2014 SWOMA Conference
Finding My Way

O&M for Students with CVI

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O&M for Students with CVI

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Primary source: Christine Roman-Lantzy's , "Cortical Visual Impairment: An approach to Assessment and Intervention, AFB Press, 2007.

Cortical (Cerebral) Visual Impairment (AKA Neurological Visual Impairment)

CVI is a "neurological disorder resulting from brain damage, which results in abnormal or unique visual responses to people, objects and the environment." (Shaman, 2009)

Cortical (Cerebral) Visual Impairment

Visual impairment is not due to damage to the eye itself but to the posterior visual pathway, i.e. the parts of brain that process and interpret visual information received from the eyes – visual cortex, parietal lobe and temporal lobe.
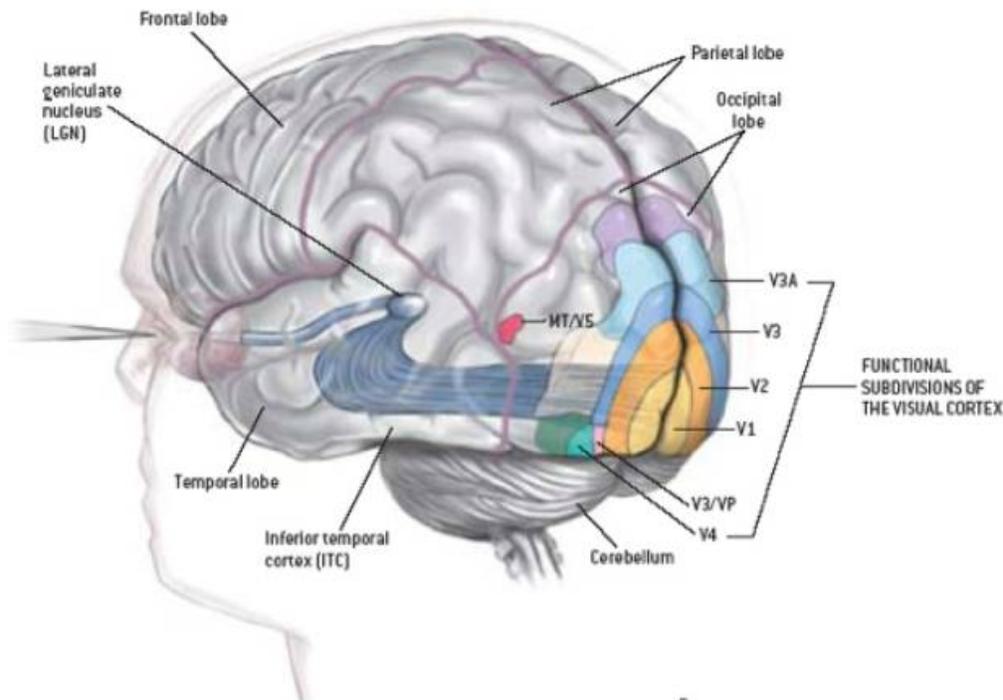
Picture of the Human Brain

Figure 1 Labeled illustration of the human brain from Logothetis, N. 1999. Vision: A window on consciousness. Scientific American.

The Plasticity of the Brain

- Over 40% of the brain is involved with visual processing.
- Research suggests that the brain can rewire itself to dedicate itself to different functions.

How are children with CVI identified?

- CVI is not a purely medical diagnosis but rather the presence of patterns of visual characteristics paired with medical diagnosis of brain damage.
- Lack of visual function, as noticed by significant others, is a key characteristic.
- While an impairment of the eye itself is not the cause of the visual characteristics, CVI can occur in conjunction with impairment(s) to the eyes AND, often, with other physical & cognitive impairments (but not always).

How are children with CVI identified? (from AFB)

A child with CVI is distinguished from a child with learning disabilities or developmental disabilities by the following criteria:
1. an eye examination that cannot fully explain the child's use of vision;
2. a history or presence of neurological problems, even when the child's brain-imaging studies may appear normal (Dutton, 2008); and
3. the presence of the behavioral or visual responses that are collectively associated with CVI.

(AFB, Statement on CVI)

Prevalence of CVI

In the population of children diagnosed with a visual impairment, approximately 30 to 40% have CVI.

(AFB Statement on Cortical Visual Impairment)

Prevalence of CVI

- Often under diagnosed
- Not recognized as cause of visual impairment until mid-1980s.
- Fastest growing cause of visual impairment in developed countries

AFB Statement on Cortical Visual Impairment

- "Our perspective is that all children who have CVI should be classified as visually impaired and receive the necessary services, regardless of the severity of the degree of CVI or additional disabilities."
- http://www.aph.org/cvi/new.html

Problems with Medical Diagnosis

- Eye report frequently doesn't list CVI
- MRI's of the brain may or may not be normal
- Eye exam may be normal, AND/OR
- CVI may occur with the presence of other eye conditions
- Look for 'red flags'

Causes of CVI - Red Flags (This is NOT an all-inclusive list.)

- Asphyxia (drowning, SIDS, choking, birth trauma)
- Stoke
- Periventricular Leukomalacia (PVL)
- Brain hemorrhage
- Cerebral Palsy
- Seizure disorder
- Cranial infection (toxoplasmosis, rubella, herpes, HIV, cytomegalovirus, encephalitis, meningitis)
- Brain tumor
- Traumatic Brain Injury (TBI)
- Fetal Alcohol Synd.
- ONH/SOD

Visual/Behavioral Characteristics

Any of which may indicate CVI

Color Preference:

- The preferred visual response to one color may be noticeably present. The preferred color is often red or yellow, but other color preferences are possible. Color acts as a visual magnet or anchor.

Attraction to Movement:

- Movement of either the item to be viewed or movement of self in order to see an item helps activate the visual response. Reflective items are often preferred as they have movement characteristics.

Visual Field Preferences:

- Especially to the periphery where movement may best be noticed.

Visual Latency:

- A delay in the time a target object is presented and the time when it is first seen. The delay is two-fold:
  1) delay in directing vision towards the target, and
  2) delay in correctly identifying the target item.

Visual Motor:

- *Look and touch may happen as two separate events.*
- The child may not be able to see and act on something at the same time -- or some children can act on what they see, but not name it.
- Characteristics may occur because of a miscommunication between two different areas of the brain:
  o The temporal lobe perceives & sees/interprets the object, and
  o The parietal lobe instructs the body to act on the object.

Visual Complexities:

- Too many objects in the visual field cause overload which may lead to:
  - visual shut-down, or
  - may create difficulties with distant viewing.
- Visual Complexity may occur:
  - Within the object itself (faces, busy patterns, many features/colors).
  - As a result of what is behind the object (referred to as 'array' or 'visual clutter').

Visual Novelty:

- Fluctuations in vision may be perceived. The reasons for differences in visual use may be:
  - Systemic: May be due to fatigue.
  - Environmental: Novel items are less easily seen. Complexity of item or visual array may be a factor.

Visual Reflexive Responses:

- The absence of or delayed response to:
  - Blink to threat
  - Blink to touch

Non-Purposeful Gaze:

- The student seems to be looking through you or sometimes interpreted as not paying attention.

Abnormal responses to light:

- Light Gazing: staring at light sources for extended periods of time. (Light gazing is normal behavior for infants and may indicate delayed development. Or it may be an effort to not look at a target while processing auditory information.)
- Photophobia: sensitivity to light.   (The eye responds correctly to light but the brain reacts abnormally to light.)

Difficulty with attending:

- To more than one sensory channel at a time, i.e. complexity of environment.
- Looking, listening and tactile exploration may need to occur separately in order for processing of information to occur.

Visual Characteristics - Summarized

- Color Preference
- Attraction to Movement
- Visual Field Preferences
- Visual Latency
- Visual Motor
- Visual Complexities
- Visual Novelty
- Visual Characteristics – Summarized (cont'd.)
- Visual Reflexive Responses
- Non-Purposeful Gaze
- Abnormal responses to light
- Light Gazing
- Photophobia
- Difficulty with attending to more than one sensory channel at a time

What is the vision world of a person with CVI like?

Imagine looking:
- For one person in sports stadium
- At modern art with lots of shapes and colors but having no understanding what it is meant to represent
- At partially finished jigsaw puzzle but not knowing what it is supposed to be

What is this?

Optical illusion.

Three Important Educational Beliefs Re: CVI

1) Children with CVI have the capacity to see more effectively and become more active and fulfilled participants in their school environments. (For O&M instruction, add "home and community".)
2) Improved vision and school participation is dependent on a carefully designed educational program consisting of enjoyable and simplified activities embedded in familiar routines and specific to each child's unique visual and learning needs.
3) Effective learning requires that well trained team members work collaboratively in order to improve vision and learning for children with CVI.

(Adapted from Edelman, et al., 2006)

Additional Educational Factor to Consider and Remember

- Presence of CVI does NOT always mean cognitive impairment is present.
  - Like eye-based vision loss, it can affect the rate of learning, CVI often slows down rate of learning, BUT
  - The potential for learning may not be adversely affected or predetermined.

Intervention

- The accepted methods of teaching may not be what is best for a student with CVI
- Find out where the student is currently functioning
- Provide repeated opportunities for them to use and develop their vision

….. the brain forms new pathways and the student himself achieves the next level of resolution.

Need for constant on-going assessment.

Charting Resolution of CVI

Christine Roman's chart

The Resolution Factor/Impact

- Presence of CVI is a dynamic condition, i.e. that the degree to which the CVI characteristics occur can (and usually does) change over time.
- The child's ability to use vision and gather information visually can increase over time.
- Interventions can be designed to increase use of vision as well as interpretation of visual information.
- Role of VI professionals is to organize experiences to help a child with CVI increase visual ability and make sense of his/her vision.

The Resolution Process

- Can be charted using Christine Roman-Lantzy's CVI Resolution Chart which has 10 ranges grouped under 3 phases.
- Charting is done by the IFSP/IEP team, usually led by the TVI and should include input from the O&M specialist.
- There is a separate Resolution Chart for O&M related skills and activities.

General Suggestions for O&M Instruction:

- Approach child's education with holistic and functional perspective.
- Collaborate so that the entire team has a common goal: fostering development of child's vision and ability to use it successfully in a variety of environments.
- Include time for consultation in ARD documents.
- Offer to the TVI to participate in FVE and LMA and completion of Resolution Chart in order to learn more about the child's unique CVI characteristics and what changes in visual function have occurred for the child.
- TVI and/or COMS needs to attend eye and low vision examinations
- Read pages 142-146 in Cortical Visual Impairment: An Approach to Assessment and Intervention by Christine Roman-Lantzky
- Become familiar with O&M Resolution Chart and be constantly looking for changes in function that can be noted on the chart.
- Heightened importance of old standby considerations:
  - Realize mantra of VI professionals --each child is an individual with unique needs and skills -- is even more applicable for students with CVI.
  - Extended wait time is critical to allow for processing visual information.
- Relate new skills/concepts to previously learned ones.
- Provide multiple examples of generalizations.
- Provide direct/real experiences.
- Teach self-monitoring techniques
    (Marnee Loftin, TX Focus 2012, presentation on Traumatic Brain Injury)
- Bring the world to the child;
- Bring the child to the world.

Suggestions for Instruction: The Beginning

The initial instructional environment should be:
- Familiar
- Uncluttered
- Quiet
- Simple

Remember the "Simple to Complex" rule

Strategies for Instruction: Color Preference

- Wear student's favorite color.
- Mark key locations with the student's favorite color.

Figure 2 A travel cane hangs from a silver hook which is placed on the wall. The wall immediately surrounding the cane is painted in red and yellow stripes meant to catch the student's attention.

Strategies for Instruction: Color Preference

- AmbuTech red and orange ball and roller tips
- Use tape in a student's favorite color to mark the placement of hands (or the lower bar) on a pre-cane device.

Figure 3 Photo of AmbuTech red ball tip on the end of a cane.

Strategies for Instruction: Color Preference

- Point out red lines on sides of aisles
- Overhead department signs also often in red.
- Incorporate preferred color in maps for student's use.

Figure 4 Photo of a shopper walking beside a red line on the aisle floor.

Strategies for Instruction: Attraction to Movement

- Mark key points on route - helium balloons (favorite color) tied to weight.
- Use Mylar pompoms to mark key destinations.
- Use hand motions to direct attention or provide directional cue.

Figure 5 Photo showing a kitchen chair with shiny tinsel wrapped around the back.

Strategies for Instruction: Visual Complexity

- Avoid wearing overly busy clothes.
- Expect the student to have difficulty recognizing faces; provide verbal prompts in social settings
- Provide opportunities to practice recognizing faces by using photos of key people seen regularly
- Spend ample time familiarizing to new classroom/school prior to beginning of year before teachers begin decorating.
- Schedule at least one lesson after teachers have returned
- Provide ample practice the first few days of the school year after students return.
- Try to limit visual complexity when choosing training sites, especially when teaching a new skill.
- Use of telescope, binoculars, digital camera or cell phone may help control for visual clutter (as well as be a motivator).
- Cane or pre-cane device may help student focus on what is ahead
- Looking at the cane as it moves may help cut down on visual clutter by decreasing array.
- Cane movement may attract student, promote use of vision, but distract from awareness of other key visual information

Strategies for Instruction: Visual & Environmental Complexity

- Because of difficulty attending to more than one source of sensory input at a time, try to limit auditory prompts as they tend to interfere with vision.
- Use physical prompts, especially those that involve movement.

Strategies for Instruction: Visual Novelty

- Use sequence of photos with increasing complexity to introduce/familiarize to new landmarks.
- Very connected to visual clutter
- Preview planned destinations with your student
- Give the student pictures of desired items when teaching shopping or how to find a landmark on a new route.
- When introducing a new route, make picture book with the student of key points on the route.
- Use preferred color for background.
- Keep it visually simple; put only one picture to a double page.
- Use the picture book to review route before practicing again.
- On any new route, allow time for exploration, perhaps initially with a guide, so the student can become familiar with new surroundings and you can point out key areas.
- Expect cane skills to temporarily decline when working in a new area until the environment becomes more familiar.
- Provide repetition until student seems comfortable in a new environment or route
- Introduce new cane skills in familiar environment to help avoid visual distractions
- Generalizing from one environment to another may be very difficult for some
- Watch for evidence of visual and/or physical fatigue.
- Student may not be capable of using his/her vision efficiently.
- Possible options are to provide rest period, return to more familiar setting/topic or discontinue lesson.

Strategies for Instruction: Visual Motor

- Because of the 'look, look away, touch' sequence, allow time for tactile exploration of items in order to promote concept development.
- As vision resolves, tactile and visual exploration will occur more simultaneously, but only when child is ready.

Strategies for Instruction: Visual Latency

- Allow for delay between first seeing and then acting upon a visual target.
- Moving the target item may shorten the delay.
- Allowing physical handling may facilitate the identification process.

Strategies for Instruction: Visual Field Preferences

- Know visual field preferences.
- Use movement in the preferred visual fields to draw vision to a desired object or provide a visual prompt.
- Repeated use of preferred visual fields can promote expansion of vision by slowly moving items into the less preferred fields.

Strategies for Instruction: Lighting considerations:

- Not the classic photophobia.
- The presence of shadows creates complexity. Teach student how to recognize shadows and what causes shadows to change.
- Or avoid times of day when shadows are present.
- Reflections from windows, standing water or shiny surfaces may distract and cause changes in performance.
- Attraction to reflective surfaces can be utilized to mark landmark or promote visual field expansion.
- Strategies for Instruction: Light considerations
- Environments with ceiling fans may be distracting as the turning fan blades may cause the lights to flicker – creating movement and light distortions.

Strategies for Instruction: Visual reflexive response

- Consider having the student wear protective lenses when traveling outdoors because of the lack of blink response.

Strategies for Instruction:

- A menu from which you can choose – ideas to try but not a prescription.
- Offered as part of dynamic document that will be posted on the TSBVI website
- Send ideas to ruthannmarsh@tsbvi.edu

Notes:

This project is supported by the U.S. Department of Education, Special Education Program (OSEP). Opinions expressed here are the authors and do not necessarily represent the position of the Department of Education.

Figure 6 IDEAs that Work logo and disclaimer.