Assessing Functional Vision Abilities and Neural Correlates in Cerebral Visual Impairment

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Online Webinar

For Researchers

Speaker:

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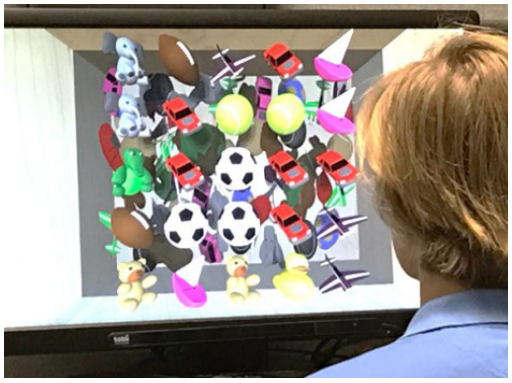
Abstract

Cerebral (cortical) visual impairment (CVI) is the leading cause of pediatric visual impairment in developed countries. Despite this clear public health concern, our understanding of the functional visual profile and underlying neurophysiology of this condition remain poorly understood. In the setting of early neurological injury, children with CVI typically show deficits associated with higher order visuospatial processing such as finding a target of interest within a complex scene. Beyond standard ophthalmic testing, it remains unknown how manipulating task demands and other environmental factors influence visual search performance in this population. To address this gap, we have developed a series of novel and naturalistic virtual reality (VR) based search tasks combined with eye tracking. We find that CVI is associated with decreased search efficiency and worsening performance with increased visual task demands when compared to neurotypical controls. Finally, neuroimaging using diffusion based techniques has shown that CVI is associated with a dramatic alteration in white matter connectivity, particularly with respect to visual pathways implicated with the dorsal (i.e. spatial) visual processing stream. This novel VR based approach allows for the assessment of visuospatial abilities in CVI with a high degree of behavioral relevance, ecological validity, and participant engagement, and may also have important clinical applications in assessing environmental factors that affect functional visual processing in CVI.



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2. Pamir Z, Bauer CM, Bailin ES, Bex PJ, Somers DC, Merabet LB. **Neural correlates associated with impaired global motion perception in cerebral visual impairment (CVI).** Neuroimage Clin. 2021; 32:102821. doi: 10.1016/j.nicl.2021.102821. Epub 2021 Sep 21.
3. Merabet LB, Mayer DL, Bauer CM, Wright D, Kran BS. **Disentangling How the Brain is "Wired" in Cortical (Cerebral) Visual Impairment.** Semin Pediatr Neurol. 2017 May; 24(2):83-91. doi: 10.1016/j.spen.2017.04.005. Epub 2017 Apr 10.

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