

Plan development for improving visual functioning in children with cerebral visual impairment and multiple disabilities – case study

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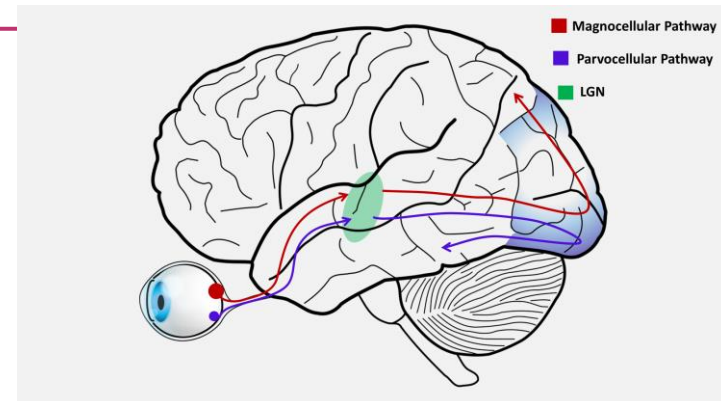
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This paper results from the project research financed by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia (no. 451-03-47/2023-01)

Aim

This paper aims to present an individual program for improving visual functioning in a girl with multiple disabilities and suspicion on cerebral visual impairment. The case study results from eight months of work with parents. The girl was born in the 30th gestational week by the cesarian section, with a body weight of 1520 grams. After birth, she spent four months at the Department of Neonatal Intensive Care in Belgrade. The discharge documentation listed 14 diagnoses, of which the following can significantly affect visual functioning: asphyxia, retinopathy of prematurity, hydrocephalus, periventricular leukomalacia, and neonatal convulsions. The process of family support services and treatment started when the girl was eight months old. In the meantime, the girl's neurological status deteriorated, i.e., she developed epileptic seizures. She underwent a ventriculoperitoneal (VP) shunt surgery to reduce intracranial pressure.

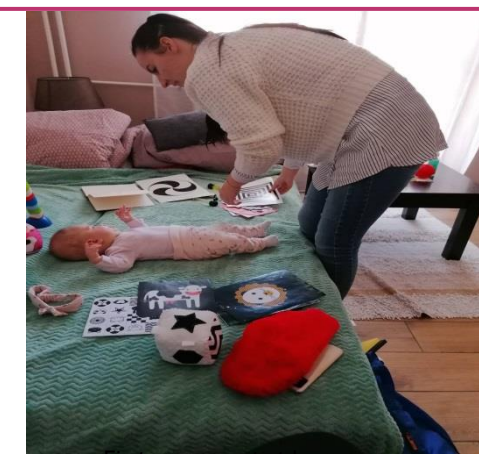
Girl's visual functioning was evaluated by specialist for visual impairment in cooperation with an ophthalmologist. Instruments used were The Tools for Assessment and Development of Visual Skills – ToAd, (Kitchel et al., 2007), Hiding Heidi low contrast test for infants (Hyvärinen, LEA Test Intl, LLC™) and Roman-Lantzy CVI assessment scale (Roman-Lantzy, 2018). Materials were selected with the help of parents. The results indicated that the girl shows several characteristics typical of **cerebral visual impairment**.



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Characteristics of visual functioning

The girl visually explored the surroundings but was easily distracted by different sounds (she turned her head toward them). While observing the object offered in the central part of her visual field, her right eye turned inward, indicating convergent strabismus. Her eye motility was regular in all directions, the movements were smooth, with the occasional presence of low-amplitude nystagmus. When she was offered the object from the left, visual latency of 5-7 seconds noted. After several repetitions of offering the stimulus from the left, the reaction was accelerated. Her visual attention was the longest on familiar objects and glittery materials. She looked away when she was offered more objects simultaneously. Examining vertical saccades determined that she slowly shifted her gaze from one stimulus to another. If there were many visual stimuli in the environment, she did not direct attention to favorite objects at a distance of more than 1m. By using the Hiding Heidi test, it was found that she noticed the 2.5% contrast stimulus at a 60cm distance. She reached for objects, but she could not assess the distance and adjust her hand to the size and shape of the object. She responded faster to a moving stimulus than to a static one. Visual reflexes were present, the blinking reflex occurred when the root of her nose was touched, but there was no defensive blinking reflex. She occasionally stared at the ceiling but easily shifted her attention to something else.



First assessment at home

The plan for improving visual functioning

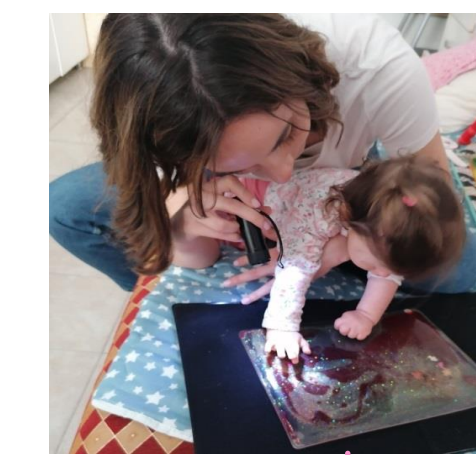
Environment adaptation

- Limit the number of stimuli at a distance up to two meters from the girl;
- Use a limited number of toys that attract her attention in playing area;
- Reduce the number of distractors in an unfamiliar space;
- Use familiar objects to attract visual attention and maintain fixation.



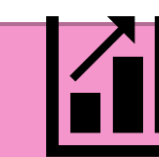
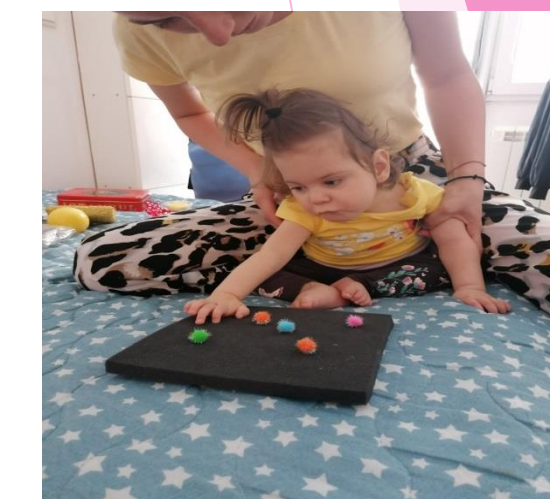
Establishing interaction and approach during play

- Bring visual stimuli into the visual field from the left;
- Avoid large number of different stimuli and introduce new objects only when the child starts recognizing previously used ones;
- Use sounds and movements to attract attention and maintain fixation on objects;
- Perform activities with an announcement and always at the same time during the day;
- Use shiny materials and toys in colors the girl responds to the best.



Developing visuo-perceptual and visuo-motor skills

- Present shiny objects on a one-color background to focus attention;
- Practice vertical saccades through playing games with a parent, such as face-hiding or offering two interesting objects at a distance of about 20cm,
- Pair actual objects with their photographs, e.g., a water bottle, favorite toys, etc.



Results

After eight months of applying the selected strategies and performing the suggested activities, there were changes in the girl's visual functioning, such as faster response to stimuli offered from the left, longer visual attention on larger-dimension stimuli and faces at a distance of more than one meter, searching for the desired object in a visually complex environment, and accepting new toys and objects without previous introduction to them.

Conclusion

The basis for creating the plan for visual functioning improvement in the girl with suspicion on cerebral visual impairment were assessment of visual functions and visual functioning, data from medical records, and interview with parents. The selected activities and recommendations had a positive impact on the girl's behavior and more effective use of vision during play, learning and everyday activities. The progress in visual functioning indicates the significance of the timely involvement of parents and children with suspicion on cerebral visual impairment and multiple disabilities in the early intervention process.



References



- Ben Itzhak, N., Vancleef, K., Franki, I., Laenen, A., Wagemans, J., & Ortibus, E. (2020). Visuo-perceptual profiles of children using the Flemish cerebral visual impairment questionnaire. *Developmental Medicine & Child Neurology*, 62(8), 969-976. <https://doi.org/10.1111/dmnc.14448>
- Birch, E. E., & O'Connor, A. R. (2001, December). Preterm birth and visual development. *Seminars in Neonatology*, 6(6), 487-497. doi:10.1053/siny.2001.0077
- Chang, M. Y., & Borcherdt, M. S. (2020). Advances in the evaluation and management of cortical/cerebral visual impairment in children. *Survey of ophthalmology*, 65(6), 708-724. doi:10.1016/j.survophthal.2020.03.001
- Costa, D. R. D., Debert, I., Susanna, F. N., Falabretti, J. G., Polati, M., & Susanna Júnior, R. (2021). Vision for the Future Project: Screening impact on the prevention and treatment of visual impairments in public school children in São Paulo City, Brazil. *Clinics*, 76.
- Kitchel, E., Sanford, L. D., & Burnett, R. (2007). *ToAD kit: Tools for assessment and development of visual skills*. American Printing House for the Blind.
- Roman-Lantzy, C. (2018). *Cortical visual impairment: An approach to assessment and intervention*. AFB Press.
- Swift, S. H., Davidson, R. C., & Weems, L. J. (2008). Cortical impairment in children: Presentation, intervention, and prognosis in educational settings. *TEACHING Exceptional Children Plus*, 4(5) Article 4. Retrieved [11.1.2023] from <http://escholarship.bc.edu/education/tecplus/vol4/iss5/an4>
- Vučinić, V., Stanimirov, K., Alimović, S., & Anđelković, M. (2019). Cerebralno oštećenje vida – dijagnostički kriterijumi i elementi tretmana. *Specijalna edukacija i rehabilitacija*, 18(3) 353-381. doi: 10.5937/specdreh18-23964.