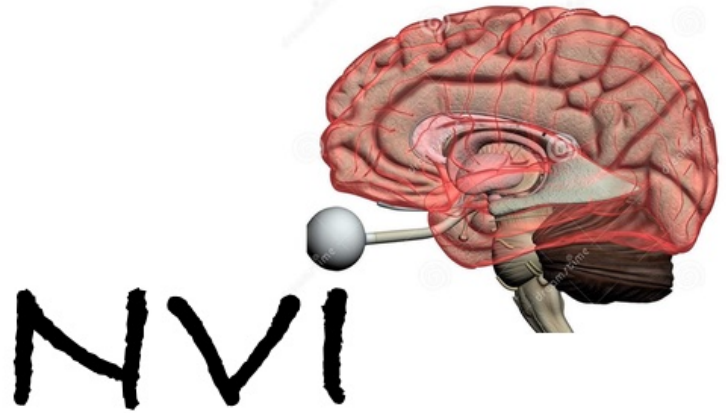


Neurological Visual Impairment

Visual impairment is not solely related to the eyes.

Even with perfect eyes, your child can be visually impaired.

The eyes see and the brain processes information.



What is NVI?

Neurological Visual Impairment (NVI) is caused by a damage or disorder of the visual pathways or parts of the brain responsible for visual processing. NVI encompasses any dysfunctions of the brain that impact vision.

NVI has two specific subsets both called CVIs and nested into each other. The largest, Cerebral Visual Impairment (CVI) corresponds to dysfunctions that take place in the occipital, parietal or temporal lobes of the brain. The smallest, called Cortical Visual Impairment (CVI) corresponds to damages that occur in the cortical area of the brain, the primary structures that process the visual information before dispatching it to the rest of the brain.

Depending on which area of the brain is injured, difficulties can be recognition and orientation, perception of movement, visual search, visual attention, or visual guidance of movement.

Identifying NVI

Neurological visual impairment (NVI) is often undiagnosed because of the variety of behaviors and characteristics that affect children. It is often mistaken with other conditions, NVI can also occur along side other disorders, like cerebral palsy, autism or ADHD, and in this case the other condition gets treated and the neurological visual impairment stays undiagnosed.

Identifying NVI can also be difficult if children have an ocular visual impairment on top of a neurological visual impairment.

Causes of NVI

- **Hypoxic Ischemic Encephalopathy (HIE):** Poor blood and oxygen delivery to the brain.
- **Hypoxia/Anoxia:** Reduced/Absence of oxygen supply in the brain (i.e. baby born blue, baby stayed in the NICU on a vent).
- **Periventricular Leukomalacia (PVL):** Damage to the white matter nerve fibres mainly due to poor oxygen or blood supply during early development.
- **Intraventricular Hemorrhage (IVH):** A broken blood vessel that leaks blood in the brain.
- **Hydrocephalus:** Water (cerebral spinal fluid) does not escape properly and increase pressure in the brain.
- **Infantile spasms and epilepsy:** Change in the brain electrical activity resulting from seizures.
- **Stroke:** Sudden interruption of blood flow in the brain.
- **Traumatic Brain Injury (TBI) Non-Accidental Trauma (NAT):** Bleeding, blunt injury and high pressure in the head that can contribute to brain damage (i.e. car accident, shaken baby).
- **Brain malformations:** The brain did not develop properly during pregnancy (i.e. genetic disorders, premature baby).
- **APGAR (Apparance, Pulse, Grimace, Activity, Respiration):** Test performed a few minutes after birth to evaluate vital functions of the baby, if score under 7 adapted treatments were implemented.
- **Extreme temperature exposure:** The brain might be damaged due to a too much high temperature affecting brain tissue (i.e. outside on a hot day under a blanket, or in a car).
- **TORCH infections:** Viruses, bacteria and parasite can all cause damage to the brain (Toxoplasmosis, Hepatitis B, Rubella, Cytomegalovirus and Herpes).
- **Genetic disorders:** Some disorders can affect brain structure and/or function.
- **Fetal alcohol syndrome or drugs:** This can affect brain structure and/or function.

Behaviors

- Unable to recognize faces and facial expressions.
- Unable to recognize objects and text.
- Difficulty finding objects, reaching for objects and pointing to objects.
- Unable to perceive more than one object at a time.
- Unable to see rapidly moving objects.
- Difficulty walking, and often tripping while walking.
- Often bumping on objects or people while walking.
- Afraid to jump into a swimming pool, off a bench, or go down stairs.
- Gets stressed, anxious or angry in crowded environments.
- Does not play or interact with others.
- Need someone's hand in crowded places.
- Does not look directly at people to make eye contact.
- Gets easily lost in familiar environments.
- Often leaves food in one side of the plate.
- Gets mad when objects or furnitures are moved.

Characteristics

- Visual acuity deficit
- Visual field preferences
- Contrast sensitivity
- Color preference
- Recognition difficulty
- Orientation difficulty
- Visual latency
- Visual search difficulty
- Visual attention difficulty
- Visual guidance of movement
- Difficulty with perception of movement

Resources

- Lueck, A. H., & Dutton, G. (2015). *Vision and the brain: Understanding cerebral visual impairment in children*. New York, NY: AFB Press.
- <https://cviscotland.org>
- <https://pcvis.vision>