



The Emerging Field of Neuro-Optometry Provides a Synergistic Effect with Ophthalmology

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Editorial

In addition to saving and maintaining eye health, ophthalmologists perform surgery and prescribe glasses to help patients use central eyesight at a conscious level to identify 20/20 letters (non-moving targets). The quality of central eyesight is often dependent on the stability of the peripheral eyesight. However, peripheral processing of moving targets is usually at a subconscious level. Eye glasses prescribed for central eyesight do not necessarily address peripheral processing and are not sufficient in some patients – such as those who have autism or a brain injury.

In the emerging field of neuro-optometry, specially trained optometrists prescribe glasses to induce changes in physical and physiological functions that can improve overall visual comfort rather than simply clearness. This differs from neuro-ophthalmology which identifies and diagnoses physical and physiological conditions that manifest in visual impairments. More specifically, in neuro-optometric practices, emphasis is on expanding peripheral awareness and enabling the patient to navigate around three dimensional space - part of ambient processing. By comparison, the ophthalmologic emphasis is on central eyesight – focal processing. Focal and ambient processing are best when working together, promoting a synergistic effect between the two professions.

The retina originates as a piece of brain tissue – an extension formed during embryonic development. It is a part of the central nervous system and receives feedback signalling from the body, in addition to incoming eyesight information. At any given moment, the retina acts as an interface between the outside environment and internal processes, either activating or deactivating awareness of the outside environment. One common neuro-optometric treatment involves prescribing customized eyeglasses that incorporate prisms, lenses and filters to influence brain chemistry and electrical activity as well as eyesight.

An example of neuro-optometric usage is provided after cataract surgery, where 20/20 central eyesight is often restored. However, other systems may be affected if the right and left circuitry remain imbalanced. For instance, depth perception may be reduced, the patient may be more sensitive to light, or their sense of balance may be impaired. Carefully prescribed neuro-optometric lenses can balance the sensory inputs during the typical co-management of patient care after the cataract surgery.

An interesting case study in neuro-optometric treatments involves the degenerative condition Acute Zonal Occult Outer Retinopathy (AZOOR). A 44-year old patient went to various ophthalmologists for 7 years with a complaint of visual discomfort when reading and walking. Since the central eyesight on this bilateral emmetrope was 20/20 with each eye, lenses would not help him see more clearly. It was determined that the patient had degenerated areas on the top of each retina, and nothing more could be done. His complaint continued, due to light bouncing up from the floor and books toward the superior retinal receptors, right onto the degenerated areas. He did not need lens power to enhance clarity of central eyesight. Instead, the prescription involved using a yoked prism to divert light away from damaged areas of each eye and onto healthy retinal areas. This treatment alleviated his symptoms, and restored overall comfort.

In essence, ophthalmologists look at eyes and visual systems while neuro-optometrists look at brains and navigation systems. General ophthalmologists emphasize structures, and are looking for diseases. If the patient can see clearly and doesn't suffer from eye paralysis, eyeglass prescription are often be measured with each eye alone. Neuro-optometrists can add value by prescribing individualized glasses to calm the nervous system. Neuro-optometric treatments have been found to be particularly effective in treating brain injuries, as shown in Professor Clark Elliott's 2015 book, *The Ghost in My Brain*.

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An impaired brain is like an orchestra out of sync. Separately, each instrument and musician seems fine, but some are playing too quickly and others too slowly. Customized eyeglasses act as a conductor, bringing systems back to synchronization so that the orchestra – or brain, in this case – can function efficiently again. The general ophthalmologist keeps the eyeball healthy and the central eyesight clear. The neuro-optometrist provides the patient with the ability to use the peripheral eyesight to gauge distances and

navigate their environment. Both structure and function can have a role in rehabilitation especially when following brain injury. Neuro-optometry is a field in itself, affecting the overall comfort of a person as well as the external eyesight. The need for collaboration of the two fields is growing, and this inaugural journal issue can be the beginning of a new treatment paradigm.