



# CORTICAL VISION IMPAIRMENT

By Julie Smith, education specialist, SESA

*“Due to improved medical care, children with severe brain insults have increasingly begun to survive over the last 30 years. The vast majority have tended to have severe multiple disabilities, including a variety of learning difficulties. A minority of them also has permanent visual loss, but normal or minimally abnormal eye examinations.*

*“Traditionally, educators for the visually impaired assisted only those whose eye conditions were associated with visual loss (reduced acuity). Now it has become necessary to offer services for those whose visual loss is due to brain damage. Thus, the definition of CVI was born.”*

—Dr. James E. Jan, as quoted on the American Printing House for the Blind Web site.

The evolving definition, identification, and educational strategies posed by cortical vision impairment (CVI) has changed the landscape of services provided by teachers of the visually impaired (TVIs). June 2007 marks the end of my 20<sup>th</sup> year as a TVI and during that time my knowledge and perception of CVI have undergone many shifts. My teacher preparation program focused on Braille, Nemeth code, and low vision along with anatomy of the eye and common eye conditions. CVI was virtually unknown to me when I graduated. More recently, I have found that at any given time 33% to 50% of the children I serve have CVI and the statistics show that I am not alone.

CVI is the most common cause of vision impairment in young children in the United States (Jan, Good, and Hoyt, 2004). It is a brain-based processing disorder and typically an eye exam

reveals no ocular abnormalities, but the child just does not appear to see as s/he should. Usually CVI can be linked back to a prior incident that involved the brain. The most common causes of CVI are:

- hypoxic-ischemic injury (hypoxia is a lack of oxygen, ischemia is tissue death due to loss of blood flow),
- head injury,
- infections (e.g., meningitis/encephalitis, congenital toxoplasmosis, neonatal herpes simplex),
- intraventricular hemorrhage (IVH) (bleeding in the brain), and
- brain anomalies (lissencephaly - the condition of having a smooth cerebrum without convolutions; holoprosencephaly – when the forebrain does not divide into two hemispheres or form lobes; and schizencephaly - an extremely rare developmental birth defect characterized by abnormal slits, or clefts, in the cerebral hemispheres of the brain) (Good, Jan, Burden, Skoczenski, Candy, 2001).

Unfortunately, characteristics of CVI are easily overlooked, especially in young children, because these medical conditions are often complicated and require extensive attention. When reviewing a student’s medical history, any of these conditions should prompt an observation of the child with specific attention to the typical characteristics associated with CVI.

In an eye report this type of visual disorder may be referred to as cortical vision impairment, cerebral visual impairment, or neurological vision impairment. The term cortical vision impairment implies damage to the visual cortex of the brain is the cause of



the vision disorder. However, the visual cortex is rarely damaged on its own and the broader term, cerebral vision impairment, gaining wider acceptance as a more accurate term (Dutton, 2005).

There is optimism when working with children with CVI — often environmental adaptations and careful consideration in choosing materials facilitates visual skills not previously observed. Dr. Christine Roman has provided a much-needed framework for assessment of and program planning for visual skills through the development of the *CVI Range* and *CVI Resolution Chart*. Mary Morse has provided information about a subset of students that have difficulty with facial recognition, and appropriate reminders that children with CVI each have unique characteristics and needs. We thank the educators who contribute to the increasing bank of information available and have helped renew the creative energies of many educators and parents.

The hard work of medical professionals such as Dr. Jim Jan, Dr. Lea Hyvärinen, Dr. William Good, Dr. Gordon Dutton, and Dr. Carey Matsuba has also greatly contributed to the base of knowledge now in use when diagnosing children with CVI. They are working toward a universal definition of CVI so there are definitive diagnostic criteria. Early and accurate identification increases the window of opportunity for effective intervention. There has been wonderful collaborative teamwork between TVIs and pediatric ophthalmologists in increasing the awareness of the needs of children with CVI.

All children deserve the support needed to achieve their maximum potential and it is important that CVI is not overlooked in the myriad of other needs experienced by children with multiple disabilities. Hopefully, this insert will increase awareness of this unique vision impairment and provide teachers, parents, and medical providers with strategies and creative ideas to help children access a visual world that they otherwise may not have known existed. ■

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At the CVI Summit in April 2005, Dr. Roman presented 10 characteristics of how damage to the brain affects vision:

- complexity
- novelty
- color preference
- visual field preference
- light gazing/nonpurposeful gaze
- visual reflex differences
- visual latency
- distance viewing
- movement
- normal eye exam

As presented in the proceedings of the CVI Summit from April 2005, Mary Morse provides the following characteristics of CVI that are not commonly addressed as they typically show up in children without obvious additional disabilities:

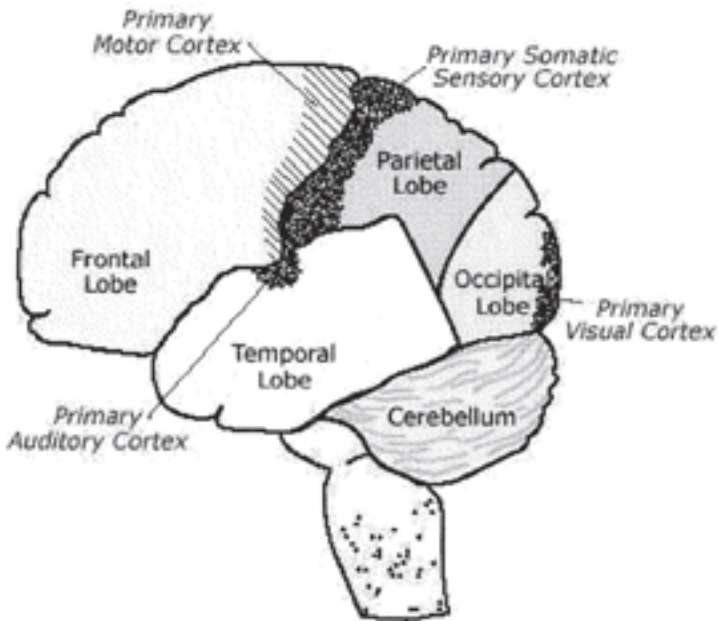
- recognizing objects in general or specific
- recognizing and discriminating one human from another
- recognizing a human face as more than an object unless it moves or talks
- organizing oneself spatially
- comfortably moving through even a very familiar environment
- recognizing and using visual symbols which may include print, photographs and/or line drawings
- recognizing colors
- pointing to various parts of their own body
- distinguishing left from right

*“All CVI children deserve to have input from the perspective of being seriously visually impaired.”* —Lois Harrell

# CVI Defined

## The Definition for Medical Purposes:

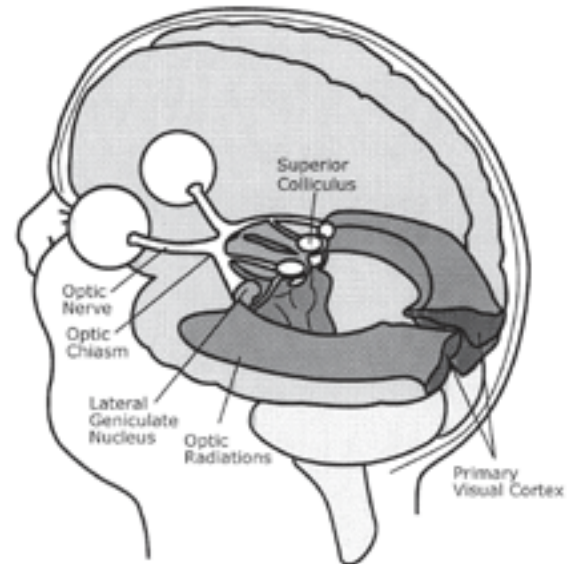
Cortical Visual Impairment (CVI) may be defined as bilaterally diminished visual acuity caused by damage to the occipital lobes and or to the geniculostriate visual pathway. CVI is almost invariably associated with an inefficient, disturbed visual sense because of the widespread brain disturbance.



## The Definition for Educational Purposes:

Cortical visual impairment (CVI) is a neurological disorder, which results in unique visual responses to people, educational materials, and to the environment. When students with these visual/behavioral characteristics are shown to have loss of acuity or judged by their performance to be visually impaired, they are considered to have CVI.

Retrieved April 10, 2007 from [www.aph.org](http://www.aph.org)



The geniculostriate visual pathway includes the lateral geniculate nucleus, the optic radiations and part of the primary visual cortex

*“Although we have the idea that we see things as they really are, in fact our brain is using shortcuts, best guesses and assumptions about the world to make our perceptions seem continuous.*

*“If some parts of the visual pathways or cortical functions are not normal, the perception of the surrounding world, people and social and emotional relationships may be changed in only one or a few situations, or it may be greatly distorted. The important thing in early intervention and special education is to try to understand the child’s visual perception and its integration with information from the other modalities as well as memory.”*

—Lea Hyvärinen, MD

Brain diagrams and text reprinted with the permission of the American Printing House for the Blind, Inc., 2007. Long description of diagrams adapted from: Palmer, Stephen E., (1999). *Vision science: Photons to phenomenology*. Cambridge, MA: the MIT Press and Sousa, David A., (2001). *How the special brain learns*. Thousand Oaks, CA: Corwin Press.

# Vision Is More Than 20/20 Eyesight

**Y**ou may not immediately see the subject of the photograph on the reverse side because the seemingly meaningless blobs of light and dark require VISUAL interpretation. When you “see” the subject you have VISION; before that you had only eyesight.

Many people have clear “eyesight,” but are slow readers, or have difficulty to get MEANING through the visual pathway. Such persons are handicapped in business, social and school life. Many also suffer visual discomfort or fatigue while reading or doing other close work.

The correction of these problems and the care of this complex physical and mental process called VISION require a highly specialized professional service – a service provided by the modern optometrist concerned with seeing as applied to clarity of eyesight AND the ability to get MEANING through vision.

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*Published in the interest of better vision by the Optometric Extension Program Foundation, Inc. (Nonprofit). Duncan, Oklahoma, an international organization dedicated to post-graduate education and research in vision.*



## What Is It?

This fascinating picture is not an illusion. It is an actual photograph of a familiar subject. (See bottom of page 5 for answer)

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## CAMP ABILITIES ALASKA USA July 9 – 14, 2007



**Deadline for applications is May 15, 2007**

**T**his year marks the 6-year anniversary of Camp Abilities Alaska. Camp Abilities is a one-week developmental sports camp for children ages 9 to 19 who are blind or visually impaired. The camp is set up to provide a one-on-one instructional situation for each child. During the week, children develop sport skills and gain confidence to become more independent in their daily lives. The purpose of Camp Abilities is to empower children with sensory impairments to be physically active and productive members of their schools, communities, and society. The Camp Abilities experience teaches children what they CAN do in the area of sports and recreation, which is often overlooked in their education and home environments.

Throughout the week, athletes participate in a long list of physical activities including swimming, goalball, beep baseball, tandem biking, track and field events, rock climbing, hiking, canoeing, archery, and more. Each physical activity is a detailed task analysis for each skill. Assessment sheets are completed daily and are sent to parents and physical education teachers at the conclusion of camp to encourage continued physical activity throughout the year. ■

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For more information contact Camp Abiliites at [www.campabilitiesalaska.org](http://www.campabilitiesalaska.org)

## Some characteristic differences between pure ocular and cortical visual disorders

Characteristics	Ocular Disorder	Cortical Disorder
Eye examination	Usually abnormal	Normal
Visual function	Consistent	Highly variable
Visual attention span	Usually normal	Markedly short
* Sensory nystagmus	Present when congenital and early onset	Not present
Poorly coordinated eye movements	Present when congenital and early onset	Usually normal
Rapid horizontal head shaking	Occasionally	Never
Compulsive light gazing	Rarely	Common
Light sensitivity	Dependent on the eye disorder	In 1/3 of the cases
Eye pressing	Especially in congenital retinal disorders	Never
Close viewing	Common, used for magnification	Common, used for magnification, a reduction in crowding, or both
Color perception	Dependent on the eye disorder	Preserved
Appearance	Appears visually impaired	Usually normal
Peripheral field loss	Occasionally	Nearly always
Presence of additional neurological handicaps	Fairly common	Nearly always

*Reprinted with permission from National Newspanch, March 1995*

*\* Reference Shelf Editor's Note: CVI can co-exist with ocular disorders, including anomalies of the optic nerve and retinopathy of prematurity (ROP). Nystagmus is often present with these ocular disorders and it is possible for nystagmus and CVI to co-exist.*

**Answer to puzzle 20/20 Eyesight:**



# CORTICAL VISUAL IMPAIRMENT: Some Words of Caution

*By Mary T. Morse*

*Originally appeared in RE:view, Spring 1999*

**I**n the last decade, children who are cortically visually impaired (CVI) have received increased attention and concern from the medical, educational, and rehabilitative communities. The Association for Education and Rehabilitation of the Blind and Visually Impaired has increased the number of sessions on CVI at its bi-annual conferences. The Journal of Visual Impairment & Blindness and RE:view have published many articles on varying facets of this often confusing condition. Several recent teleseminars were devoted to children with CVI. All of these efforts have increased our understanding of CVI and given many of us confidence to work with children who are cortically visually impaired. Because we should not become overly confident about our knowledge, I offer the following words of caution.

## **CVI is a Complex Condition**

We need to be cautious not to oversimplify a complex condition. Despite its label, the term cortical visual impairment refers not to an eye condition but to a brain condition. About 80% of the brain, working as functional systems, is required to efficiently process and understand a visual message. We the workers, therefore, need knowledge of how the brain functions if we are to understand the implications of brain dysfunction (Dutton et al., 1996; Morse, 1990; Morse, 1992; Padula, 1996; Sacks, 1985).



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Vision is also a psychological process; as a result, disruptions in visual function cannot be considered in isolation from other functions. Visual attention does not automatically mean cognitive understanding. We the workers should understand the implications of motor, cognitive, and communication problems when we plan habilitative visual services (Dutton et al., 1996; Morse, 1990; Morse, 1992; Nielson, 1991; Padula, 1996; Padula & Shapiro, 1993; Sacks, 1985; van der Kolk, 1994).

A final factor to consider is that vision is an emotional process. All people with complete or partial sight have patterns of visual use and nonuse. People tend to use the visual system more when they feel confident about what they are expected to do, when they are listening to something that interests them, or when they want to relate to others. They tend not to use their vision when their senses are overwhelmed, when they are planning or thinking how to do something that is difficult (i.e., giving someone some bad news or when performing a difficult motor act); or when they are bored, tired, stressed, or feel submissive. We the workers should always consider what the child finds motivating and find ways to give the child a sense of self-efficacy in the activity (Morse, 1991).

## **All Children with CVI Do Not Exhibit Similar Behaviors**

We should be cautious not to assume that all children with CVI exhibit the same behaviors. The diagnosis means different things for different children; the effects depend on factors such as how extensive and severe were the insults to the brain, the developmental period during which the insult occurred, the child's previous experience, the presence or absence of additional disabilities, medications being taken, and the child's motivation. Some individuals with CVI have no observable visual responses: others have occasional responses to stimuli, whereas still others have a significant amount of usable vision. Some children have field restrictions and others do not. Even some of those who have significant peripheral field losses may be able to detect movement, perhaps through the secondary visual system. Over time and with or without intervention, many children show significant improvement in their general use of vision. That improvement may be the result of being more able neurologically to handle complex stimuli (Burke, 1991). Thus, we might see that as children understand their daily experiences more and as they anticipate routines, their functional visual behaviors also improve.

Even when visual behaviors improve to the point of appearing normal, many of the children may have significant

difficulty with specific types of visual stimuli. For example, some individuals may be able to see a human face, know it as a face, but be unable to identify to whom the face belongs solely on the basis of the experience of visual information. That difficulty in visual identification may be similar to the experience of those of us who can discriminate cars from trucks but cannot identify the make or year of the car on the basis of our visual discrimination abilities. Faces are often confusing to individuals with CVI. The face changes with every expression and with every physical movement of different parts of the body. The face also presents a kaleidoscope of sensory information – visual, auditory, and olfactory. Moreover, a specific face may change depending on the hair style, on whether the individual alternates between wearing glasses or contact lenses or is using makeup or not. Identifying faces requires complex visual analysis. Other individuals with cortical visual impairment may be able to identify people and concrete objects as well as photographs of them but be unable to understand visual symbolic information in forms such as line drawings or print.

Some children with CVI may have difficulties with depth perception that go far beyond a situation such as mono-ocularity. Others may have significant difficulty in moving through even a very familiar environment. Dutton et al. (1996) described several children who can identify objects when they are moving very slowly but not when they are stationary or moving quickly. Padula and Shapiro (1993) discussed later-in-life trauma and see many patients who have associated strabismus, oculomotor dysfunction, convergence and accommodative abnormalities, diplopia, and balance and movement difficulties. Those patients described a world of distortions that did not match their previous visual memories. Those reports raise interesting questions about the individuals who attribute their CVI to congenital causes or early postnatal insult. The point here is that a major insult may have been localized to one or more specific areas but other parts of the cerebral cortex may or may not come into play and support the functions lost to the insult.

On casual observation, vision use in some children may appear normal. During the school years, however, some of these children may be described as being preoccupied, distractible, and inattentive when, in reality, some of their behaviors result from CVI. The observable school behaviors may be a result of fatigue from trying to interpret difficult visual stimuli. The visual components of a task frequently become even more difficult when combined with the demands of listening, maintaining position in space, and simultaneously performing complex motor actions (Dutton et al., 1996).

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## A Single Approach Does Not Work for All Children

We should be cautious not to think that a single approach works for all children. As Sacks (1985) pointed out, a diagnosis of seizures is an insufficient label for prescribing a treatment regimen, and so too is a diagnosis of CVI.

Some children increase their visual awareness by such means as the use of lighted toys in a darkened room, the light box, distinctive geometric patterns, the use of bright colors, and sound toys (Baker-Nobles & Rutherford, 1995; Jan & Groenveld, 1993). Other children, however, tend to use their vision more efficiently and more frequently when they understand and feel comfortable with the tactile-kinesthetic-



motor demands of the task. Farrenkopf, McGregor, Nes, and Koenig (1997) stated, “[T]ypical visual enrichment strategies do not work with children who have CVI because the visual sense is overwhelmed by the visual information” (p. 484). For example, a common lament among educators and therapists is that many children who are diagnosed with CVI tend to turn their head away as they reach for an object. One hypothesis is that the children are using their peripheral vision when they turn their heads away. That may be true for some. I have followed a significant number of children with CVI for over a decade (many on video tape) and believe that many of the children avert their gaze until they understand what their hands are doing. For these children, intervention might be referred to as vision through the back door, through the hands. That approach considers the complexities of the task’s motor demands and the saliency of the tactual experiences so the brain becomes aware of what the hands are doing. It is the hand first; then the vision. When the hands explore real objects, they feed the abstract visual and cognitive systems (Affolter, 1991; Dutton et al., 1996; Hyvärinen, 1994; Morse, 1992; Nielson, 1995; Padula & Shapiro, 1993; Sack, 1985).

Many of these same children are extraordinarily attentive to environmental sounds. We need to be cautious that we do not assume that an interest in sounds automatically means an understanding of those sounds. Many, but not all, children with cortical visual impairment display varying degrees of difficulty with language. Indeed, processing auditory information may actually interfere not only with the use of vision but also with motor exploration. Much energy may go into trying to interpret the meaning of the sounds or the sounds themselves may provide a recreational diversion. According to studies by Farrenkopf et al. (1997) and Lane (1996), verbal prompts are not as effective as physical prompts. These children come to understand their visual world better when the language used around them does not interfere with attending to what the hands are doing. Interestingly, language is promoted more effectively when the words used conform to what the hands are experiencing (Affolter, 1991; Hodgdon, 1997; Koenig & Farrenkopf, 1997; Lane, 1996; Morse, 1992).

## Treatment Is A Dynamic Process

We should be cautious not to view treatment as a linear and isolated training process. We need to recognize that simplification of the visual environment is not enough. Infants with no disabilities come to recognize those objects



and people that have the most meaning to them (parents, bottle, favorite toy) through physical interaction in their everyday activities. For many children with CVI, reaching out and actively participating is a frightening experience. To them, the world may seem chaotic and unfriendly. Our interventions should examine the environments in which these children function, the activities in which they engage, the sensory-motor demands of tasks, time pressures, and interfering variables. We need to relate those factors to the individual child's ability to modulate his or her states of arousal, ability to determine which aspects of the task are the important ones to attend to, and memory. For many of the children we need to reduce the number of words we use while they are involved in highly demanding tasks. We should be more consistent in what we call objects and people. We also need to learn when not to talk. (Hynd & Willis, 1988; Morse, 1990; van der Kolk, 1994).

We need to be cautious about allowing our own egos and desire for student progress to interfere with our objective professional evaluation of the child's progress. Many of these students also have severe multiple disabilities that may prevent them from making obvious quantitative changes. Rather, many make qualitative changes. One of the most objective ways to measure change is to video tape a child 3 or 4 times during a school year. Determine ahead of time which behaviors are to be taped during which activities and develop an accompanying data sheet. Subsequently, have staff independently watch the tape and fill in their own data sheet from their professional perspective. The findings then constitute one measure of change. Subsequently, the composite data and the video tape may become part of the child's permanent record.

Those of us who work on behalf of children who have visual handicaps need to applaud our efforts to secure quality information to use on behalf of children with CVI. However, we should be forever diligent that we do not fool ourselves into thinking that there is a step-by-step single or simple method of enticing these children into their visual world and of assisting them in comprehending what they see. ■

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*RE:VIEW, Cortical Visual Impairment: Some Words of Caution, Morse, Mary T., vol. 31, #1, pp. 21-26, Spring 1999. Reprinted with permission from the Helen Dwight Reid Educational Foundation. Published by Heldref Publications, 1319 18<sup>th</sup> Street, NW, Washington, DC 20036-1802. <http://www.heldref.org> / © 1999.*

## These are a few of our favorite things —Julie Smith, education specialist, SESA

Please note that the pictures provided are for illustrative purposes only —typically only one or two items at a time would be used for a child with CVI

It can be difficult to create environments and find toys that facilitate visual attention for children who experience CVI. Following are some of the favorite things used by Teachers of the Visually Impaired (TVIs) throughout Alaska, as well as some ideas from the CVI listserv:

### The Invisiboard

The all-black background reduces visual distractions and draws the student's attention to single objects. Items can be attached to the Invisiboard with sticky-back Velcro. It can also be fashioned into a triangular pup-tent form that works well when children are engaging in "tummy time." Invisiboards are available from the American Printing House for the Blind (APH). In the absence of an Invisiboard, try a tri-fold display board covered with black or dark navy material, or a dark colored shower curtain or sheet.



### The Light Box/Mini Light Box

Light Boxes have a lighted translucent white work surface providing a high contrast background and source of illumination for colored transparent and opaque items. There are two sizes of Light Boxes available, both have a dimming control and a tilting stand. In a dim environment, the Light Box helps draw the child's visual attention and a variety of materials can be presented on the surface. Some favorites are the CVI swirly mat set (available through APH), hair gel in a Ziploc bag with food coloring, wrapping the light box with plastic wrap and putting pudding or Jell-O on top, Gel Gems (plastic gel shapes that are translucent like stained glass and are reusable), and asking peers to make designs on acetate overhead sheets in the child's favorite color(s). The Light Boxes and swirly mats are available from APH, Gel Gems® are available at various gift, book, and novelty stores ([www.gelgems.com](http://www.gelgems.com)).



### GloE™ Light Changing Bear

This is one of my personal favorites. The white bear lights up with red, blue, green, and purple. It changes color slowly and will continue for about 30 minutes once activated. Available at various retailers such as Wal-Mart, Target, and Toys R Us, or on-line through [www.lightupbears.com](http://www.lightupbears.com).

### Slinkys

Plastic Slinkys come in a variety of bright colors – yellow, orange, green, and purple. These are great for the Invisiboard because they are high contrast, stretchy, and easily graspable.

### Shiny Materials

Anything shiny and reflective can give the appearance of movement, which is one way children with CVI cue into their vision. Pinwheels, crinkle paper, beads (Mardi Gras, garlands for Christmas trees), and bright pom-poms are good to try. Seasonal garland is also a great choice —you can find red hearts in February, green clovers in March, etc. One mother on the CVI Listserv posted that her son loves tummy time on a large emergency blanket; the shiny, reflective kind. The sound and reflective properties are very motivating for him.

### Light-Up Toys

Any type of light-up wand or flashlight that changes color slowly works well for many children. Popular places to find these items are theme parks, the state fair, and novelty/specialty stores. There is also a great light-up urchin ball: Its soft tentacles protrude from the flashing, light-up center and it comes in various colors. Seasonal lights are also worth trying; such as small Christmas tree lights, snowman lights, hearts, Easter eggs, etc. All these items show up great against the Invisiboard.



### Electrical/Duct Tape

Once the child indicates a color preference, that color can be integrated into daily routines through the use of colored electrical or duct tape. Use the tape on cups, eating utensils, brushes/combs, and toothbrushes.

Creativity and not limiting yourself to traditional toys is key. It may take a number of trials to find out what works best for your student but in the end it will be well worth your effort! ■

#### **IMPORTANT NOTE:**

*Many of the items children with CVI respond to are not traditional toys. Close supervision is required for all activities especially if the child mouths or bites. Light-up items that strobe or change quickly should not be used with any child with a seizure disorder or history of seizures.*

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# CHARACTERISTICS OF CORTICAL VISUAL IMPAIRMENT CHECKLIST

Children with other types of visual impairments may exhibit some of these characteristics

CHILD'S NAME: \_\_\_\_\_ AGE: \_\_\_\_\_ DATE: \_\_\_\_\_

RESPONDENT'S NAME & RELATION TO CHILD: \_\_\_\_\_

*A child may be suspected of having a cortical visual loss when the extent of visual loss is unexplained by ocular abnormalities. Etiologies may include cerebral palsy, asphyxia, intracerebral hemorrhage, and meningitis.*

**Please check any areas below that pertain to the child.**

## APPEARANCE

- \_\_\_\_\_ Does not look blind
- \_\_\_\_\_ Blank facial expression
- \_\_\_\_\_ Lack of visual communication skills
- \_\_\_\_\_ Eye movements smooth, but aimless
- \_\_\_\_\_ Nystagmus (rapid eye movement) rarely seen

## VISION FUNCTION

- \_\_\_\_\_ Visual function varies from day to day or hour to hour
- \_\_\_\_\_ Limited visual attention and lacks visual curiosity
- \_\_\_\_\_ Aware of distant objects, but not able to identify
- \_\_\_\_\_ Spontaneous visual activity has short duration
- \_\_\_\_\_ Visual learning tiring
- \_\_\_\_\_ Closes eyes while listening
- \_\_\_\_\_ Balance improved with eyes closed
- \_\_\_\_\_ Look away from people and objects
- \_\_\_\_\_ Consistently look to either side when visual looking
- \_\_\_\_\_ When visually reaching looks with a slight downward gaze
- \_\_\_\_\_ Turns head to side when reaching, as if using peripheral fields
- \_\_\_\_\_ Uses touch to identify objects

## MOBILITY SKILLS

- \_\_\_\_\_ Occasionally "sees" better traveling in a car
- \_\_\_\_\_ Difficulties with depth perception, inaccurate reach
- \_\_\_\_\_ Unable to estimate distances
- \_\_\_\_\_ Difficulties with spatial interpretation
- \_\_\_\_\_ Avoids obstacles, but unable to use vision for close work

## IMPROVED VISUAL PERFORMANCE

- \_\_\_\_\_ When in familiar environments and when using familiar objects
- \_\_\_\_\_ When told "what" to look for and "where" to look
- \_\_\_\_\_ When objects are held close to eyes when viewing
- \_\_\_\_\_ When objects are widely spaced
- \_\_\_\_\_ When looking at one object versus a group of objects
- \_\_\_\_\_ When color is used to assist in identification of objects or shapes
- \_\_\_\_\_ When objects are against a plain background and paired with movement and sound

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*Reprinted with permission. K. Appleby's compiling information from article by: Jan, J.E., Groenveld, A., Sykanda, A.M., Hoyt, C.S. (1987) "Behavioral Characteristics of Children with Permanent Cortical Visual Impairment." *Developmental Medicine & Child Neurology*, 25, 755-762.*

# CVI Resources

## **American Printing House for the Blind (APH)**

APH has one of the most extensive sites for information on CVI. APH created CVI Synergy, a group of researchers, educators, and physicians who work with children diagnosed with CVI. This web site is the product of the CVI Synergy meetings, contributions from individuals and agencies across the United States and Canada, and APH staff.

[www.aph.org/cvi/index.html](http://www.aph.org/cvi/index.html)

## **Deaf-Blind Link**

The National Consortium on Deaf-Blindness: Information to nurture, empower, and instruct children who are deaf-blind.

[www.tr.wou.edu/dblink/lib/topics/topics.cfm](http://www.tr.wou.edu/dblink/lib/topics/topics.cfm)

## **CVI Listservs**

This group is to help others understand and share ideas about cortical vision impairments and how they relate to learning. Also support and sharing for parents and professionals dealing with CVI issues.

<http://groups.yahoo.com/group/Corticalvisionimpairments/>

There is a new group created by parents of older children with CVI:

<http://groups.yahoo.com/group/cviBeyondtheBaby-Days/>

## **Blind Babies Foundation**

### **Pediatric Visual Diagnosis Fact Sheet™**

[www.blindbabies.org/factsheet\\_cvi.htm](http://www.blindbabies.org/factsheet_cvi.htm)

## **Dr. Lea Hyvärinen**

Dr. Hyvärinen is a pediatric ophthalmologist from Finland who has developed a number of vision assessments for use by educators. There is a PowerPoint presentation of CVI assessment on her website. Click on "assessment of vision" and then "assessment of CVI" to access. [www.lea-test.fi/](http://www.lea-test.fi/)

## **Association for the Education and Rehabilitation of the Blind and Visually Impaired (AER)**

CVI on-line course available - *Damage to the Brain Common Cause of Visual Impairment in Children* course presented by Dr. Gordon Dutton, a pediatric ophthalmologist from Glasgow, Scotland.

Course fee is \$75.

[www.emeraldevents.net/diopp/?rcode1=AER](http://www.emeraldevents.net/diopp/?rcode1=AER)

## **Articles by Dr. Lilli Nielsen**

Dr. Nielsen is an educator who has devoted much of her work to students with vision impairments and multiple disabilities. Her Active Learning approach has been used worldwide and she brings this perspective to children with CVI. Her articles are posted on the Scottish Sensory Centre website.

[www.ssc.education.ed.ac.uk/resources/vi&multi/lilli/article1.html](http://www.ssc.education.ed.ac.uk/resources/vi&multi/lilli/article1.html)

[www.ssc.education.ed.ac.uk/resources/vi&multi/lilli/article2.html](http://www.ssc.education.ed.ac.uk/resources/vi&multi/lilli/article2.html)

[www.ssc.education.ed.ac.uk/resources/vi&multi/lilli/article3.html](http://www.ssc.education.ed.ac.uk/resources/vi&multi/lilli/article3.html)

## **SESA Library Resources**

*Cortical Visual Impairment in Young Children* (videorecording) from the British Columbia's Children's Hospital and Sunny Hill Health Centre for Children

*CVI perspectives (DVD)* Dr. Christine Roman and Dr. Alan Lantzy

*Swirly Mat* set for students with cortical visual impairment

*Cortical visual impairment: A complex physiological, psychological & motivational condition* (sound recording) Mary Morse

*Spring Fling* (videorecording) Dr. Lea Hyvärinen

*Proceedings: Summit on Cerebral/Cortical Visual Impairment*, April 30, 2005. Elizabeth Dennison and Amanda Hall Lueck, (Editors). AFB Press