

A New Approach to Old Problems: Implementing an Inpatient Vision Rehabilitation Service for Patients with Acquired Brain Injury

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OBJECTIVES

- To review the importance of vision, visual processing and the impact of visual disturbance on function
- To introduce Post Trauma Vision Syndrome and Visual Midline Shift Syndrome and options for treatment
- To discuss our experience with implementing a Neuro-Optometric Rehab Service (NORS) on an Inpatient ABI Unit

Why did we implement NORS?

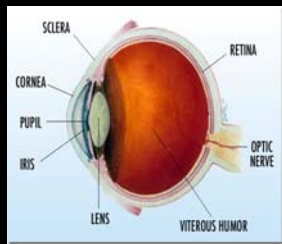
- Took a course taught by Dr. William Padula OD that challenged my previous ideas of why patients presented the way they did post ABI and gave some new options for treatment.

Dr Padula's Definition of Vision

- A dynamic, interactive process of motor and sensory function mediated by the eyes for the purpose of simultaneous organization of posture, movement, spatial orientation, manipulation of the environment and to its highest degree perception and thought.

VISION

- 80% of all that is learned occurs through vision.
- Assessment is often done for visual acuity or visual field problems.
- Vision dysfunction can affect attention, concentration, balance and spatial orientation.



Retinal Processing

- Sensory, motor, emotional and cognitive systems interact and process stimuli transmitted via retinal fiber pathways
- Susceptible to TBI-related dysfunctions
- 59-65% of ABI patients have visual dysfunction
- Pathways can be visual, non-visual or both
- Retinal related symptoms not visible on CT or MRI



Ambient vs Focal Systems

• AMBIENT

- Lightning fast
- Subconscious
- Diverse in brain
- Larger impact on balance/posture & function



• FOCAL

- Slower
- Detailed
- More specific
- Secondary to ambient process

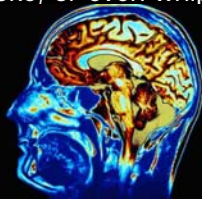


Non-Visual Retinal Related Symptoms

- Persistent headaches
- Memory problems
- Comprehension and attention difficulties
- Balance problems
- Abnormal posture
- Persistent clumsiness
- Persistent motion sickness
- Concentration or anxiety problems
- Disorientation or disorganization
- Subcortical eye-aiming difficulties (nystagmus)
- Persistent dizziness & nausea
- Persistent muscle tension

Post Trauma Vision Syndrome

- A complete collapse of the ambient visual processing system (AVP)
- Can be as a result of a traumatic brain injury, stroke, or even whiplash



Post Trauma Vision Syndrome

- Over focalization
- Spatial-temporal problems
- Results in detail first and spatial second or or spatial is lost all together in severe cases
- Patients try to use their focal system for spatial relationships
- Movements in periphery become detail

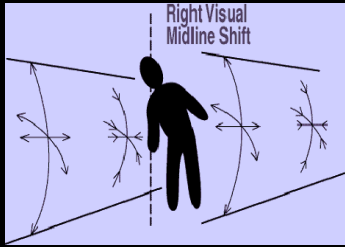
Neuro-Optometric Rehabilitation

- Use *base end prisms* to shift images
- Gently compresses the central vision
- Allows AVP to reestablish itself
- *Binasal occlusion* – put boundaries on vision and minimizes mismatch of vision between 2 eyes.

Visual Midline Shift Syndrome

- A phenomenon where the AVP changes its orientation to concept of the midline
- A mismatch of motor and sensory info from one side to the other
- AVP tried to create balance by expanding its concept of space on one side of the body compared to the other
- The midline shift usually shifts away from the neurologically affected side

Right Visual Midline Shift



Visual Midline Shift Syndrome

- Distortion of ambient visual space reinforces:
 - Hemiparesis
 - Visual neglect
 - Decreased weight bearing on affected side
- Yoked Prisms are used to reorient patient to the midline

Neuro-Optometric Intervention

- Affects changes to brain processing via the autonomic and central nervous systems.
- Alter light by the use of lenses, filters, prisms and occluders thereby sensory system integration.
- When light is angled onto the retina in different way, different parts of the brain are stimulated, chemically and electrically.

....So Now What?

- Needed to do something with this information so our patients could benefit
- Found an optometrist who had the training and was interested in partnering with us – one of only 4 in Canada

Development of NORS

- Literature review
- Drafted proposal to implement vision rehab service at Parkwood
- Developed a vision screening tool (VST) to identify patients requiring neuro-optometric assessment
- Developed forms for necessary documentation & communication
- Purchased needed equipment

NORS AT Parkwood

- First Neuro-optometric inpatient rehab program in Canada
- Early visual assessment and intervention for ABI and Stroke inpatients
- Visual Screening performed by OT & PT to identify patients with visual dysfunction
- Optometrist performs assessment and make recommendations
- Multi-disciplinary team incorporates vision rehab strategies into therapy sessions

Implementation of NORS

- Met with key physicians
- Developed a half day training session provided by ourselves and neuro-optometrist
- Selected key staff members across programs and professions (OT, PT, SLP) to receive training
- Inservices to nursing and other rehab staff to introduce NORS

Implementation of NORS (cont)

- Started service on ABI
- Rolled out service to Stroke Rehab 6 weeks later
- Several follow up meetings with therapy team and optometrist to identify problems and develop quick solutions

Education Day

- Content divided into 2 sections:
- Vision Rehab Education: normal and abnormal visual processing, PTVS, VMSS, neuro-optometric treatment, how to incorporate vision strategies into therapy sessions
- NORS: process for referral and documentation, how to administer VST, communication with optometrist, timeline for rollout

Results - Analysis of VST

<i>Incidence</i>	<i>Agreement with OD</i>	<i>False Positive</i>	<i>False Negative</i>	<i>Pre/Post VST agreement</i>
12/21	15/21	5/21	1/21	18/21
57%	71.4%	23.8%	4.8%	86%

Results – Focus Group

- ABI team identified a number of items that were redundant
- Only one item had strong support from both ABI and Stroke to be removed
- The VST is currently under revision to reduce the redundancies
- ABI team recommended that a patient with a level of RLA 6 is needed to accurately complete the entire tool

Results – Therapist Interviews

- Need for role clarification
- Need for ongoing education
- Need for more equipment
- NORS results in an increased workload demand but allows for improved patient care

Recommendations

- Meet with teams to clarify roles and responsibilities
- Supplementary education day that focuses on treatment strategies
- Process for orientation of new staff
- Streamline VST
- Purchase additional equipment

Future Plans

- More comprehensive program evaluation
- Evaluate effectiveness of interventions on ABI and Stroke
- Increase awareness and treatment of vision dysfunction

Final Thoughts

- Able to implement a new program in a short time
- UWO research project was very helpful in formally defining strengths of the NORS and areas for improvement
- Allowed us to provide management with recommendations supported by data
- Exciting new treatment options for multidisciplinary team that enhances patient care

Dr. Padula Vision Rehab Course

- Parkwood Hospital
- November 19th – 21st
- Applicable to OT, PT, SLP, OD and MD
- Contact Janet Tozer
 - (519) 685-4292 ext 44049
 - Janet.tozer@sjhc.london.on.ca

Reference List – Journal Articles

- Gianutsos R, Ramsey G, Perlin RR: Rehabilitative Optometric Services for Survivors of Acquired Brain Injury. Arch Phys Med Rehabil 69:573-578, 1988.
- Padula WV, Argyris S: Post Trauma Vision Syndrome and Visual Midline Shift Syndrome. NeuroRehabilitation 6:165-171, 1996.
- Padula WV, Argyris S, Ray J: Visual Evoked Potentials (VEP) Evaluating Treatment for Post-Trauma Vision Syndrome (PTVS) in Patients with Traumatic Brain Injuries (TBI). Brain Injury 8(2):125-133, 1994.

Reference List – Journal Articles

- Riggs RV, Andrews K, Roberts P, Gilewski M: Visual Deficit Interventions in Adult Stroke and Brain Injury: A Systematic Review. Am J Phys Med Rehab 86: 853-860, 2007.
- Schlageter K, Gray B, Hall K, Shaw R, Sammet R: Incidence and Treatment of Visual Dysfunction in Traumatic Brain Injury. Brain Injury 7(5): 439-448, 1993.
- Zelinsky D: Neuro-Optometric Diagnosis, Treatment and Rehabilitation Following Traumatic Brain Injuries: A Brief Overview. Phys Med Rehabil Clin N Am 18:87-107, 2007.

Reference List - Textbooks

- Padula WV. Neuro-Optometric Rehabilitation. 3rd Edition, Santa Ana, CA: Optometric Extension Program Foundation, Inc; 2000.
- Scheiman M. Understanding and Managing Vision Deficits: A Guide for Occupational Therapists. 2nd Edition, 2002.
- Zoltan B. Vision, Perception and Cognition: A Manual for the Evaluation and Treatment of the Neurologically Impaired Adult. 4th Edition, Thorofare, NJ: SLACK Incorporated; 2007

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