

# AMERICAN ACADEMY OF PEDIATRICS

Committee on Children With Disabilities, American Academy of Pediatrics (AAP) and American Academy of Ophthalmology (AAO), American Association for Pediatric Ophthalmology and Strabismus (AAPOS)

## Learning Disabilities, Dyslexia, and Vision: A Subject Review

**ABSTRACT.** Learning disabilities are common conditions in pediatric patients. The etiology of these difficulties is multifactorial, reflecting genetic influences and abnormalities of brain structure and function. Early recognition and referral to qualified educational professionals is critical for the best possible outcome. Visual problems are rarely responsible for learning difficulties. No scientific evidence exists for the efficacy of eye exercises ("vision therapy") or the use of special tinted lenses in the remediation of these complex pediatric developmental and neurologic conditions.

### BACKGROUND

Learning disabilities have become an increasing personal and public concern. Among the spectrum of issues of concern in learning disabilities, the inability to read and comprehend is a major obstacle to learning and may have long-term educational, social, and economic implications. Family concern for the welfare of children with dyslexia and learning disabilities has led to a proliferation of diagnostic and remedial treatment procedures, many of which are controversial or without clear scientific evidence of efficacy. Many educators, psychologists, and medical specialists concur that individuals who have learning disabilities should: 1) receive early comprehensive educational, psychological, and medical assessment; 2) receive educational remediation combined with appropriate psychological and medical treatment; and 3) avoid remedies involving eye exercises, filters, tinted lenses, or other optical devices that have no known scientific proof of efficacy.

### EVALUATION AND MANAGEMENT

Reading involves the integration of multiple factors related to an individual's experience, ability, and neurologic functioning. Research has shown that the majority of children and adults with reading difficulties experience a variety of problems with language<sup>1-3</sup> that stem from altered brain function and that such difficulties are not caused by altered visual function.<sup>4-7</sup> In addition, a variety of secondary emotional and environmental factors may have a detrimental effect on the learning process in such children.

Sometimes children may also have treatable visual difficulty along with their primary reading or learning dysfunction. Routine vision screening examina-

tions can identify most of those who have reduced visual acuity. Pediatricians and other primary care physicians whose pediatric patients cannot pass vision screening according to national standards<sup>8,9</sup> should refer these patients to an ophthalmologist who has experience in the care of children.

### Role of the Eyes

Decoding of retinal images occurs in the brain after visual signals are transmitted from the eye via the visual pathways. Some vision care practitioners incorrectly attribute reading difficulties to one or more subtle ocular or visual abnormalities. Although the eyes are obviously necessary for vision, the brain performs the complex function of interpreting visual images. Currently, no scientific evidence supports the view that correction of subtle visual defects can alter the brain's processing of visual stimuli. Statistically, children with dyslexia or related learning disabilities have the same ocular health as children without such conditions.<sup>10-12</sup>

### Controversies

Eye defects, subtle or severe, do not cause the patient to experience reversal of letters, words, or numbers. No scientific evidence supports claims that the academic abilities of children with learning disabilities can be improved with treatments that are based on 1) visual training, including muscle exercises, ocular pursuit, tracking exercises, or "training" glasses (with or without bifocals or prisms),<sup>13-15</sup> 2) neurologic organizational training (laterality training, crawling, balance board, perceptual training),<sup>16-18</sup> or 3) colored lenses.<sup>18-20</sup> These more controversial methods of treatment may give parents and teachers a false sense of security that a child's reading difficulties are being addressed, which may delay proper instruction or remediation. The expense of these methods is unwarranted, and they cannot be substituted for appropriate educational measures. Claims of improved reading and learning after visual training, neurologic organization training, or use of colored lenses, are almost always based on poorly controlled studies that typically rely on anecdotal information. These methods are without scientific validation.<sup>21</sup> Their reported benefits can be explained by the traditional educational remedial techniques with which they are usually combined.

### Early Detection

Pediatricians, other primary care physicians, and educational specialists may use screening techniques

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

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to detect learning disabilities in preschool-aged children, but in many cases, the learning disability is discovered after the child experiences academic difficulties. Learning disabilities can include dyslexia, problems with memory and language, and difficulty with mathematic computation. These difficulties are often complicated by attention deficit disorders. A family history of learning disabilities is common in such conditions. Children who are considered to be at risk for or suspected of having these conditions by their physician should be evaluated for more detailed study by educational and/or psychological specialists.

### Role of the Physician

Ocular defects in young children should be identified as early as possible, and when they are correctable, they should be managed by an ophthalmologist who is experienced in the care of children.<sup>22</sup> Treatable ocular conditions among others include refractive errors, focusing deficiencies, eye muscle imbalances, and motor fusion deficiencies. When children have learning problems that are suspected to be associated with visual defects, the ophthalmologist may be consulted by the primary care pediatrician. If no ocular defect is found, the child needs no further vision care or treatment and should be referred for medical and appropriate special educational evaluation and services. Pediatricians have an important role in coordination of care between the family and other health care services provided by ophthalmologists, optometrists, and other health care professionals who may become involved in the treatment plan.

### Multidisciplinary Approach

The management of a child who has learning disabilities requires a multidisciplinary approach for diagnosis and treatment that involves educators, psychologists, and physicians. Basic scientific and clinical research into the role of the brain's structure and function in learning disabilities has demonstrated a neural basis of dyslexia and other specific learning disabilities and not the result of an ocular disorder alone.<sup>4-6</sup>

### The Role of Education

The teaching of children, adolescents, and adults with dyslexia and learning disabilities is a challenge for educators. Skilled educators use standardized educational diagnostic evaluations and professional judgment to design and monitor individualized remedial programs. Psychologists may help with educational diagnosis and classification. Physicians, including pediatricians, otolaryngologists, neurologists, ophthalmologists, mental health professionals and other appropriate medical specialists, may assist in treating the health problems of these patients. Because remediation may be more effective during the early years, prompt diagnosis is paramount.<sup>20,21</sup> Educators with specialty training in learning disabilities play a key role in providing help for the learning disabled or dyslexic child or adult.

### RECOMMENDATIONS

1. For all children, clinicians should perform vision screening according to national standards.<sup>8,9</sup>
2. Any child who cannot pass the recommended vision screening test should be referred to an ophthalmologist who has experience in the care of children.
3. Children with educational problems and normal vision screening should be referred for educational diagnostic evaluation and appropriate special educational evaluation and services.
4. Diagnostic and treatment approaches that lack objective, scientifically-established efficacy should not be used.

### SUMMARY

Reading difficulties and learning disabilities are complex problems that have no simple solutions. The American Academy of Pediatrics and the American Academy of Ophthalmology, American Association for Pediatric Ophthalmology and Strabismus strongly support the need for early diagnosis and educational remediation. There is no known visual cause for these learning disabilities and no known effective visual treatment.<sup>23,24</sup> Recommendations for multidisciplinary evaluation and management must be based on evidence of proven effectiveness demonstrated by objective scientific methodology.<sup>23-24</sup> It is important that any therapy for learning disabilities be scientifically established to be valid before it can be recommended for treatment.

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