

# **Optometric Interventions in PCS/PTVS**

**(Post Concussive Syndrome/Post Trauma Vision Syndrome)**

Merrill D. Bowan, O.D.  
**Neurodevelopmental Optometrist**  
[www.simplybrainy.com](http://www.simplybrainy.com)  
Offices:

Pittsburgh South Hills  
412-831-5255  
New Kensington:  
724-339-1233

For over 15 years, optometric clinicians and researchers have been aware of the power of low powered prisms (now being called microprism) and low plus lenses (microplus) in resolving many aspects of Post-concussive Syndrome, (PCS, a mild variant of Diffuse Axonal Injury, DAI). The precise reasons why they have worked have not been well understood.

As outlined below, there are a number of symptoms that develop over time following concussion or whiplash-like injuries. In addressing the symptoms, empirical, problem-based methods have been adopted to address the specific issues. Both developmental vision and neuro-optometrists use therapeutic office-based methods that have worked on non-traumatic visual problems. They were rewarded to find that the methods (lenses, prisms, perceptual and orth-optic visual therapy) resolved many of the issues – even emotional changes – in those who had often suffered from the aftermath of the trauma, even after a number of years had passed.

## **PCS/PTVS**

Post-Concussive Syndrome (PCS) has a number of seriously distressing symptoms:

- Headaches
- Photophobia
- Phonophobia
- Tactile defensiveness
- Mental/physical fatigue
- Decreased Attention
- Irritability
- Emotional distress/anxiety
- Balance issues
- Vertigo/Nausea
- Sleep disturbances
- Disordered thinking
- Emotionally sensitive

Post-Traumatic Vision Syndrome (PTVS), is a specific sub-set of symptoms of the above PCS issues. There are correspondences, but we see that it has additional, specific visual symptoms:

- Headaches
- Photophobia
- Blurred vision
- Dizziness or nausea
- Attention or concentration difficulties
- Confusion in busy visual environments;
- Pulls away from looming objects;
- Upset by objects moving nearby;
- Staring behavior (low blink rate);
- Spatial disorientation;
- Losing place when reading;
- Can't find beginning of next line when reading;
- Perceived movement of stationary objects (especially text, defined as Textual Visual Aliasing);
- Comprehension problems when reading;
- Visual memory problems; and,
- Double vision.

The following signs are often found:

- Exotropia or high exophoria;
- Accommodative insufficiency;
- Convergence insufficiency;
- Poor fixations and pursuits;
- Unstable peripheral vision; and,
- Associated neuromotor difficulties with balance, coordination and posture.

MRI findings are usually negative in PCS and PTVS. The injuries suffered are most often diffuse and are caused by shearing and stretching of the brain fibers (as in DAI), as well as the neuro-toxic cascade induced by the injury. The symptoms often develop days or weeks later, creating suspicions of malingering, neuroticisms, or other psychological issues as they accumulate.

In the past, these symptoms were diagnosed as individual eye problems or muscle imbalances. We now strongly suspect that these eye problems and other reported difficulties that result from a brain injury occur because of a syndrome of systemic interferences.

The neurologists and pharmacists studying the issues in PCS have good reason to suspect an excitotoxic process that builds up across time, releasing toxic levels of the neurotransmitter glutamate, which then breaks down the normal neuronal architecture. As a consequence, the super-normal levels of glutamate can especially affect retinal tissue, causing visual system irritability, amplified light sensitivity (photophobia), and an exaggeration of many, if not all, sensory and cognitive responses as it leeches throughout the CNS.

## **MICROPOWER LENSES AND PRISMS**

Our clinical investigations have revealed that very low powered lenses and prisms (microprism and micro-plus) are powerful tools in addressing a high percentage of PCS/PTVS sufferers. The results are fascinating because the changes are immediate. Extremely light sensitive PCS patients with severe balance issues often stop using dark sunglasses immediately with the application of microprisms and one patient changed from a 20% composite score on the Balance Master™ to 76% in less than a week's time. (Bowen, 2010).

Nasal patches on their glasses have also been seen to have a salutary effect on some of the symptoms of these patients. This does create some minor cosmetic issues, however.

It is also highly significant that in one study, changes in P-100 (VEP) values were recorded in every patient in the study when microprisms were applied. [Padula, et al (1994)]

## **THE FUTURE**

As mentioned at the outset, the reason that these interventions work is now beginning to emerge. One recurring postulation is that the novelty of the change in visual input stimulates the release of dopamine (DA) from the peripheral retina, which may trigger a DA cascade throughout the CNS. (The instant changes frequently seen in light sensitivity and in Y-B color vision are supportive observations for this, since DA is an antagonist for the effect of glutamate in the retina and also affects Y-B perception.) Additional clinical and didactical research will be needed to verify the accuracy of this thinking. For the present, the risk to benefit ratio is extremely low and the measure is cost-effective.

Until those things occur, the use of microprism and microplus lenses as a clinical probe and potential intervention needs to be encouraged for screening candidates when addressing the life-disturbing issues of these sufferers.

## **Additional Reading**

Bowen, MD. Objective support for optometric intervention in traumatic brain injury, a case report of microprism application. Poster. 6th ICBO. April 8-11, 2010. Ontario CA.

Padula WV, Nelson CA, Padula WV, et al. Modifying postural adaptations following a CVA through prismatic shift of visuospatial egocenter. Brain Inj. 2009 June; 23(6)566-76.

Centre for Neuro Skills: Post-Trauma Vision Syndrome: Parts I and II. Padula W, Argyris S. <http://www.neuroskills.com/tbi/vision1.shtml>

Neuro-Optometric Rehab. Assn (NORA): Post Trauma Vision Syndrome, Visual Midline Shift Syndrome. <http://nora.cc/content/view/31/74/>

Padula WV, Argyris S, Ray J. Visual evoked potentials (VEP) evaluating treatment for post-traumatic vision syndrome (PTVS) in patients with traumatic brain injuries (TBI). Brain Inj. 1994 Feb-Mar;8(2):125-33.