Neuro-Optometry: An Evolving Specialty Clinic … 40 Years Later: A Perspective

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The area of “neuro-optometry” has grown rapidly and broadly over the past several decades, and it will continue to evolve, as we learn from our past and make new inroads and advances into the future. But what exactly do we mean by “neuro-optometry” and perhaps now more accurately, “neuro-optometric rehabilitation (NOR)”?

Some nicely articulated answers come from the COVD website: (www.covd.org). It “ … represents a specialized area of optometry, which addresses the oculomotor, accommodative, visuomotor, binocular, vestibular, perceptual/visual information processing, and specific ocular/neurological sequelae of the acquired brain injury population. It includes “standard optometric modalities, such as corrective lenses, prisms, tints and coatings, and optometric vision therapy.” This includes the diagnosis of the visual sequelae present and their remediation, that is, a dual-pronged neuro-optometric rehabilitative evaluation. These descriptions present and allow for a comprehensive approach and conceptualization of the area for the optometrist, as well as other professionals involved in their own related specialty (e.g., the physiatrist).

One might ask, “How did the area of neuro-optometry come about?” To such a broad and personalized question, there rarely is a single answer, as history typically reveals several independent avenues that develop over a similar timeframe, then overlap and converge, and ‘suddenly’ a new field emerges. The particular ‘milestone’ for the present authors was a paper from the Stark laboratory at Berkeley co-authored by the present first author (KJC): “Neuro-optometry: An Evolving Specialty Clinic” published in 1977, in which the authors considered it to be “an optometric clinical specialty focusing on neurological dysfunctions of the visual system”, a broad description at the time that included eye movements, accommodation, and the pupil using objective, laboratory-based protocols and instrumentation, in conjunction with the clinical findings. Larry Stark was a board-certified neurologist and widely considered to be the “father of bioengineering”, a brilliant and futuristic thinker, and true friend of the profession of optometry. He did not care much about your professional degree, but rather your brain-power and creativity! Interestingly, both the second and third authors were also influenced by Larry: Barry Tannen spent an externship at his Berkeley laboratory while still an optometry student, and has subsequently spent much of his career in this field, and Diana Ludlam used Larry’s theory

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of oculomotor ‘scanpaths’\(^2\) (1971) to explain visual information processing problems to her patients over the past 45 years — Larry was clearly influential in optometry! While the original 1977 paper concentrated on eye movements, accommodation, and the pupil, it had broader implications, both for the care of these patients, as well as the scope of the care, and even more broadly, the optometric profession itself.

There were other significant early developments and milestones that were influential to the growth of neuro-optometry, some of which included the following. In 1990, the Neuro-Optometric Rehabilitation Association (NORA; www.nora.cc) was founded and remains an educational and political force in the area. NORA provides lectures, symposia, courses, and formal fellowships in the area in the United States, and internationally. Its intent is to integrate the best science and clinical aspects to improve the care of this broad population having neurological and developmental disorders, accompanied by problematic visual sequelae. Another key group is the College of Optometrists in Vision Development (COVD) founded in 1971, with a broad agenda of important visual dysfunctions to care for, including those individuals with visual developmental and neurological disorders, and others. It has an international examination certification board for both optometrists and vision therapists. COVD’s mission is educational, both nationally and internationally. They too have a wide array of educational programs, most recently with emphasis on acquired brain injury. Lastly, from this historical perspective, some of those who pioneered the area, and involved in one or both of the aforementioned organizations, include: Irwin Suchoff, Lynn Hellerstein, Bill Ludlam, Vincent Vicci, Penelope Suter, Bill Padula, Danny Gottlieb, and Allen Cohen, and others, who have made a range of important contributions in both the clinical and research arenas.

And, in more recent times, advances in clinical research have elevated neuro-optometric rehabilitation to new heights. This too includes a range of objective approaches: documentation of the oculomotor system and reading in mild traumatic brain injury (mTBI) and stroke, both before and after vision therapy, as done in our SUNY Brain Injury Laboratory;\(^3\),\(^4\) assessment of cortical responsivity and visual attention using the visual-evoked potential (VEP) following some vision intervention, such as vision therapy\(^5\) or binasal occlusion,\(^6\) with this also done in our laboratory; and on-going investigations using imaging techniques to record brain changes following vision therapy. Interestingly, all of the above “recent advances” were foreseen and predicted by the Stark et al paper\(^1\) in 1977, namely objective approaches and instrumentation to assist in the diagnosis, prognosis, and therapy of these patients.

Thus, the future bodes well for optometry, and more specifically the area of neuro-optometric rehabilitation. There continues to be a rich, symbiotic relation between the clinical and laboratory domains, with resultant improvement in neuro-optometric rehabilitative care.

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