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Persistent Post Traumatic Vision Syndrome - From Onset to Recovery

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Dr. Juanita Collier is a Behavioral Optometrist who specializes in Optometric Vision Therapy in Cromwell, CT. Dr. Collier earned her Bachelor of Arts degree in Biology from the University of Pennsylvania. She then graduated from the State University of New York, State College of Optometry with her Doctor of Optometry degree. While on the Dean's List, she conducted research on Computer Vision Syndrome and received her Masters degree in Vision Science from the Schnurmacher Institute of Vision Research.

Dr. Collier's research has been published in Ophthalmic and Physical Optics; the Journal of the College of Optometrists, Optometry; Journal of the American Optometric Association, and Review of Optometry. She has also completed an externship in Pediatric Vision Therapy at the University Optometric Center in New York City. She is licensed in treating and diagnosing ocular diseases and is proficient in the latest technologies for ocular disease management. She specializes in pediatric vision-related learning difficulties, and primary vision care for patients of all ages.
OBJECTIVES

- Vision as a functional, multifaceted neurological process
- The impact of concussions on the visual system
- Signs and symptoms of Persistent Post Traumatic Vision Syndrome
- Comprehensive evaluation to determine the course of treatment
- Recovery: Vision Therapy’s role in successful rehabilitation

How We See Determines What We See
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Sight is our dominant sense and our primary source for gathering information in learning, navigating through space, and evaluating in order to make decisions.

Vision is More than 20/20

- The relationship between the eyes and the brain
- How we derive meaning from our environment
- A learned process that develops over time beginning at infancy
- Interconnected with other neurological processes

VISION IS A LEARNED PROCESS

A weak spot in any of these key visual areas can hinder learning and affect behavior.
Behavioral Optometry

Is concerned with how vision affects a person's daily functioning in all areas of life.

Determines the cause of the symptoms by performing in-depth vision testing, evaluating eye health, and taking a complete history.

Treats the cause of the barriers affecting a person's behavior, not the symptoms.

Creates permanent change at the neurological level by retraining the brain.

WHAT OCCURS DURING A CONCUSSION?

Vienna/Zurich International Conference on Concussion in Sport, 2012, definition:

“A complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces.”

- Excessive force applied to head or body
- Brain crashes into sides of skull
- Changes in physical, cognitive, or emotional behavior
- Functional disturbance not structural
- Recovery is sequential process

Diagnoses

Concussion
“A complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces.”

Post Concussion Syndrome
Prolonged recovery from initial symptoms

Persistent Post-concussion Syndrome
Imbalance between two visual processes, ambient and focal
Post Concussion Syndrome Symptoms

- Dizziness
- Headache
- Photophobia
- Tinnitus
- Tactile Defensiveness
- Mental/Physical fatigue
- Irritability
- Decreased attention
- Vestibular system dysfunction: balance issues
- Sleep disturbances
- Speaking difficulties
- Residual neck muscle whiplash
- Memory issues

Persistent Post Traumatic Vision Syndrome Symptoms

- Specific subset of symptoms of PCS:
  - Dizziness
  - Headache
  - Photophobia
  - Blurred vision
  - Double vision
  - Spatial disorientation
  - Irritability
  - Confusion in visually stimulating environments
  - Textual Visual Aliasing (perceived movement of static objects)
  - Loss of place when reading
  - Comprehension issues

Diagnosing a Concussion

Physical Examination

1. Thorough head examination
   - Trauma
   - Neck exam
   - Signs of cervical spinal cord damage

2. Comprehensive neurological examination
   - Cognitive functioning
   - Physical functioning
   - Visual functioning
Vestibular/Ocular Motor Screening (VOMS)

- Developed at the University of Pittsburgh:
  - Said to have 90% accuracy in diagnosing a concussion
- Areas tested:
  - Smooth Pursuits
  - Saccades
  - Vestibulo-Ocular Reflex
  - Visual Motion Sensitivity
  - Near Point of Convergence

Visual Signs During Your Evaluation

- Oculomotor Dysfunction
  - Smooth Pursuits
  - Saccades
- Vestibulo-ocular Reflex
- Visual Motion Sensitivity
- Near Point of Convergence

Oculomotor Dysfunction

Example of Oculomotor Issues
Visual Signs During Your Evaluation

- Oculomotor Dysfunction
  - Smooth Pursuits
  - Saccades
- Vestibulo-ocular Reflex
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Reading text especially challenging:
Distortion produced by even the smallest head movements
Bouncing words and shifting letters require more effort to process

Visual Signs During Your Evaluation

- VOR Impairment

Try to read this
May appear like this:
Try to read this
### Visual Signs During Your Evaluation

- **Visual Motion Sensitivity**
  - Mismatch between visual, vestibular, and somatosensory system
  - Discrepancy between what stimuli is expected and what is received

- **Symptoms:**
  - Episodic dizziness
  - Fatigue
  - Imbalance
  - Motion sickness
  - Vertigo
  - Nausea/vomiting

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### Visual Signs During Your Evaluation

- Oculomotor Dysfunction
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- Saccades
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- Visual Motion Sensitivity
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### Example of Convergence Issues

- **When the eyes focus and ads together normally, point on the paper is single and clear:**
  - The dog chased the cat

- **When eyes focus/blend toms, the eyes move independently and print jitters:**
  - The dog chased the cat
Visual Processing Deficits

"Visual-perceptual dysfunction is one of the most common devastating residual impairments of head injury". Barbara Zoltan, M.A., O.T.R.

Visual Processing Deficits

Visual Perceptual Skills:
- Visual Motor Integration
- Visual Auditory Integration
- Visual Memory/Sequential Memory
- Visual Closure
- Visual Discrimination
- Visual Figure Ground Discrimination
- Visual Spatial Relations/Organization

In The Classroom...

- Frequent eye rubbing
- Difficulty remaining on task
- Learning forward to see the board or to read a book
- Fatigue after near work
- Slow performance
- Decreased reading comprehension
- Poor handwriting
- Poor posture
What Is Vision Therapy?

**Vision therapy** is an individualized treatment program prescribed to eliminate or improve conditions such as eye turns, tracking, focusing, eye teaming and learning related vision disorders through the utilization of lenses, prisms, and other optical equipment in a wide variety of activities.

- Trains the visual system to
  - Input accurate information
  - Process visual information efficiently
  - Output an effective response or action

The Vision Therapy Difference

Because of our specialized training, we can go deeper into the visual system and improve the ability to:

- See clearly when focusing, near and far
- Move smoothly, accurately, and quickly from one point to another
- Work together as a team
- Interpret and use visual information effectively

Vision Therapy In Action

- Guided activities done in a safe, comfortable environment.
- Activities are designed to develop specific visual skills.
- Therapy allows for more experiences for learning.
- Therapy includes activities which integrate vision with auditory and visual motor skill development.
Rehabilitative Work in VT Setting

- Active, vestibular work necessary
- Benign neglect does not equal therapy
- Vision-dependent posture causes symptoms
- Establishment of sub-symptom thresholds
- Journaling for planning and pacing
- Energy "diet"

Rehabilitative Work in VT Setting

- Peripheral awareness
- Floor: stabilization
- Compression
- Peripheral → Central → Peripheral
- Sealed pain/discomfort and timing
- Vestibular challenges
- VOR training

Vision Therapy In Action

- Image of patient engaging in vision therapy activities.
- Image of patient performing tasks.
- Text: Vision Therapy In Action.
CASE STUDY PRESENTATION

17 yo white female student athlete
- Sustained concussions on 10/09/13
- Presented on 01/28/2014 with unresolved symptoms of:
  - Becoming easily tired when reading for more than 5 minutes
  - Headaches when reading for more than 5 minutes
  - Eye strain
  - Short attention span
  - Balance inconsistencies
  - Blurry near vision

Incoming Diagnoses:
- Convergence insufficiency
- Accommodative insufficiency
- Intermittent Exotropia

CASE STUDY, CONTINUED

Vision Therapy treatment plan consisted of activities designed to:
- Improve her ability to coordinate both eyes together
- Build appropriate accommodative flexibility
- Improve her visual processing speed

After 20 VT sessions:
- Could read for an unlimited amount of time without discomfort
- No longer experienced headaches
- No longer needed medication
- Resolved all visual diagnoses

Graduated from Vision Therapy with:
- A brighter future – she graduated senior year on time; going to college in the Fall
- Self-confidence – pursued and passed lifeguard training
- More fun – the ability to go on roller coasters once again!

“WHEN I FIRST STARTED VISION THERAPY, MY EYES COULD NOT FOCUS PROPERLY AND I COULD NOT READ FOR MORE THAN 5 MINUTES AT A TIME. NOW I CAN READ FOR AN UNLIMITED AMOUNT OF TIME! I WAS ABLE TO GRADUATE ON TIME AND WILL GO OFF TO COLLEGE IN THE FALL.”
- 4D Vision Gym Graduate, 17 years old

From her mother: “We were so happy to find Dr. Collier and the coaches. Their care and expertise really helped our daughter complete her senior year and be ready for college. Most concussion specialists are unaware that a concussion can create convergence issues with the eyes.”
Conclusions

• Concussions, both rapid recovery and prolonged, can be successfully treated with full recovery of abilities.
• A full evaluation with attention to visual system deficits can be key to unlocking successful rehabilitation.
• A multidisciplinary team is required to successfully treat all areas of dysfunction, with assigned contact people responsible for communicating with all members.

References

1. www.ATSNJ.org
2. Pediatric Strategies for Prolonged Recovery in Pediatric and Adolescent Care. Pediatric Annals 41:9, Vidal, Paul G., PT, MSSc, DPT, OCSE, FAAOMPT; Goodman, Arlene, MD; Colin, Amy, MA, CCC-SLP; Leddy, John L., MD; Grady, Matthew, MD
3. www.WebMD.com
4. International Conference on Concussion in Sport Zurich, Switzerland, November 2008 and November 2012
5. Office Based Management of Pediatric and Adolescent Care. Pediatric Annals 41:9, September 2012. Master, Christina L., MD and Grady, Matthew F., MD
6. Importance of “Return to Learn” in Pediatric and Adolescent Care. Pediatric Annals 41:9, September 2012. Master, Christina L., MD; Cioia, Gerard A.; Leddy, John L. and Grady, Matthew F., MD
References


Images and Animations:
Childrensvision.com
www.vestibular.org
www.4DVisionGym.com

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