

## GUEST EDITORIAL

## The optometrist's role in learning difficulties and dyslexia

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This issue of *Clinical and Experimental Optometry* publishes an invited review by Dr Trichur Vidyasagar on the neural underpinnings of dyslexia, which presents important ideas for optometrists who are involved in helping children with learning difficulties.

There is a long history of swings in emphasis between visual factors, language factors and neural processing in theories of causation of dyslexia. At one stage, eye movements were considered by some to be a primary factor in dyslexia.<sup>1</sup> Lovegrove<sup>2</sup> was one of the first to propose deficits in neural transmission as significant in the aetiology of dyslexia. Currently, the weight of opinion holds that problems using the sounds of words (phonological processing) are the major barrier to learning to read for people with dyslexia. This can cause problems in acquiring letter sound/symbol matches and breaking words into sounds, a difficult task given the illogicality of the English language. There is often a strong family pattern to these deficits, with father and son most commonly affected, as boys with learning difficulties outnumber similarly affected girls by a ratio of five to one.

Many children and adults have weaknesses in reading or other aspects of learning but most have mild or moderate learning difficulties rather than dyslexia. The

continuum from mild reading inefficiencies, through moderate to severe reading difficulties and disabilities, to dyslexia is not well understood by most of our community. Dyslexia can often be applied indiscriminately as a label for children with learning difficulties by parents and teachers. A diagnosis of dyslexia should be a diagnosis of exclusion, made as a result of specific educational tests, when other factors, such as intellectual disability, dysfunctions of hearing or vision, inadequate learning experiences or cultural issues have been eliminated.

Some researchers and practitioners have proposed single-deficit diagnoses for dyslexia, suggesting unique 'cures' with dramatic results. In the visual field, these include treating mixed eye versus hand dominance, coloured lenses and small degree prisms. However, most practitioners involved in the care of children and adults with severe reading problems will admit that the deficit is almost always multifactorial in origin and requires a multidisciplinary management approach. One of the key decisions demanded of a person practising in this field involves whether the identified deficits (visual, language, physical et cetera) are primary causes of the reading difficulty or are contributory factors. Optometrists are frequently drawn into the process of developing a differential diagnosis of the causes of learning difficulties, particularly in relation to the degree to which any visual dysfunction is affecting learning.

Optometrists do not treat dyslexia or

teach reading. We treat people with learning difficulties who have visual dysfunctions that interfere with their ability to use their vision to learn to read, and to read to learn effectively, and who will benefit from instruction. When a child presents with 'reading difficulties', my initial case history questioning is designed to elucidate whether this child has or had a primary problem learning to read or whether he or she learned to read well but is now having difficulty reading efficiently.

Primarily, learning to read requires visual and auditory information processing. Any child who is having significant difficulty learning to read should have a full optometric assessment of ocular health, refraction, binocular vision, eye movements and accommodation to identify any factor that is impeding the process of learning to read. The major issues to be considered are the levels of development of visual and auditory information processing in relation to established norms for a child of that age and gender and in terms of being able to meet the individual demands of schooling for that child.

Typically, a child in early grades of school is not required to maintain accommodation and convergence for long periods and so visual dysfunctions are less likely to interfere with the process of learning to read. As the child develops reading skills, it is necessary to maintain visual attention and near visual function for longer periods in the reading-to-learn process. Under these conditions, dysfunctions of accommodation can significantly interfere

with the comfort, clarity, speed, accuracy and enjoyment of reading. As intensive reading instruction and practice are introduced as early as preschool in some schools, the visual demands increase dramatically on a visual system, which may not be sufficiently robust to cope. As an example, I have experienced recently a spate of children aged five to six years who learned to read at the very early age of three to four years, all of whom have severe convergence insufficiency associated with accommodative dysfunction.

Vision therapy is employed by many optometrists to improve visual function where there is a deficit of accommodative convergence and eye movements, and to help a child to develop more normal age-expected levels of visual information processing. This allows children to use their vision to access the curriculum as efficiently and comfortably as possible and to use their processing skills to learn at more complex levels. The literature regarding vision therapy for learning problems is controversial and contradictory, to a great extent because there are widely varying definitions of learning problems and the type of vision therapy involved.<sup>3</sup>

Optometrist Geoffrey Sampson is completing a PhD study entitled 'Efficacy of treatment for visual information processing and its effect on educational performance in children' at The University of Melbourne, co-funded by the Department of Optometry and Vision Sciences and the Australasian College of Behavioural Optometrists. Children with concurrently reduced literacy and visual information processing (VIP) dysfunction were divided into two groups, a control group and a group provided with vision therapy to improve lags in development of VIP. The changes in VIP and educational measures have the potential to provide evidence of definitive cause and effect relationships between visual processing and reading performance in some people.

It has been argued that visual factors are unrelated to significant learning difficulties and that optometric care is of no benefit in the treatment of dyslexia. The policies of Optometrists Association Australia and the American Optometric Association

on learning difficulties, the relationship of vision and learning and vision therapy are in direct contradiction to the American Academy of Ophthalmology's policy statement, which has been comprehensively rebutted by Flax.<sup>4</sup>

Grisham and Simons<sup>5</sup> put the optometrist's point of view succinctly:

*'If a patient's symptoms include constant or intermittent blur, diplopia, jumping or distortion [or] misreading of symbols, a decoding error can occur. The anomaly disrupts the first stage of bottom-up processing, the discrimination and identification of symbols and all subsequent higher stages of processing are affected. Second, nearly all vision anomalies that affect reading at all affect it indirectly by slowing or limiting reading performance through some neurophysiological stress response—eye strain, headache, fatigue, inflammation or a vague sense of discomfort. The reader must exert more effort to decode and comprehend the meaning of the passage. Both direct misperception and indirect asthenopic symptoms can also contribute to conscious or unconscious avoidance, behaviour commonly seen as inattention, distractibility, restlessness or hyperactivity, boredom, fatigue and a general dislike of reading tasks.'*

Parents looking for reasons and treatment of a child with significant learning difficulties are faced with a confusing choice of 'experts'. In the absence of organised and cohesive strategies to identify early, assess and remedy factors potentially contributing to the learning difficulty, parents are forced to try one professional after another, through myriad testing and treatment programs and compensatory strategies. It is the optometrist's responsibility to provide appropriate assessment and management of any visual factor that may be a significant cause of the difficulty or may contribute to the overall problems in performance. An integral component of optometric care of learning-related visual difficulties should be balanced counselling of all parties involved about the importance of visual factors, the potential benefits of optometric treatment and the possible need for other investigations revealed by the optometrist's case history and assessments.

The application of optometric expertise

and insight for people with reading deficits depends significantly on the individual's history and examination results, as the following recent cases illustrate:

V is a 15-year-old girl who does not enjoy reading but learned to read well initially. She has visual acuities of 6/6 each eye but also has manifest hyperopia of +1.75 dioptres OU and a near esophoria of 11 prism dioptres, a high lag of accommodation and poor vergence function. She has a significant visual dysfunction that interferes with her reading concentration, comprehension, accuracy and comfort, which she has solved by consciously and unconsciously reducing her reading visual workload. She has a reading problem and requires optometric care but she definitely does not have dyslexia.

Her brother, K aged 10 years, has severe problems with reading and spelling, although his writing and mathematics are reported to be average for his age. He has normal intelligence but has been diagnosed with dyslexia by a number of authorities using standardised tests. He also complains of blurred vision on the board, close work blur and doubling after one minute of reading, frontal headaches, losing his place and missing words when reading. He has normal visual acuities and ocular health, minor hyperopia but a near exophoria of 12 prism dioptres and significant vergence and accommodative dysfunction. Visual information processing assessment indicated no significant evidence of delays in development of his visual perception that would interfere with learning. He has dyslexia. His visual dysfunctions are not the major cause but they are now a contributing factor to his reading difficulties, interfering with clear and comfortable near visual function, as well as diverting his visual attention from processing to the basic task of seeing clearly, and significantly reducing the benefit of reading remediation efforts. He requires optometric management of his visual dysfunctions and counselling of his parents and other professionals so that they understand that his visual information processing skills are not a factor in his dyslexia and communication with others, and regarding the effects of his visual

dysfunction and of his visual strengths and weaknesses on learning and remediation. The optometric care will remove any visual barriers to him reaching his potential.

Optometry's scope of service includes assessment and management of visual function and visual information processing deficits. A child or adult with reading problems attending an optometrist has a right to expect a competent examination and advice regarding possible visual impediments to reading, as well as referral where indicated for more specialised optometric investigation. Equally, optometrists must continue to educate the public and other professionals on the role of vision in learning, just as researchers will continue to search for the range of factors that cause many adults and children to not easily read our language.

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