Vision disorders do not cause learning problems as often as you might think

■ Jerome Rosner, O.D.

ABSTRACT

The optometrist's examination is designed to obtain information that is inherently relevant to the health and proper functioning of the visual system. It is important, however, that he/she also know what subset of that information is needed to address specific clinical problems. For example, when a child with an enigmatic school learning problem presents, which visual functions, if impaired, will generate learning problems and, if remedied or/and effectively accommodated, will enable the child to progress satisfactorily in the classroom. This paper argues that the list is short and identifies those functions.

KEY WORDS

learning problems, perceptual skills, visual functions

Children with enigmatic school learning problems (i.e., children who do not make satisfactory school progress despite adequate IQ: children who are often called *dyslexic* or *learning-disabled*) frequently exhibit behaviors/symptoms that imply a vision disorder; e.g., letter reversals, frequent loss of place on page when reading, trouble completing paper work, etc. Hence, they often seek our services.

Certainly, the optometrist is always obliged to conduct a comprehensive examination. But we are also obliged to know *which* vision functions, if deficient, are likely to generate those worrisome classroom behaviors. Further, we should not simply conclude, by virtue of "logic" or because of statistical correlations, that all vision functions fall into this category.

In other words, the optometrist must not only measure vision functions and treat those that do not meet standard criteria, he/she must also know how those behaviors affect classroom performance. For example:

Visual acuity

Obviously, the child in a standard classroom must be able to see his school materials, but that does not necessarily require 20/20 acuity. There is much empirical evidence that illustrates this.

Ocular motilities

Although there are many who support the proposition that poor readers ARE poor readers because of faulty eye movements (some stress versions; others emphasize saccades),[1-3] their respective cases are based on statistical correlations rather than on valid evidence. Indeed, there are compelling data to support the opposite proposition: that poor readers have poor eye movements while reading simply because they are poor readers; their eye movements are not impaired when engaged in other visual tasks.[4,5]

Refraction

The data are convincing: myopes tend to be good school achievers; hyperopes are more prone to school difficulties; and astigmats are difficult to categorize.[6,7] The unanswered question in this regard: How much hyperopia justifies compensatory lenses? Few would argue against prescribing compensatory lenses for the school child with significant hyperopia, but not enough is known about the degree of hyperopia required to earn the designation of "significant."

Phoria

Although there is reason to believe that heterophoria may hamper school performance (depending on the magnitude of the heterophoria, the patient's relative fusional vergence capacities, and the extent to which the patient adapts to vergence stress by suppressing versus manifesting diplopia), there is no evidence to show that it CAUSES a learning disability.

Binocular status

Strabismus has not been found to be a significant factor in a child's school achievement except in those cases where the strabismus is caused by a CNS disorder that also produced the learning problem.[8] This shows what, in my opinion, many experienced O.D.s know: Satisfactory school achievement does not always REQUIRE the participation of two eyes.

Accommodative/vergence facility

These functions are frequently implicated in discussions regarding learning disabilities--and, again, it is more on the basis of reasoning than on hard data.[9] As of this date, there are no data showing that accommodative and/or vergence infacility produces school failure. Indeed, it appears to be exceptionally difficult even to collect valid data regarding these functions because of the unreliability of the tests that are used to measure them.[10]

Ocular health

Obviously this is an important concern, but not one directly related to school performance except in those situations where the pathology impairs visual acuity

or any of the other visual functions that have a negative effect on classroom performance.

Perceptual skills

For our purposes, the term *perceptual skills* refers to the basic analytic aptitudes that normal children are expected to develop on a predictable schedule during the first decade of life. These aptitudes enable children to analyze what they see and hear on the basis of concrete (sensory) as well as abstract (semantic) features.[11] These skills are critical to learning to read, write, spell and do arithmetic because it is the concrete features of information that the symbols of the classroom (letters and numerals) code. Once the child identifies these features, reading, writing, spelling and arithmetic make sense. If they are not identified, then the child's only alternative is to attempt to memorize what he is to learn--an impossible task.

Visual perceptual skills

Visual perceptual skills, in behavioral terms, refers to the ability to identify the concrete features of spatially-organized patterns. The optometrist usually assesses this with standardized geometric design copying tests that reveal how effectively the child can identify the (concrete) features of quantity, magnitude and spatial relationships. The link between being able to identify these features and the classroom is obvious. These concrete features provide a basis for classifying information which is a must with respect to memory and reading comprehension. In arithmetic, they represent precisely those spatial features that numerals symbolize.[12]

Auditory perceptual skills

Auditory perceptual skills refers to the ability to recognize the concrete features of acoustical patterns. In discussing school performance, the acoustical patterns of interest are spoken words, and the concrete features are the separate sounds--the phonemes--and their temporal sequences. Once again, the link between these skills and the classroom is apparent. Phonemic analysis provides the basis for learning to read and spell in that it enables the child to identify those features in spoken information that letters symbolize.[13]

Conclusion

The optometrist examines all patients as thoroughly as the situation requires, employing those tests that provide the information needed to address the patient's spoken (and unspoken) concerns. When serving children with puzzling learning problems, we should pay particular attention to those vision functions that, if successfully remediated (before the child gets too far behind in school) and/or accommodated (if remediation provides an unfavorable prognosis), will improve school achievement. These visual functions are, specifically, visual acuity, ametropia (especially hyperopia), and (visual and auditory) perceptual skills.[14]

Obviously the other vision functions should also be assessed and treated if found to be deficient. However, treatment should not be initiated to eliminate a possible learning disability, but rather because these functions are important for clear, single, simultaneous binocular vision, independent of school performance concerns.

Treatment recommendations should be formulated in accord with existing knowledge rather than on the basis of well-intentioned wishful thinking. To prescribe a treatment based on correlational evidence rather than cause-effect evidence, on the strength of "it can do no harm and it might even help" reasoning, represents a disservice to the patient. IT DOES DO HARM. It wastes resources and serves to discredit the profession.

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Corresponding author:
Jerome Rosner
University of Houston
College of Optometry
4901 Calhoun
Houston, Texas 77204-6052

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