



## Vision Therapy

*Revised: February 21, 2024*

### **Background:**

The American Optometric Association defines vision as "... not simply the ability to read a certain size letter at a distance of 20 feet" but as "a complex and adaptable information gathering and processing system which collects, groups, analyzes, accumulates, equates, and remembers information."<sup>i</sup>

Dysfunctions in any part of the visual system can lead to symptoms ranging from blurry or spotty vision, a narrowed visual field, light sensitivity, and headaches to complete blindness. Such dysfunctions can be congenital, developmental, or result from traumatic or acquired brain injury (concussion, TBI, or stroke). Among children, dysfunctions in the visual system and their associated symptoms may co-exist with certain learning disabilities, such as dyslexia and reading difficulty. Even though they may exacerbate certain disabilities, caution should be exercised so as not to conflate them with the learning disabilities themselves or to label them as the singular or even primary cause of learning disabilities.

Because visual system dysfunctions tend to occur as co-morbidities with learning disabilities and brain injuries, it is imperative that they are treated in conjunction. With this approach, vision therapy, a well-tested and proven optometric set of tools becomes an important element of a comprehensive, collaborative, and interdisciplinary approach to clinical care – one that has been proven to be most effective for best patient outcomes. Contrary to common belief, vision therapy is not a treatment for developmental, behavioural, and cognitive disabilities. It is rather an approach for addressing visual system dysfunctions, which may coexist with or exacerbate some such disabilities as dyslexia.<sup>ii</sup>

### **What Vision Therapy is:**

Vision therapy is a term that refers to sequential, sensory-motor perceptual stimulation programs that are used to improve vision skills.<sup>iii</sup> Vision therapy is performed under the supervision of an optometrist, whereby a specific program is designed to help the patient gain or regain specific visual skills.

The practice of vision therapy is anchored in neuroplasticity, a well-established and continuously growing field of scientific research and clinical practice. One way to define neuroplasticity is "the ability of the nervous system to change its activity in response to intrinsic or extrinsic stimuli by reorganizing its structure, functions, or connections after injuries, such as a stroke or traumatic brain injury (TBI)."<sup>iv</sup> Vision therapy is, therefore, not simply "eye exercises," as some purport it to be, because the conditions that vision therapy addresses are rarely musculoskeletal. Rather, it is a group of techniques and tools that,



combined, take advantage of the malleability of the human brain and its ability to learn or re-learn certain visual processing skills.

Vision therapy can be applied to address a wide range of symptoms such as headaches, double vision, blurry vision, inability to focus when reading, and difficulty with tracking objects. For example, vision therapy can help align crossed eyes, or help an individual regain functional vision by recovering from brain injury symptoms such as dizziness and difficulty with reading. It can also be used in Sports Vision to enhance an athlete's visual skills, such as reaction time and visual-motor integration. Like any other skill, visual skills are developed as the child grows and can be improved with training. Vision therapy helps individuals learn, relearn, and reinforce specific visual skills, such as eye movement accuracy, focusing control, and coordination of the two eyes.

Vision therapy starts with an initial assessment to determine the individual's vision status and needs. Depending on the results from the initial assessment, a treatment program with tailored visual tasks is prescribed. The program involves repetition of the prescribed visual tasks under the supervision of a trained optometrist. In addition to visual tasks, specialty lenses, prisms, filters, stereo-viewers, and video games may be used. Sophisticated equipment and instruments may also be used to increase the brain's ability to process visual information.

The time required to complete a vision therapy program can vary depending on factors such as the number of visits to the optometrist, the length of each visit, the number of in-office therapy sessions, and the number of at-home therapy sessions if prescribed. The program's course depends on the type of condition, the condition's duration, the individual's age, and the desired improvement level. A typical program may take from a few weeks to several months. Vision therapy has proven to be an effective treatment for many vision-related problems that cannot be treated with glasses or contact lenses alone.

### **Strength of Evidence:**

While randomized controlled trials (RCTs) are considered the "gold standard" for establishing causal relationships between clinical treatments and effects, it is becoming increasingly recognized and established that "real world" observational studies and those that might not adhere to strict RCT criteria play an increasingly important role in public health and real-world clinical decision-making and practice. In his paper "Randomized Trials vs. Real-world Evidence. How Can Both Inform Decision-making?" Sheldrick explores this in more detail.<sup>v</sup> While RCTs and observational studies have their strengths and weaknesses, considered together, they likely lead to the best clinical decisions and outcomes. Neither should be discounted. In fact, an analysis of Cochrane reviews showed that only 13.5% (just over one in ten) of clinical interventions are based on what is called "high quality" or Level III" evidence<sup>vi</sup> as per the Grading of Recommendations, Assessment, Development and



Evaluation system. Therefore, the argument that vision therapy practice should be discounted on the premise that it is not supported by high-quality RCT evidence is moot. Furthermore, vision therapy is recommended in Canada for the management of conditions such as mild traumatic brain injury (mTBI) <sup>vii</sup> in conjunction with other treatments in an interdisciplinary manner for the achievement of best patient outcomes.

The above notwithstanding, RCT evidence does exist, which demonstrates the efficacy of vision therapy in treating oculomotor deficits, particularly convergence insufficiency, which is prevalent among mTBI patients and is predictive of prolonged mTBI symptoms.

## Position Statement:

Vision therapy, a well-established practice anchored in neuroplasticity, is an effective approach to addressing certain visual system conditions, either on their own or when they coexist with certain learning and developmental disabilities or with traumatic or acquired brain injury. Vision therapy is one of many tools that can and should be utilized. When addressing developmental or learning disability, traumatic or acquired brain injury, every effort should be made to offer the patient the most holistic and interdisciplinary approach to treatment and rehabilitation, in a person-centred care approach, not an “organ-centred” one. This, by default, would include vision therapy.

## References

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<sup>i</sup> The efficacy of optometric vision therapy. The 1986/87 Future of Visual Development/Performance Task Force. J Am Optom Assoc. 1988 Feb;59(2):95-105. PMID: 3283203

<sup>ii</sup> Lack, D. Another joint statement regarding learning disabilities, dyslexia, and vision rebuttal. Optometry (2010) 81, 533-543.

<sup>iii</sup> Pinero, DP. Science-based Vision Therapy. Journal of Optometry (2016) 9, 203-204.

<sup>iv</sup> Puderbaugh, M., Emmady, P. [Neuroplasticity](#). National Library of Medicine, National Center for Biotechnology Information. 2023

<sup>v</sup> Sheldrick, R. Christopher. [Randomized Trials vs Real-world Evidence. How Can Both Inform Decision-making?](#) JAMA. 2023;329(16):1352-1353. doi:10.1001/jama.2023.4855

<sup>vi</sup> Howick J, et al. The quality of evidence for medical interventions does not improve or worsen: a metaepidemiological study of Cochrane reviews. Journal of Clinical Epidemiology v. 126 pp 154-159. 2020. <https://doi.org/10.1016/j.jclinepi.2020.08.005>

<sup>vii</sup> Marshal, s., et al. Updated clinical practice guidelines for concussion/mild traumatic brain injury and persistent symptoms. Brain Injury, 2015; 29(6): 688-700.