

Information Packet

The information contained herein is comprised of materials for use by COVD members to educate both parents and teachers as well as substantiate the vital connection between vision and learning. The College of Optometrists in Vision Development is an international membership of eye care professionals whose specialized care develop and enhance visual abilities and correct many vision problems in infants, children and adults.

Contents:

Vision and Learning
Vision Skills
School Vision Screenings
Reversals
Vision and Dyslexia
Strabismus and Amblyopia
What is Vision Therapy?
Vision Therapy vs. Orthoptics
Role of Optometrist in the Multidisciplinary Team
Symptoms Checklist for Parents and Teachers

DrJoan@theVDCinc.com www.theVDCinc.com



VISION AND LEARNING

Research has demonstrated that vision is a contributing factor to an individual's ability to attend and respond to classroom instruction. A major portion of what we learn is taken in through the visual system.

There are many aspects of vision which might affect an individual's abilities to attend and respond to teacher instruction. It is well known that nearsightedness, farsightedness, and astigmatism, all of which can result in blurred vision or eye strain, relate to performance in the classroom. However, individuals may have focusing problems which do not allow them to rapidly change focus from book to chalkboard and vice versa. They may have difficulty using both eyes together. This dysfunction can require excess effort to overcome and may interfere with visual information processing. Also, an individual may have difficulty controlling eye movements. This could result in loss of place when reading, frequent guessing of words, need for the use of the finger to maintain one's place, or other more subtle difficulties.

Visual information processing problems may result in children being overwhelmed the day they start school. The academic curriculum is designed on the assumption that children possess certain visual information processing abilities, as well as other skills, at certain chronological ages. In other words, is the child visually ready for school? The child who has not developed the required level of skill may have difficulty from "day one". These difficulties might manifest themselves as problems in reading, writing, mathematics, spelling, thinking, sports endeavors, playground activities, and even the social relationships children have with their siblings and peers.

Individuals manifesting visual problems associated with learning problems may benefit from the use of lenses and prisms for both the prevention and remediation of these visual problems. Other visual problems might best be remediated by optometric vision therapy. This includes the application of lenses and prisms in conjunction with procedures to provide the individual with strategies which will aid in the development of adequate visual performance.

There are numerous research and clinical studies demonstrating the effectiveness of optometric vision therapy for treating problems in the functioning of the visual system. There are also numerous case reports supporting specific diagnoses and treatment plans. Studies have also demonstrated visual deficiencies and visual information processing deficits in older individuals, supporting the fact that children do not simply outgrow these deficits.

Members of the College of Optometrists in Vision Development (COVD) have post graduate education in vision and learning. Fellows of the College are certified in the diagnosis and treatment of learning related vision problems. For further information contact COVD or consult with your COVD optometrist.

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VISION SKILLS

Vision skills are a group of neuro-muscular activities which are learned and developed. These skills involve moving, focusing and teaming the eyes so they may function efficiently. Vision skills include several components.

Fixation is the ability to direct and maintain steady, central visual attention on a target. This basic skill is developed in infancy and refined through the early years. Ocular motor skills are the neuro-muscular control skills developed to point the visual system on target and move it to either follow a moving target (pursuit eye movements), or jump from one object to another (saccadic eye movements). The infant reflexively turns the entire upper torso toward the direction of a noise, and then gradually learns to turn only the head to guide the visual system. Through the toddler years the individual refines this movement system by learning to use eye muscles to replace head movement - an achievement important in visual readiness for school. Eventually vision becomes the dominant sense.

Accommodation (eye focusing) is another vision skill involving focusing the light entering the eyes. This combined lens neuro-muscular system is a network integrating the eyes and the brain. Accommodation is developed rather well by age three and further accuracy is achieved throughout the early years of development. This function deteriorates with age, causing the need for bifocals and/or reading glasses beginning at about age forty.

Binocularity (eye teaming) allows for coordinated eye movements as targets move from distance to near. This skill has a sensory and motor aspect. The sensory aspect is the brain's ability to put what each eye sees together. This gives information on location (depth perception). The motor aspect involves convergence, where the eyes are turning in together and divergence, where the eyes are turning out together. This component allows both eyes to remain on the target as it moves closer and further from the eyes.

Optometrists evaluate the development, function, and efficiency of these vision skills. Poorly developed or abnormal function of vision skills results in inefficient visual performance and/or symptoms of fatigue or discomfort. This may have a negative impact on performance in school, the work place, sports, and activities of daily living. When properly diagnosed these visual inefficiencies can be effectively remediated with prescription lenses, prisms and/or vision therapy.

The symptoms typically caused by vision skill deficiencies include seeing double, losing one's place with reading, poor or slow reading ability, discomfort (eye strain or headaches) with sustained use of the eyes, clumsiness, and poor performance in sports.

Difficulty processing visual information when reading, using computers or performing any sustained visual activity might also be attributable to vision skill problems.

Members of the College of Optometrists in Vision Development (COVD) are optometrists with a special interest in vision skills and the remediation of vision skill inefficiencies. Fellows of the College have certified their competency in this area. For more information contact COVD or consult with a COVD member optometrist.

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SCHOOL VISION SCREENINGS

As part of routine school health assessments, children's eyesight is commonly tested in school vision screenings. However, passing a school vision screening does not guarantee the absence of a vision problem. These screenings are typically limited in scope to reading letters on a distance eye chart and are not intended to replace a comprehensive vision evaluation that can detect vision based learning problems. In fact, many times these important vision disorders routinely evade detection.

It is estimated that 35-40% of all children with learning disabilities have visual problems. Specifically, at least 20% of individuals with learning disabilities have been found to have prominent visual information processing problems, and 15-20% of them have problems with visual efficiency skills.

Without efficient visual skills the act of reading can be very frustrating. To the child with a vision based learning problem – often called a "hidden disability" – these frustrations can spill over into behaviors that can present themselves in a fashion similar to attention deficit disorders such as ADD/ADHD, or reading problems such as dyslexia.

Prevention of vision problems and their consequences require timely detection. The College of Optometrists in Vision Development (COVD) recommends that all children receive a thorough professional eye and vision examination, particularly one that includes a comprehensive assessment of visual information processing and binocular function. A child should have a developmental vision assessment at age 3 and again at age 5 prior to entering school to monitor vision development. School vision screening alone are not sufficient for investigation of visual function for school-aged children.

Members of the College of Optometrists in Vision Development (COVD) are optometrists with a special interest in vision development and are skilled in providing comprehensive vision care for children. Fellows of the College have certified their competency in this area. For further information contact COVD or consult with a COVD member optometrist.

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REVERSALS

Problems of letter and number reversals in children have concerned parents and educators for many years. Some have considered reversals as a symptom of dyslexia. More commonly reversals reflect a lag in spatial development. Most research has shown there is no structural or medical basis for these reversals. Although reversals are common and expected in five to six year old children, they may persist through childhood. Some adults may even continue to manifest these problems.

For many years, scientists have studied children with reversal problems, particularly regarding orientation to right and left as related to their own bodies (laterality), and to objects around them (directionality). At three, or even younger, the child should have grasped the concept of top and bottom, and right side up or upside down (even though still looking at books upside down). The four year old is grappling with front and back, and may still put a shirt on backward. Many four year olds show reversals as they put on shoes by themselves. Some four to five year olds may start printing numbers and letters from right to left. At these ages, this is a normal stage of developing orientation in children.

Although most children master this concept of directionality by age seven, this confusion in orientation may continue, in some people, all their life. Reversals are a manifestation of a developmental lag in the process of orientation. They are indicative of an underlying problem in the integration of the vestibular and visual systems in the brain. Rote repetition of learning to write letters and numbers correctly or rotely learning right and left hands may help us pass a test, but it does not solve the problem of the underlying causative factor of delayed orientation development.

The development of orientation starts in the prenatal period with the attitudinal reflexes which help the fetus orient in utero. This development continues through varied learned experiences in our lives. Interferences in movement activities involving vision and neuromotor relationships limit the development of orientation. According to the neuroscientist J.D. French, orientation contributes in an important way to the highest mental processes--the focusing of attention, and the ability to think, to learn, and to act.

Specific vision therapy, including the unique application of lenses and prisms during visual-neuromotor activities (movement with awareness and feedback), provides learning experiences to improve the development of laterality, directionality and orientation, and the related problems of reversals. When a child learns to orient easily, the evidence points to a well integrated and effectively operating person.

Members of the College of Optometrists in Vision Development (COVD) are optometrists who have demonstrated interest in the problems and remediation of reversals. Fellows of the College are certified in the diagnosis and treatment of learning related vision problems. For further information, contact COVD or consult with a COVD member optometrist.

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VISION AND DYSLEXIA

Children and adults with dyslexia usually have normal healthy eyes. However, a substantial number of individuals with dyslexia have other visual problems. These problems may include inadequate development of function in the visual system, associated pathways, and brain.

Margaret Livingstone and her colleagues from the Department of Neurobiology, Harvard Medical School and the Dyslexia Research Laboratory, Beth Israel Hospital in Boston have defined dyslexia as follows: "Developmental dyslexia is the selective impairment of reading skills despite normal intelligence, sensory acuity, and instruction. Several perceptual studies have suggested that dyslexic subjects process visual information more slowly than normal subjects. Such visual abnormalities were reported to be found in more than 75% of the reading-disabled children tested."

Although dyslexia is a reading disorder, it is not limited to language. Recent research has demonstrated the significance of visual information processing in dyslexia. The visual factors associated with dyslexia include spatial perception, timing, and rhythm. These problems may also be manifested when catching a ball, maintaining orientation for balance, tying shoelaces, and in tendencies to be accident prone, distractible or absent minded.

The teams of researchers at Harvard University and Beth Israel Hospital also reported that information in the two major processing pathways (transient and sustained systems) arrive at the visual brain centers out of sequence. As a result, for most dyslexics, words on a printed page seem to move chaotically and appear as reversals. In essence, this is a visual problem of timing and coordination. Research has shown that transient visual system deficits impact upon reading skills.

The College of Optometrists in Vision Development recommends a comprehensive evaluation which includes a thorough "eye" examination of structure and health, and a thorough "vision" examination of functions which are necessary to process visual information meaningfully. This comprehensive evaluation of vision leads to recommended management strategies including vision therapy, the application of lenses and prisms, and/or appropriate referral to other professionals. The strategies of a therapy program might emphasize:

- Development of neurological timing within the visual system
- Binocular coordination with flexibility
- Ocular movement controls with rhythm
- Visual-vestibular coordination
- Development of visual information processing
- Integration of vision with other systems in the brain

Members of the College of Optometrists in Vision Development (COVD) have a special interest in the relationship between vision and learning. Fellows of the College are certified in the diagnosis and management of learning related vision problems. For further information contact COVD or consult with a COVD member optometrist.

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STRABISMUS AND AMBLYOPIA

Strabismus is the condition in which a person is unable to align both eyes simultaneously under normal visual conditions. When both eyes do not point at an object at the same time, it results in the appearance of one eye "turning" in relation to the other. This turning may be in, out, up, down. This eye turning may be constant, in which an eye turns all the time, or it may be intermittent. It may also alternate so that either eye turns at any given time. Besides the obvious turning of an eye, the individual with amblyopia has reduced coordination of both eyes, loss of stereopsis (depth perception), and may develop reduced vision in one eye (amblyopia).

There are many different causes of strabismus. The specific treatment is dependent on the specific type and cause. Strabismus can be treated at any age. Some factors favor younger patients, while compliance and motivation are more favorable with adults. Treatment typically consists of prescription lenses and prisms and a program of vision therapy. In certain patients, surgery may be recommended in conjunction with vision therapy. Surgery may cosmetically straighten the eyes, but does not typically improve visual function. The prognosis for optimal outcome in these cases is enhanced through pre and post-surgical vision therapy. Whether it is constant or intermittent, strabismus always requires treatment. It rarely goes away by itself nor will children outgrow it.

Amblyopia, more commonly known as "lazy eye", is a condition in which reduced vision, not correctable by glasses or contact lenses, will develop usually in just one eye. It is not due to any apparent structural or disease condition. It may be related to strabismus, since a turned eye generally loses vision to some extent due to disuse. Many patients with amblyopia may be unaware of the condition until they undergo a vision screening or a comprehensive vision examination. There are different causes of amblyopia and the treatment is dependent on the cause. In general, the treatment consists of the use of lenses and occlusion (patching) in conjunction with a vision therapy program. Patching of the non-amblyopic eye is more successful when it is part of an active vision therapy program.

For many years, it was thought that amblyopia could only be treated during the "critical period" of visual development before seven or eight years of age. Current research has conclusively demonstrated that effective treatment can take place at any age, but the length of the treatment period increases dramatically the longer the condition has existed prior to treatment. Research has also demonstrated that patients with amblyopia are more likely to sustain injuries resulting in the loss of their good eye than individuals with two good eyes. This is one of the many reasons that early childhood examinations are essential.

Members of the College of Optometrists in Vision Development (COVD) have post graduate education in the management of strabismus and amblyopia. Fellows in the College are certified and skilled in diagnosing and treating these conditions. For further information, contact COVD or consult with a COVD member optometrist.

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WHAT IS OPTOMETRIC VISION THERAPY?

Optometric vision therapy is an individualized treatment program designed to improve overall visual function and performance. Its proven results are derived from vision-based neurological and neuromuscular conditioning over time. When provided by a knowledgeable optometrist, vision therapy results in quantitative improvements in visual and visual information processing skills and, perhaps more importantly, an improvement in quality-of-life due to decreased symptoms and improved performance.

Many functional vision problems can be significantly improved through optometric vision therapy. It is a treatment modality for disorders including, but not limited to:

- Ocular motility dysfunction eye movement disorders
- Vergence dysfunction inefficiency in using both eyes together
- Strabismus misalignment of the eyes
- Amblyopia lazy eye
- Accommodative disorders focusing problems
- Visual information processing disorders
- Visual sensory and motor integration
- Visual rehabilitation after traumatic brain injury which results in inefficient visual information processing (e.g., stroke)

These visual conditions are best treated with optometric vision therapy, which enables an individual to learn more efficient ways to perform visually. Optometric vision therapy can improve visual function much like physical therapy can improve general motor function.

Optometric vision therapy, also referred to as visual training or orthoptics is an established, medically necessary therapy when prescribed by an optometrist. Clinical tests with associated normative values are administered to determine the presence of visual deficiencies. If optometric vision therapy is indicated, the optometrist recommends a specific treatment plan for the individual.

Optometric vision therapy plans typically involve a programmed combination of office treatment and home therapy. Lenses, prisms, optical instruments, and specially adapted computers are some of the devices through which one learns to use vision more effectively. The specific materials are less important than the feedback provided to the patient to enable change. Visual skills need to be developed until they become automatic and integrated with other visual as well as cognitive skills. As with most therapeutic treatments, the extent of success is also linked to patient compliance.



The principal benefits of optometric vision therapy, which include improved visual information processing and the ability to sustain visual function over time, are as applicable to the child in the classroom as they are to the adult using a computer or reading a book.

Without efficient visual skills the act of reading can be very frustrating. To the child with learning-related vision problems – often called a "hidden disability" – these frustrations can spill over into behaviors that can present themselves in a fashion similar to ADD/ADHD or dyslexia.

According to the American Optometric Association, 35-40% of all children with learning disabilities have visual problems. Specifically, at least 20% of individuals with learning disabilities have been found to have prominent visual information processing problems, and 15-20% of them have problems with visual efficiency skills.

Some of the common symptoms relieved through vision therapy include eye strain, visually induced headaches, inability to concentrate when doing visual tasks, and errors such as loss of place or reversals when reading or writing. More often, individuals have no recognized symptoms due to their avoidance of visually demanding tasks or an adaptation that decreases their performance. Optometric vision therapy also facilitates appropriate visual development, and serves as a component of the multi-disciplinary effort following stroke or head injury.

Members of the College of Optometrists in Vision Development (COVD) have post-graduate education in the diagnosis and management of conditions for which optometric vision therapy is an appropriate treatment. Fellows of the College are certified in providing this vision care. For further information, contact COVD or consult with a COVD member optometrist.

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THE DISTINCTION BETWEEN VISION THERAPY AND ORTHOPTICS

Optometric vision therapy is a program of care used to develop, restore, or enhance visual function and performance. The procedures are conducted under the supervision of an optometrist and are individualized to meet the needs of each patient. Depending on the case, vision therapy is prescribed to develop or remediate fundamental visual skills and abilities; improve visual comfort, ease and efficiency; and/or enhance how a person cognitively processes visual information and uses it to direct and monitor actions.¹

Vision therapy is generally conducted in-office, once or twice weekly for 30 minutes to an hour, often supplemented with procedures done at home between office visits. The goal of optometric vision therapy is to automatize normative function, not to strengthen eye muscles. It should not be equated with self-directed programs of eye exercises marketed to the public. Many specialized procedures and equipment are used in vision therapy programs including therapeutic lenses and prisms (regulated by state licensure.) Optometric vision therapy is a blend of medical, developmental and behavioral therapies which may include:

- 1. Pursuit and saccade therapy (to improve the speed and accuracy of eye movements)
- 2. Visual-vestibular therapy (to integrate eye movements with balance)
- 3. Visual perceptual therapy (to enhance visual information processing)
- 4. Eye-hand coordination therapy (to develop visually guided movement)
- 5. Accommodative therapy (to enhance focusing stability, flexibility, and comfort)
- 6. Visual attention therapy
- 7. Peripheral awareness therapy (enhances the use of vision as a simultaneous sense, synchronously receiving and processing multiple inputs)
- 8. Visual-spatial awareness including laterality, directionality, and visual imagery
- 9. Visual-auditory integration
- 10. Orthoptics (mechanics of eye movements)

Although optometric vision therapy evolved from orthoptics, orthoptics is only one of many therapies which are used in contemporary optometric vision therapy.² Orthoptics, which literally means straightening of the eyes, is limited to eye exercises to treat eye coordination problems by increasing the range of binocular fusion. The treatments used during optometric vision therapy go beyond the limited definition and scope of orthoptics to treat disorders of the visual system, indicative of vision as a collaboration between the eyes and the brain.³

In summary, optometric vision therapy is a complete program of habilitative and rehabilitative therapeutic vision care of which orthoptics is a subset. Optometric vision therapy is not synonymous with orthoptics.

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¹ www.aoa.org/documents/DefinitionsOptometricVisionTherapy.pdf. Accessed June 13, 2007.

² Press LJ. The evolution of vision therapy. In: LJ Press, ed. Applied Concepts in Vision Therapy. St. Louis: Mosby 1997.

³ www.aoa.org/x5417.xml. Accessed June 13, 2007.



VISION BASED LEARNING PROBLEMS: THE ROLE OF THE OPTOMETRIST ON THE MULTIDISCIPLINARY TEAM

When a child is not achieving to his or her potential at school, parents and teachers need to voice their concerns and take action. This action may follow any number of courses, including parent-teacher conferences, educational, behavioral, and medical assessments, and tutoring or special education services.

Children having difficulty learning may be evaluated by a multi-disciplinary team of school personnel. This team is often comprised of a school psychologist, a learning specialist, and a reading specialist. With the parents' consent, the outcome of these evaluations result in an Individualized Education Plan (IEP). This sets the goals to be achieved by the child through special education.

Any assessment of a child who is experiencing reading or learning problems should also include a comprehensive vision evaluation by a developmental optometrist. The role of the developmental optometrist in this multi-disciplinary approach is to assess the child's visual abilities. Attempting to function in school with poor visual abilities may result in fatigue, short attention span, avoidance of near work, slower performance, and reversals or transpositions. Deficient eye-hand coordination can result in sloppy or tedious handwriting which will interfere with a child's ability to express thoughts in writing.

Tests administered at school or visual screenings conducted by school nurses are useful in identifying the need for comprehensive visual evaluations. However, they are not intended to substitute for optometric assessment of visual efficiency or visual information processing skills. The results of any prior assessments, together with the child's history and the results of the optometric evaluation should be thoroughly reviewed when making recommendations for treatment and special education services.

Many children with learning difficulties may have 20/20 eyesight, but still have other vision problems. Recommendations for treatment of vision based learning problems are to enable the child to use their vision more efficiently and process visual information effectively. This may be accomplished through the application of lenses, prisms and/or vision therapy. When visual function is improved, children are better able to benefit from classroom instruction or specialized resources.

Members of the College of Optometrists in Vision Development (COVD) are optometrists whose special interests, experience and training enable them to examine children with vision based learning problems. Fellows of COVD are board certified in developmental vision including the diagnosis and management of learning-related visual problems. For further information, contact COVD or consult with an optometrist who is a member of COVD.

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Symptoms Checklist for Parents and Teachers:

If your child has 20/20 vision and passes the school vision screening, he or she may still have a VISION-related learning problem. Frequently, the classroom teacher is the best observer for identifying vision problems that tend to interfere with school work. The following checklist identifies many of the observable clues and symptoms that are often observed in a child with a vision related learning problem. Please indicate if this child is or has been experiencing the following symptoms:

Child's Name:	Grade:Teacher:
P = Parent T = Teacher	Visual Processing P T
Visual Comfort & Efficiency P T Headaches when reading Eyes hurt, burn, tear or itch Eye(s) turned in or out at any time Blinks excessively during near tasks Print blurs when reading or copying from the board	Difficulty with word recognition Reverses letters and numbers when reading/ writing Child doesn't know his right from left side Transposes letters and/or numbers (12 for 21) Failure to complete work in allotted time Poor printing or handwriting Mistakes words with similar beginnings and ending
 ☐ Rubs eyes frequently when doing up close tasks ☐ Gets very tired after short periods of reading ☐ Reading comprehension decreases with time ☐ Avoids near work (reading, writing) ☐ Child hates to read 	 ☐ Confuses words ☐ Repeatedly omits small words; a, an, the, of ☐ Fails to recognize the same word in later sentences ☐ Says words aloud or moves lips while reading
 ☐ Holds book too close to face when reading ☐ Sits in awkward positions when reading ☐ Complains of seeing double ☐ Difficulty copying from the board ☐ Squints or covers one eye when reading ☐ Frowns or squints to see the board ☐ Uses finger or marker to keep place ☐ Often loses place, skips or rereads words ☐ Reads too slowly ☐ Sees print "running together" or "moving around ☐ Moves head excessively as reads across the page ☐ Complains that eyes feel like they are "pulling ☐ Seeing/visual work worse at the end of the day 	Cives up easily of doesn't accempe the task

I-5 checks: Visual problem suspect- Submit checklist to child's teacher for other behaviors seen in class. 6+ checks: Visual problem highly likely- Binocular vision and visual perception evaluation recommended.