

Train the trainer TEACH CVI project

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Chapter II

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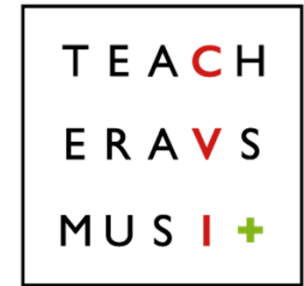
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Chapter II - Resources and information to support assessment of the child's vision



Overview

Communication, initiating communication, play and exploration tips

Supporting development of visual skills

Developing visual skills – basic visual functions

Developing visual skills – Resources for visual perceptual skills

Checklist when assessing children with CVI



Outline of presentation



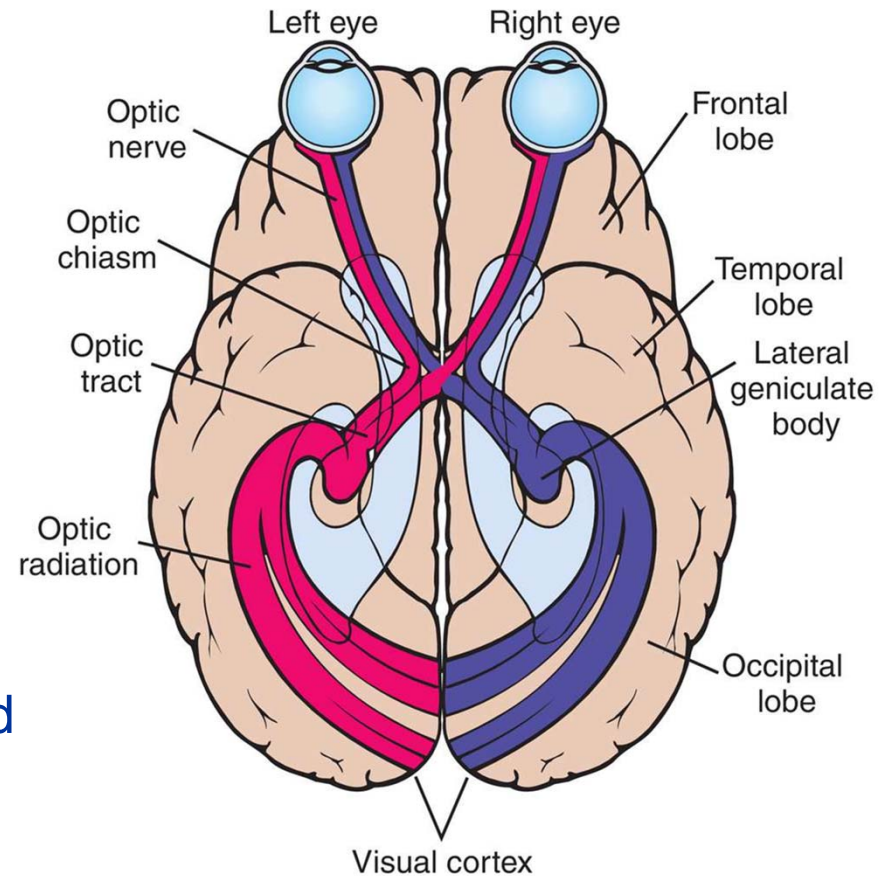
- Introduction
- Basic visual functions
- Visual perception
- Dorsal and ventral stream dysfunctions
- Educational implications
- Ideas of strategies for communication and visual stimulation
- Time for practice – Video
- Time for practice – Exercise



The visual system

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- Peripheral segment: sensory receptor – eye and optic nerve
- Intermediary segment: neural pathways responsible for the transfer of information – optic tract, optic chiasma and optic radiations
- Central area: part of the brain involved with the processing of information – primary visual cortex and visual association cortical areas



Basic visual functions – Oculomotor functions

Visual fixation

Visual following

Shift of gaze and saccades

Accommodation

Convergence/divergence

Alignment of the eyes

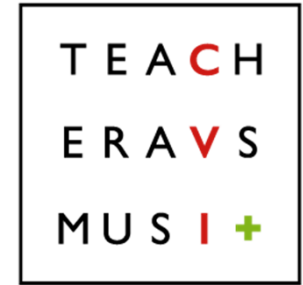
Binocular function

Enable us to make sense of,
move within, and interact with the
world we can see with our eyes

Basic visual functions – Sensory aspects

Visual acuity	Ability to resolve or recognise fine details
Visual field	Peripheral fields, lower fields, upper fields
Contrast sensitivity	Ability to see differences in the amount of light reflected from adjacent surfaces Gives information for communication and perceiving of environment
Colour vision	Is possible due to photoreceptors (cones) in the central part of retina
Stereopsis	Fine depth perception that results from the brain's interpretation of the slight difference between the disparate pictures of the same visual scene provided by the two eyes
Visual adaptation	Describes the processes by which the visual system alters its operating properties in response to changes in the environment

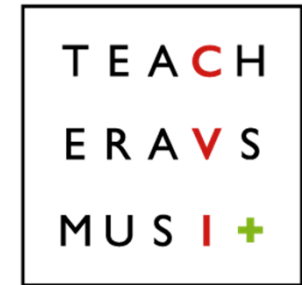
CVI – Diagnosis



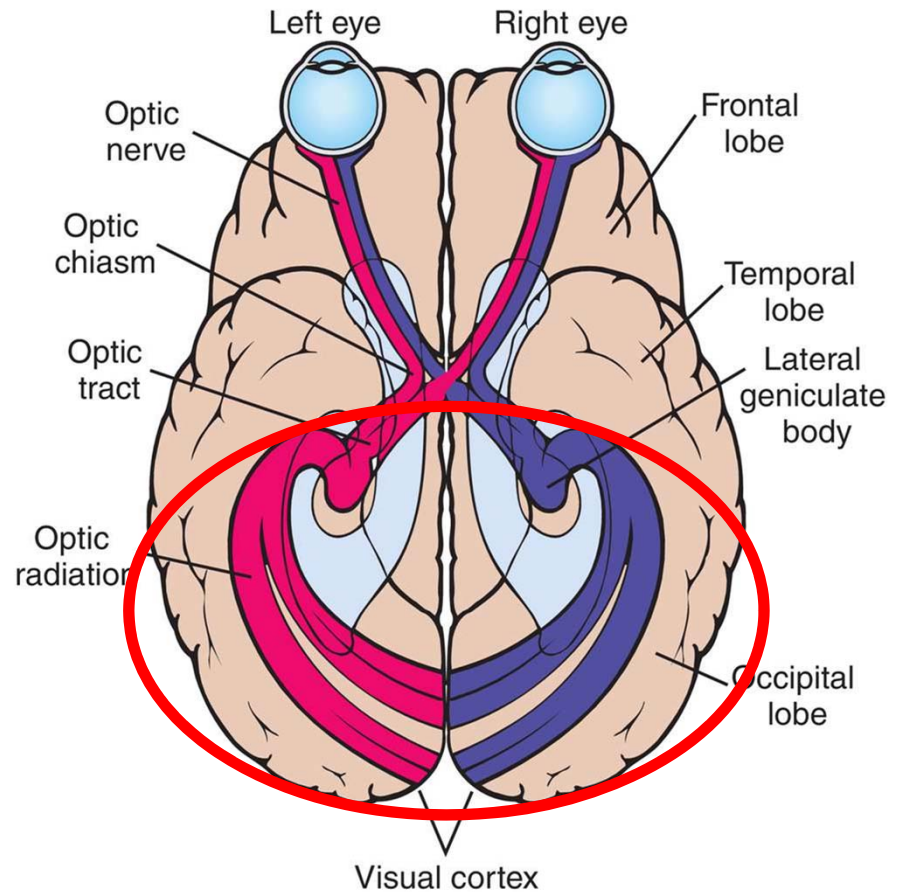
- Eye-examination does not explain the level of functional vision
- History of neurological problems
- Distinct behavioural characteristics



CVI and visual perception



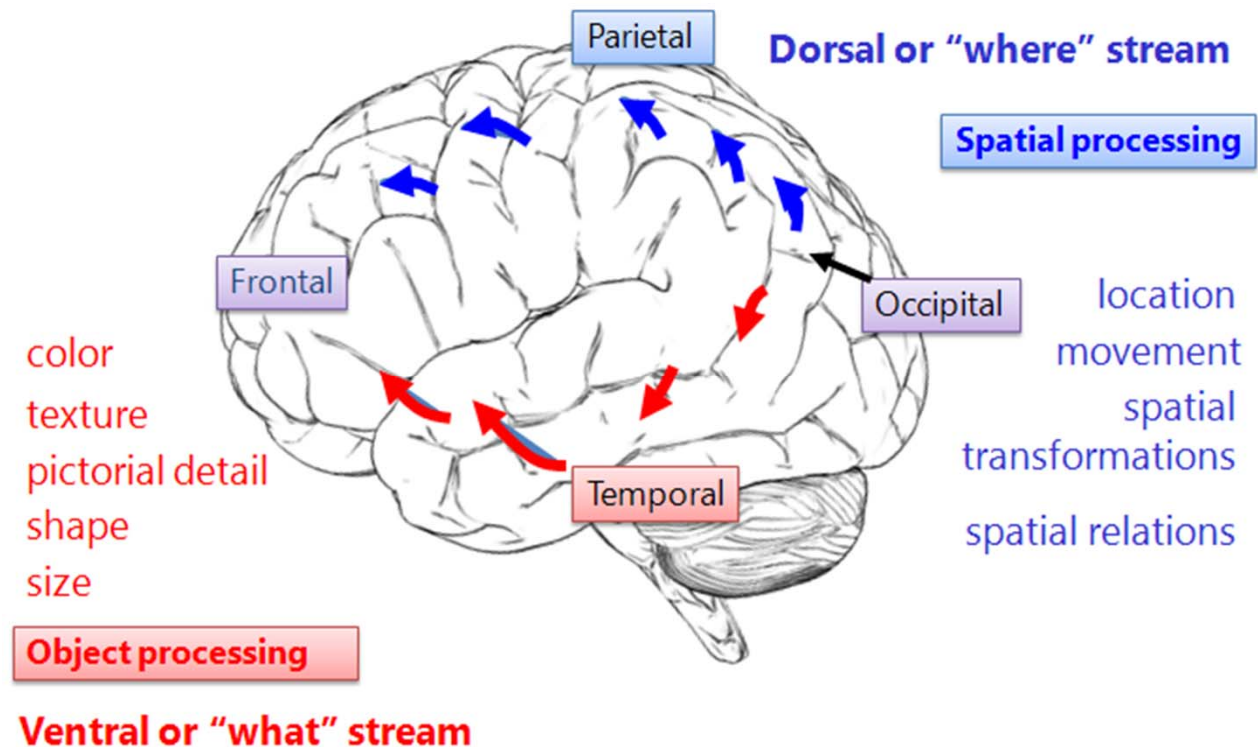
- Symptoms of CVI are caused by injury to the visual pathways and visual centres of the brain
- CVI – complex brain processing difficulties
- Manifestations of CVI can be seen as a spectrum ranging from profound to mild



Dorsal and ventral stream and visual perception

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- From the occipital lobe, the visual information is sent to the visual association cortex through two major pathways:
 - ventral stream
 - the dorsal stream



Dorsal and ventral stream dysfunctions

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- **Ventral stream – WHAT is it?**
 - Responsible for
 - Details of objects
 - Recognition of shapes, objects, letters, numbers, words
 - Recognition of human faces and facial expressions
- **Dorsal stream – WHERE is it?**
 - Responsible for
 - Processing of stimuli in movement
 - Control of ocular movements
 - Grasping of objects under visual control
 - Finding people in a group
 - Visual attention

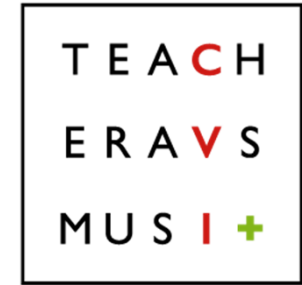
Ventral stream dysfunction	Impact on reading
Shape agnosia	Difficulty recognizing the shapes of letters
Visual memory	Difficulties with recalling letters or words they have read before
Visual form constancy	Difficulties with recognising the same letters regardless of changes in size, shape, and orientation. The child is likely to reverse letters (e.g. p and q and b and d)



Dorsal stream dysfunction	Impact on reading
Crowding	If there is no adequate spacing between the letters, the child may experience problems seeing each letter within the word
Visual clutter	Too much print or too many images presented on a page or within an image can lead to difficulties with processing the information
Visual sequential memory	Difficulty remembering the correct sequence of letters in a word which may impact correct spelling
Visual search	Difficulties with finding a specific word , phrase, sentence, moving to the next line etc.
Simultaneous processing of information from more than one sensory channel	The child may have difficulties listening to a story whilst reading the text and holding an object relating to the story



Children with CVI – three categories¹

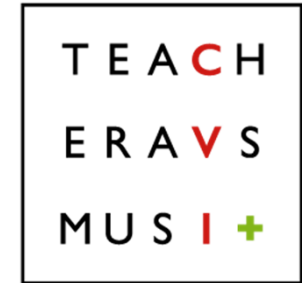


- Children with profound visual impairment due to CVI, many of whom have additional disabilities
- Children with CVI who have better functional visual abilities and some cognitive and motor challenges
- Children with CVI who have sufficient vision, that allows them to work at or near expected academic level for their age group

¹ Lueck A.H & Dutton G.N. (2015). *Vision and the brain. Understanding Cerebral Visual Impairment in Children*. AFB Press.



Five keys to successful intervention²



- Try to understand and be sensitive to the child's visual world
- Develop familiar routines and activities
- Offer visual stimuli at the child's level
- Approach the child gently, with respect and humor
- There is no universal CVI-program – Each child is unique



Ideas of strategies for communication and visual stimulation³

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1. Communication

2. Body position

3. Time

**4. Adaptation of
environment - Space**

**5. Adaptation of
environment - Lightning**

**6. Adaptation of
environment - Distance**

7. Toys and materials

8. Colour and contrast

**9. Shapes and size,
technology and Apps**

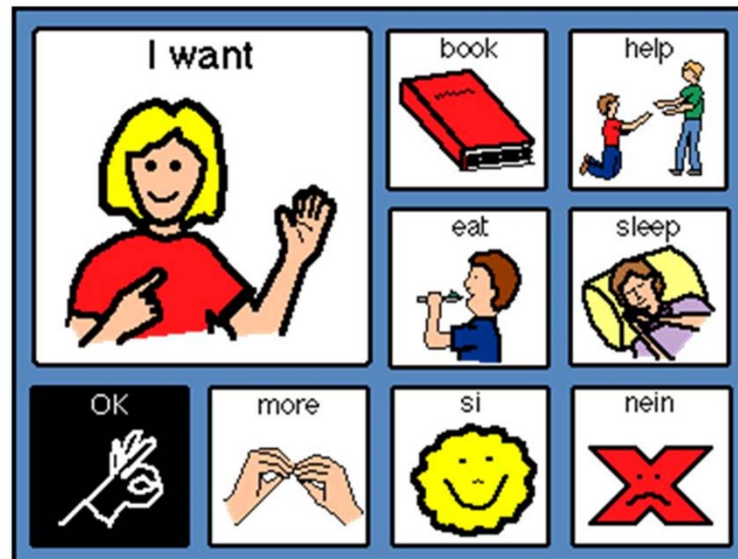
**10. Multisensory
stimulation**

3. Diagram shared by Roxana Cziker

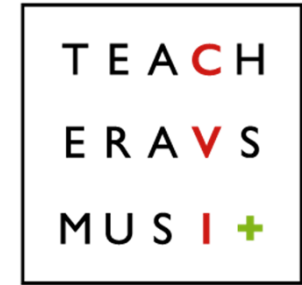
1. Communication

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- First step in assessment or intervention
- Address on the child name when asking for achieving a task
- Try to establish eye contact with the child (if possible)
- Try to find out which is the way of communication chosen by the child: verbal, sign language, pictures, body language etc.
- Give the child time to react



2. Body position



- The quality of visual stimulation program depend on the body position
- Try different body position in order to get best visual reaction: laying down on the tommy, sitting in a special chair, using different type of mattresses for a comfortable position etc.



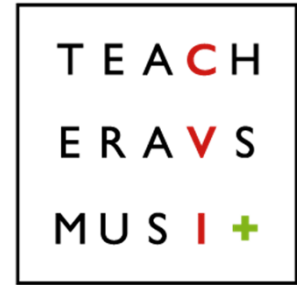
3. Time

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- Time is one of the key aspects for successful reaction of children with CVI
- Use slow movement of stimuli
- Repeat sequences and routines to develop understanding



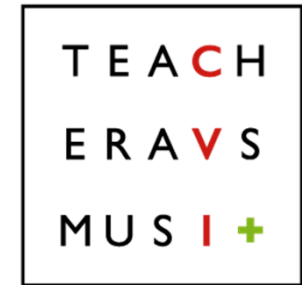
4. Adaptation of environment - space



- Keep the space clear of objects and furniture as much as possible
- Avoid having too many stimuli at the same time
- Reduce as much as possible the visual clutters (noise, people moving around etc.)
- Create landmarks (on environment, on the table etc.)



5. Adaptation of environment - Lightening



- Use visual stimuli in different lightening conditions: normal lightening condition, artificial light, dim light, black / UV light
- Avoid strong sources of light if the child is sensitive



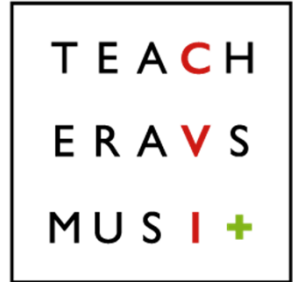
6. Adaptation of environment – Distance and visual field



- Try different distances in near vision tasks
- Use different devices and tool in order to make the distance more comfortable when working near visual tasks
- Check the visual sphere where the child respond better on visual stimuli: left, right, up, down



7. Toys and materials



- Visual
- Auditory
- Tactile
- Vibration
- Balance



8. Colour and contrast

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- Black and white toys (puppets), pictures
- Simple colours – red, yellow, green, blue
- Use a good contrast⁴

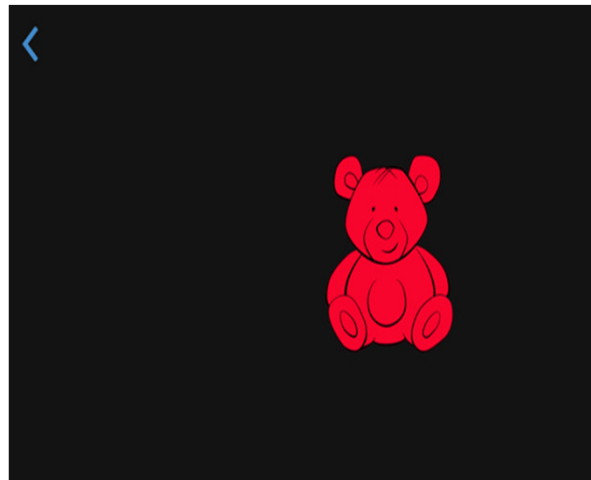


4. Ideas shared by Roxana Cziker

9. Shapes and size, technology and Apps



- Use simple, real an common pictures
- Present common real objects that have meaning to the child
- Find out the appropriate size for objects and pictures
- Use iPad Apps and animation for visual stimulation and visual attention



10. Multisensory stimulation



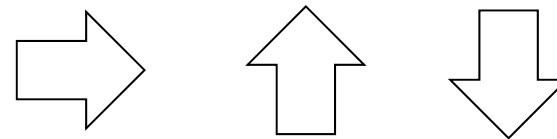
- Provide opportunity to multisensory stimulation activities



Visual perceptual skills⁵

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- Visual discrimination
- Figure-ground discrimination
- Visual closure
- Visual-motor coordination
- Form constancy
- Visual memory
- Visual spatial relations



5. Ideas shared by Postive Eye, Gwyneth McCormack

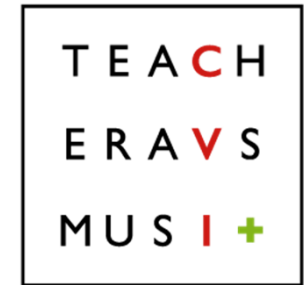
Checklist when assessing children with CVI



- Checklist – pathway of activities when assessing children with CVI
- Visual profile



Brief summary - Review



- Tips and ideas for preparation of assessment and intervention:
communication and visual stimulation
- Visual system and dorsal and ventral streams
- Visual skills
- Visual perceptual skills



Time for practice - Exercise



- How the visual functions are working in daily life of children?
- How we can transfer the results of visual function assessment in functional vision?
- Why the results of visual assessment are important for teachers?
 - Communication and social interaction
 - Orientation and mobility
 - Daily living skills
 - Near vision tasks
 - Access to literacy



Time for practice - Video



- Visual skills and visual perception - Study cases
- Child with CP - Child with CVI who have functionally useful vision and cognitive challenges
- Child with additional disability - Children with profound visual impairment due to CVI and additional disability





Final thoughts

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- Please note that provided information are not exhaustive
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