loss
Convergence Insufficiency

- Very common side effect of brain injury

- Contributes to many symptoms listed previously
  - Difficulty with reading & comprehension
  - Headaches
  - Balance problems
  - Judgment of space

- CITT Study
Visual Field Loss

- Common and easy to miss following brain injury
  - True visual field loss vs. visual-spatial neglect

Paris as seen with full visual fields

Paris as seen with bitemporal hemianopsia

Brain Injury and Vision

As many as 50% of those with neurological injury will suffer from changes in the visual system; many are undiagnosed.

- Disruption of neural pathways
- Structural damage
  - Brainstem
  - Cortex
  - Cerebellum
Brain Injury and Vision

- Visual problems resulting from TBI/ABI are often overlooked
  - Too often, these problems are undiagnosed and untreated and can affect recovery
- There are various treatments or combinations of treatments to address residual vision problems
  - Vision Therapy
  - Corrective lenses and/or prism lenses
Vision and Concussion

- Visual problems have been found to correlate so well with head injury that an eye movement test is now being used to screen on the sidelines for concussion.

- **The King-Devick Test**
  - saccadic eye movements
  - Mayo Clinic

http://kingdevicktest.com/for-concussions/research-and-publications/
Vision & Vestibular

- 3 main contributors to **balance**
  - Vestibular + Vision + Proprioceptive

- Dysfunction in any of the three necessitates an over-reliance on the others to maintain postural control
  - There are close neurological links between the visual and vestibular systems
  - When there are balance problems, both should be addressed
    - Vestibular rehab & Vision Therapy
Vision and Vestibular

- Vestibular-Ocular Reflex (VOR)
  - activated when there is head movement, body movements or if the individual leans to one side

Brain Trauma is the second most common cause of vestibular damage

- Tumor is #1
- Symptoms: loss of balance, dizziness, hearing loss, vision problems, and Bell’s Palsy

- Dizziness vs. vertigo
What is Vision Therapy?

- Optometric Vision Therapy is a form of neuro-muscular re-education. It is:
  - A progressive program of procedures;
  - Performed under doctor supervision;
  - Individualized to fit the visual needs of each patient.

- Procedures are prescribed to:
  - **develop, improve, or restore** fundamental visual skills and abilities;
  - Improve visual comfort, ease, and efficiency;
  - Change how visual information is processed or interpreted.
What is Vision Therapy?

- Research has demonstrated that vision therapy can be an effective treatment option for:
  - Ocular motility dysfunctions (eye movement disorders)
  - Non-strabismic binocular disorders (inefficient eye teaming)
  - Strabismus (misalignment of the eyes)
  - Amblyopia (poorly developed vision)
  - Accommodative disorders (focusing problems)
  - Visual information processing disorders, including visual-motor integration and integration with other sensory modalities
What Vision Therapy is NOT

- **NOT** Just “eye exercises”
  - Extraocular muscles are already incredibly strong
- **NOT** Orthoptics
  - Concerned with cosmesis more than function
- **NOT** Experimental or unproven
  - There are many studies that document the efficacy of vision therapy
    - Taught in every Optometry School
    - Residency Programs
    - Fellowship Programs
- **NOT** New, has been around for over 100 years!
- **NOT** A cure for dyslexia and/or learning disorders
Vision Rehabilitation Treatment

- Specialized Testing
- Personalized treatment plan
- Weekly in-office therapy sessions
  - “home therapy” between sessions
- Monthly progress evaluations
- Post therapy progress evaluation
Am I Too Old to Benefit From Vision Rehabilitation?

- No!

- NEUROPLASTICITY in popular media

Dr. Sue Barry

Cavin Balaster

“Cavin Bounce”

In 2011, Cavin survived a two-story fall

http://www.stereosue.com

www.cavinbounce.com
How You Can Help

- **Symptom Checklist**
  1. go through the [checklist](#) with your patients
  2. if they are experiencing 3 or more symptoms on the list, there is a good chance they can benefit from vision therapy
  • Download checklists: [here](#)

- **Consider quality of life**
Post-Trauma Eye Exams

Anyone suffering a brain injury should have a comprehensive **dilated eye exam** and a **visual field test**

- Evaluates ocular and visual pathway integrity
  - Critical: if there have been changes in clarity or if there is double vision

- To find a developmental optometrist:
  - [www.covd.org](http://www.covd.org)
  - [www.oepf.org](http://www.oepf.org)
  - [www.nora.cc](http://www.nora.cc)
Case Study #1

- GV – 65yo WM, work accident
- Strabismus detected on post-trauma eye exam
  - Alternating exotropia with double vision
- With weekly therapy, eye turn and double vision resolved within 6 months
  - Was prescribed 8 months of therapy
- Maintenance therapy
Case Study #2

- JW – 25yo WM, sports concussion
- Headaches, difficulty adjusting focus between near and far, double vision, difficulty reading
- 6 months in-office therapy resolved all symptoms with no recurrence
Case Study #3

- RD, 23yo BF, car accident with severe brain trauma
- Some permanent nerve damage, some loss of function
  - Difficulty reading, blur at distance and near, extraocular muscle restriction
- Combination of lenses and therapy
- 8 months of therapy with maintenance post-therapy
  - Improved clarity, balance & reading ability
Contact Me

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Scholarly Articles Used to Develop this Presentation


Online Resources

- www.covd.org
- www.oepf.org
- www.nora.cc
- www.aoa.org
- Fixing My Gaze – Sue Barry
  - Available on www.amazon.com
- www.cavinbounce.com
- www.visiontherapy.org
- www.braininjuries.org
Questions?