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Short Communication
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CVI and Physiotherapy

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Abstract

It is estimated that one in every ten children with Cerebral Palsy (CP) presents with severe visual impairment and 75% to 90% present with some degree of visual impairment. Cortical visual impairment is an associated condition of CP and has been identified as one of the primary causes of visual impairment in children.

Background

CP and CVI share a similar etiology (i.e. hypoxia, increased intracranial pressure, interventricular hemorrhage, periventricular Leukomalacia and head injury etc.). As with any injury to the brain CVI may gradually improve due to neural plasticity, eyesight is a critical element in terms of a child's emotional and cognitive development, the sooner the children are diagnosed and treated, the better the outcome will be. A Multi-disciplinary approach is essential to maximize the child's potential children with cerebral palsy have many associated conditions that need to be taken into consideration during assessment and treatment. The crucial role of vision plays an important role of development, which cannot be ignored and therefore should not be overlooked by the physiotherapist. Associated conditions should always be considered when treating a child with CP to ensure a holistic approach.

When working with a child with Cerebral Palsy therapists need to look at the whole child and not just their motor skills. Therapists use sensory input to get a desired motor response. Vision plays a major part in a child's motivation to move and explore their environment. Because there is damage to the brain in a child with CP there is a high probability that there is damage to the visual pathways leading to cortical visual impairment. As therapists we use toys and objects to help a child move and to interact with their surroundings.

Other associated conditions

In addition, a child with Cerebral Palsy may experience one or more of the following vision concerns -strabismus, cataracts, field loss, refractive issues and oculomotor concerns. The Physiotherapists and other team members should be thoroughly educated on the visual diagnoses and implications of CVI. Children with CVI may interpret physical realities differently from sighted peers. Growing up without vision, or with incomplete or confusing visual information and perception, puts a child at risk for delays in the meaningful organization of environmental information. Because of lack of visual stimuli their motivation and curiosity is deprived, they just need an extra encouragement and facilitation to explore.

In children with CVI ability to see can vary from one time to another, depending on child's overall physical comfortableness and on environmental and situational factors. The most common characteristics which all therapists should be aware of while dealing with CVI Children before an Introduction of visual stimulus

- A distinct color preference
- An attraction to movement
- Visual latency
- Visual field preferences
- Difficulty with environmental complexity
- light-gazing
- Absent or atypical visual reflex responses
- Difficulty with visual novelty and
- Absence of visually guided reach

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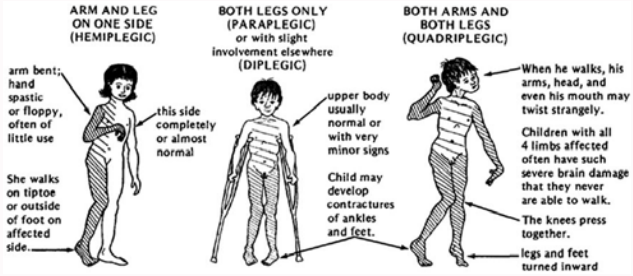

Figure:

Classification of CVI in different cerebral palsy children

For example children who are hemiplegic have visual field defects, amblyopia and reduced accommodations.

Children who are diplegic and spastic CP are hyperopic and esotropic with CVI but retain the highest prevalence of fusion and stereopsis. In contrast, children who are quadriplegic and mixed CP (dyskinetic, athetoid, hypotonic, and ataxic) have high myopia, CVI, dyskinetic strabismus, and severe gaze dysfunction.

Management

Physiotherapists mainly rely on Neuro developmental therapies and traditional physiotherapy for treating children with cerebral palsy. They focus on gross motor and fine motor skills and apply therapeutic exercises like Range of motion exercises, strengthening, stretching, positioning, weight bearing/shifting, alignment of body segments, balance and coordination exercises and also gait patterning for children who may or may not have visual problems. But while treating children with CVI therapists should be educated on the diagnoses and implication of visual impairment. Some useful Interventions for physiotherapists to keep in mind when dealing with children who have CVI, When and how to use a visual stimulus or a property to get a desired motor response like at what distance, contrast, bright colors, non-illuminated objects etc.

Therapy and Home based programme

- Ensure appropriate lighting
- Use movement
- Use high contrast (colors, boundaries, borders)
- Use simultaneous touch and vision
- Simplify the visual environment
- Use physical prompts
- Make opportunities for training visual skills
- Select stimulus materials carefully
- Allow adequate time for responding/processing, it is also very important to explain this to the caregivers as they often assume that the child has lost interest and therefore remove the stimulus. It is commonly seen that children turn their head away in order to apply or use their more developed peripheral vision.
- Use multiple and consistent approaches
- Use intrinsically motivating/rewarding stimuli
- Remember behaviors may be communication
- Keep team members informed and involved
- Consider less inclusion
- Give appropriate education and home programme for parents and caregivers

As a Health Care Professional it is essential to also understand these associated conditions and think about how these might impact or influence your management strategies when working with the child. Sense of sight is most important for early child development, motivation, learning through imitation. It is, therefore, indispensable to know about visual problems of children with CP and possibilities of facilitating visual functioning in different situations.

Early comprehensive, multidisciplinary assessment must be done whenever the child is at risk for developing neurological dysfunction.

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