Cerebral Visual Impairment

Children with Complex Needs

Cerebral Vision Impairment (CVI) is a condition where some of the special “vision” parts of the brain and its connections are damaged. A child/young person can have CVI in isolation (*without* reduced visual acuity) or the CVI may be accompanied by an ocular condition (*with* reduced visual acuity).

CVI affects each child/young person uniquely and to different degrees (mild to severe). In its most severe form, it causes blindness. This is a condition where there is profound damage to the back of the brain, - the occipital cortex, and the visual pathways from the eyes leading to it. Profound visual impairment/ blindness is the result, but this may be accompanied by apparent intermittent ability to detect movement, or “Blindsight”, usually from the side.

In the other types of CVI difficulties in processing visual information and making sense of what is seen occur. Much of the brain is linked with visual processing tasks, from accurate selection of objects, accurate reach and grasp, coordinated movement to being able to give visual attention to more than one thing at once. Children with complex needs may have ‘healthy’ eyes and there may seem to be no obvious reason why they are not responding visually.

Common Causes of CVI

- Lack of blood supply/oxygen to the brain
  - Periventricular leukomalacia (PVL), an injury to the white matter of the brain that occurs primarily in premature infants.
  - Head injury
  - Meningitis and encephalitis
  - Some cases of shunted hydrocephalus
  - Infection to the brain
  - Neonatal hypoglycaemia (very low blood sugar at birth)
  - Other medical conditions which may be associated with CVI, some rare, some more common such as-
  - Premature birth
  - Cerebral Palsy
  - Hemiplegia

Some Common Features of CVI

The following behaviours are all associated with CVI in children with complex needs:

- Reaching for objects to the side but not straight ahead
- Looking away from people/objects in order to ‘see’ them
- Vision seems to be variable and may change on a day to day or even an hour-to-hour basis.
- For the mobile child – uncoordinated movement and reach for objects
- Inability to fix on objects for any length of time
- Irregular eye movements
- Lack of response to objects placed on a ‘busy’ background which the child may respond to against a plain, contrasting surface

- Children with CVI may experience a "crowding phenomenon" when looking at a picture/text: i.e. have difficulty differentiating between background and foreground visual information
- Close viewing is common, to magnify the object or to reduce crowding
- Eye movements not made independently of head movements
- Difficulty seeing objects unless moving or in some children, unless objects are still
- Lack of response to faces/facial expression
- 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
- Many children with CVI will have lower visual field neglect that can cause difficulties with their mobility. They may also have difficulty accessing curriculum materials which have not been raised, in order to bring it within their visual field
- Many children with CVI may be able to use their peripheral vision more effectively than their central vision
- Some children will have difficulty recognising faces of familiar people

N.B. A side effect of hyoscine patches, used to control salivation, is that they can paralyse the pupils in the eyes. This causes photophobia and a lack of ability to focus for near vision tasks.

Strategies to encourage a response to visual stimulation

Keep It Slow and Simple (KISS)

The world is a visually complex place for a child with CVI and anyone supporting a child with CVI should remember to “keep it simple.” A child with CVI has difficulty controlling the visual input in the environment, therefore it is important to reduce as much extraneous sensory input as possible. For example:

- Understand that attention can only be given to one or two things. Use one object at a time – less really is more
- Limit the child’s sensory input. Children with CVI can oftentimes only process one sensory modality at a time. If a child is looking at a person or an object he may not be able to listen to directions and touch the object at the same time. Too much sensory input can be stressful and a child may simply “shut down” as a way to get away from the input
- Children are often able to see better when told what to look for ahead of time.
- Eliminate background sounds and other distractions. Working inside a coloured ‘tent’ may be helpful when introducing something new as it helps to block out other distracting stimuli both visual and auditory
- Keep visual clutter in the classroom to a minimum. Are the walls/ work surfaces busy or clear? Remember that clutter can create confusion and distractions. The potential link between cluttered classrooms and students' functioning and behaviour indicates that visual clutter may amplify the visual difficulties associated with CVI and distract the students from learning activities. Changes to consider may include: covering glass displays with black paper;

hanging sheets over open shelving; creating areas of blank wall in front of the student to focus attention on work; removing unnecessary equipment and furniture; and taking down information on windows and walls

- Provide a screened work area for child/young person to work at for specific tasks/times
- Reduce visual clutter on images/ or any printed materials being presented to the child. Present images/objects/information against a simple, plain background. Keep it simple
- Use objects that are one colour (e.g., red ball) versus a multiple coloured item.
- Present a single object instead of an array of objects on a background that will create some contrast (e.g. red car on a black background)
- Provide a meaningful experience at the right speed – use the KISS principle
- Give the child favourite objects to begin with then watch and wait – most of all give them lots of time to respond – don't be tempted to 'fill the space' with speech or sounds. Remember they may look, then look away before returning to the item. Remember responses will vary – tiredness, ill health will all make a difference. The factors that influence a child's response time will depend on how familiar the child is with the activity, the environmental conditions (e.g. light, noise) under which the child is being asked to respond, and what kind of response the child is being asked to give
- Using familiar objects can also increase a child's visual attention. Known people, places, and things reduce a child's stress level in that he can learn to rely on and understand the activities of the

day. Familiar objects also create an opportunity to develop a child's receptive and expressive communication system and help him make choices throughout the day

- Remember the child will be working very hard processing information and will tire easily –small activities, little and often works best

  N.B. **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**

Positioning

Make sure that the child is in an optimal position to use his vision. A child should be comfortable and able to focus his energy on the visual task. If a child has to concentrate on holding his head up, looking at an object or a person, and following verbal directions at the same time he may become overloaded, unresponsive or agitated. Strategies for optimal positioning may include:

- When positioning children take account of which lighting conditions they prefer, some prefer darkened areas and some brighter ones
- Ensure they are comfortable, comfort helps attention.

Movement

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

- Use movement cues to stimulate the child's visual attention. Remember that a child may even move himself to see an object if there is nothing to look at that moves

- Pointing/tapping at an item can provide additional cues of where to look

Field Of Vision

Find the child's "field of vision" (where the child sees). Which way does the child's head turn and/or eyes look? The "field of vision" will be different for each child and the response to educational and environmental input will also be unique to each child. An informal assessment of how a child uses his vision and under what conditions will be very helpful in designing strategies and environmental adaptations.

- It may be helpful to try moving the target object in different visual fields and observe the child's responses
- Communicate with and present objects within the child's field of vision
- The use of a sloping desktop will help bring visual information within the child's visual field.

Facial Recognition

- For a child/young person who has difficulty recognising the faces of known people allow/enable the child/young person to listen to voices and focus on key identifying features/objects e.g. hair styles, jewellery worn often, frequently worn clothing e.g. colour of coat
- Ascertain at what distance the child/young person begins to have difficulty with recognition of expressions and ensure that you are within that range when communicating. If at a distance, tell the child/young person verbally how you are feeling rather than expecting them to interpret your facial expression

Colour Preference

Identify the child's colour preference. Do some informal assessment and see if you can identify the child's favourite colour. Children with CVI are often times attracted to fluorescent and glittery items (e.g., gold glittery pom-pom). Colour can be a strength for a child with CVI and create a path to a variety of instructional opportunities. It can be used to encourage visual attention to functional objects, toys, and people. For example:

- Offer two shapes or objects of similar interest, but in different colours and observe the reaction of the child
- A solid red cup or comb may be presented in a child's peripheral visual field, the child can then touch the object before it is used
- Glittery material like strips of shiny paper can be attached to an item to attract a child's attention before using an object
- Colour can be used to create an organizational strategy to code items in a communication system or to identify certain places in a school or home.

Touch

Recognise how important touch is for a child with CVI. Touch is a critical way of gathering information for a child with CVI, therefore always provide tactile information about what is happening in the environment. These kinds of strategies might include:

- Having peers and adults use tactile cues (e.g., ring, bracelet, watch, a peer's ponytail) as well as verbal information to introduce themselves
- Developing an object/texture schedule system, and/or presenting textures within the context of an activity to give a child information

- Giving the child the opportunity to handle lots of different textured toys and objects
- Make use of objects of reference to represent personal care routines or curriculum activities. For example, an orange armband to represent swimming, therapy pool time.

Not all strategies need to be maintained for the long term as improvement with vision can occur over time with CVI. Reduce or gradually remove strategies if the child/young person no longer requires them.

Websites for further information about CVI

CVI Scotland

Scottish Sensory Centre

Scottish Sensory Centre An Introduction to CVI

The CVI Society