

# Cortical Visual Impairment

*Visual Diagnosis Fact Sheet by the Blind Babies Foundation, San Francisco, CA*

## DEFINITION:

Cortical Visual Impairment (CVI) is a temporary or permanent visual impairment caused by the disturbance of the posterior visual pathways and/or the occipital lobes of the brain. The degree of vision impairment can range from severe visual impairment to total blindness. The degree of neurological damage and visual impairment depends upon the time of onset, as well as the location and intensity of the insult.

It is a condition that indicates that the visual systems of the brain do not consistently understand or interpret what eyes see.

This is not an indicator of cognitive ability.

## CAUSE:

The major causes of CVI are asphyxia, prenatal hypoxia ischemia (“hypoxia”: a lack of sufficient oxygen in the body cells or blood; “ischemia”: not enough blood supply to the brain), developmental brain defects, head injury, hydrocephalus, and infections of the central nervous system, such as meningitis, and encephalitis.

## CHARACTERISTICS:

Initially, children with CVI appear blind. However, vision tends to improve. Therefore, Cortical Visual Impairment is a more appropriate term than Cortical Blindness. A great number of neurological disorders can cause CVI, and CVI often coexists with ocular visual loss, so the child should be seen by both a pediatric neurologist, and a pediatric ophthalmologist.

The diagnosis of Cortical Visual Impairment is a difficult diagnosis to make. It is diagnosed when a child has poor or no visual response and yet has normal pupillary reactions and a normal eye examination.. The child’s eye movements are most often normal. The visual functioning will be variable.

The combination of the MRI and how the child is functioning visually, provides the basis for diagnosis.

## BEHAVIORAL/VISUAL CHARACTERISTICS:

Children with CVI have different abilities and needs. The presence and type of additional handicaps vary: some children have good language skills and others do not, and spatial confusion is common because of the anatomical proximity of the parietal and occipital lobes.

Habilitation should be carefully planned.

A full evaluation by a number of professional is essential. The evaluation team could include: teachers (of the visually impaired or severely handicapped), PT's, OT's, Speech Therapists, and Orientation and Mobility Specialists.

There are several common characteristics of visual function demonstrated by children with CVI:

Vision is variable: sometimes on, sometimes off; changing minute by minute, day by day.

Rapid horizontal head shaking or eye pressing is uncommon among children with CVI.

One third of children with CVI are photophobic.

Others may be compulsive light gazers.

Color vision is generally preserved in children with CVI (color perception is represented bilaterally in the brain, and is less susceptible to complete elimination).

The vision of children with CVI has been described much like looking through a piece of Swiss cheese.

Children may exhibit poor depth perception, influencing their ability to reach for a target.

Vision may be better when either the visual target or the child is moving.

Many children with CVI may be able to use their peripheral vision more effectively than their central vision.

The behaviors of children with CVI reflect their adaptive response to the characteristics of their condition:

Children with CVI may experience a "crowding phenomenon" when looking at a picture: difficulty differentiating between background and foreground visual information.

Close viewing is common, used to magnify the object or to reduce crowding.

Overstimulation can result in "fading" behavior by the child, or in a short visual attention span.

The ability of children with CVI to navigate through cluttered environments without bumping into anything could be attributed to "blindsight", a brain stem visual system.

Children are often able to see better when told what to look for ahead of time.

Children with CVI may use their peripheral vision when presented with a visual stimulus, appearing as if they are looking away from the target.

Some children look at an object momentarily and turn away as they reach for it.

#### MYTHS:

The following are some of the many myths associated with CVI:

Children with CVI are visually inattentive and poorly motivated.

All children with CVI will have cognitive deficits.

CVI is not a true visual impairment.

Children with CVI are totally blind.

Children whose visual cortex is damaged are Cortically Blind.

#### TEACHING STRATEGIES:

A great deal of energy is needed to process information visually. The child might tire easily, when called upon to use his visual sense. Allow for intermittent “break” times.

Positioning is important. Keep the child comfortable when vision use is the goal, in order that “seeing” is the only task.

Head support should be provided during play or work sessions, to avoid involuntary shifting of the visual field.

Try many different positions to find the one in which the child feels most secure. Infants and toddlers will demonstrate when and where they see best by their adaptive behaviors.

If the child needs to use a lot of energy for fine motor tasks, work on fine motor and vision separately, until integration of the modalities is possible.

When a child with CVI needs to control his head, use his vision, and perform fine motor tasks, the effort can be compared to a neurologically intact adult learning to knit while walking a tightrope.

The simpler, more constant and more predictable the visual information, the better the child with CVI is likely to deal with it. Keep toys an environment simple and uncluttered. Use books with one clear picture on a contrasting simple background.

Use familiar/real objects (bottle, bowl, plate, bath toy, diaper, cup, spoon, favorite toy) one at a time. Familiarity and simplicity are very important.

Since the color system is often intact, use bright, fluorescent colors like red, yellow, pink, and orange. Colored mylar tissue seems to evoke visual responses.

Repetition is very helpful: use the same objects and same process each time to provide familiarity and security for the child. Familiarity breeds response.

Look for toys and activities that motivate the child.

Vision is often best stimulated when paired with another sensory system. For example, auditory cue from the handling of mylar may help attract the child's attention.

Introduce new and old objects via touch and verbal description.

Try different lighting situations to assess optimal conditions for viewing. Try locating a light source behind, and/or to the side of the child.

Try moving the target that you want the child to see: try different visual fields.

Allow lots of time for the child to see and to respond to what is being seen.

Learn to interpret each child's subtle response cues: such as changes in breathing patterns, shifts of gaze or body position, etc.

#### RESOURCES:

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2. "Visual Behaviors and Adaptations Associated with Cortical and Ocular Impairment in Children," Jan, J.E.; Groenveld, M.; April 1993, American Foundation for the Blind.
3. Video: "Issues in Pediatric Ophthalmology: Cortical Visual Impairment (1994), Child Health and Developmental Media, Inc., 5632 Van Nuys Blvd., Suite 286, Van Nuys, CA 91401
4. "Cortical Visual Impairment in Children," Good, W; Jan, J.E.; Luis, D. (1994) *Survey of Ophthalmology*. 38:4:351-364

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