Child Vision Research Society

19th Biennial Meeting

ENGAGED SCIENCE IN VISION RESEARCH

7th - 9th of July
Zagreb, Croatia

BOOK OF ABSTRACTS

The Child Vision Research Society (CVRS) is an international society of researchers interested in the development of vision in infancy and early childhood.
A scientific meeting is organized every second year to provide an opportunity for exchanging new ideas and findings between basic scientists and clinicians concerned with vision in infants and children. Active participation in attending the meeting is encouraged by means of short oral presentations and posters.

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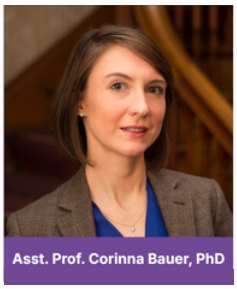
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Measuring speed and amplitude of accommodation in school-aged children

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Objective:
Visual accommodation is crucial for focusing on objects at varying distances, with both amplitude and speed playing key roles in daily tasks. While norms for the amplitude of accommodation exist, there is a lack of normative data for the speed of accommodation in school-age children. The speed of accommodation is essential for tasks like reading and shifting focus between near and distant objects. This study aims to establish normative data for the amplitude and speed of accommodation in school-age children, providing reference values for visual functioning in this population.
Methodology:
A sample of school-age children (1st to 8th grade) will be tested to measure the amplitude and speed of accommodation using the Accommodation and Near Point Rule, along with other relevant visual stimuli for testing. Other visual functions, such as acuity and convergence, will also be tested to exclude their potential impact on accommodation measurements.
Results:
The study will provide a set of normative values for the amplitude and speed of accommodation in school-age children. These results will serve as a baseline for identifying deviations from typical visual functioning in this age group.
Conclusion:
The findings will contribute to the establishment of normative standards for accommodation in school-age children, filling a gap in the current literature regarding the speed of accommodation. In conclusion, this study will provide valuable insights for both clinical practice and future research in the field, ultimately improving the understanding of accommodation problems and their implications in functional and educational contexts.

Keywords: accommodation, speed, amplitude, school-aged children, norms

Use of Optical Aids in Children and Adolescents with Visual Impairments: Perspectives, Challenges, and Opportunities

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Objective:
The aim of this study was to investigate the use of optical aids among primary and secondary school students with visual impairments in Croatia. Given the absence of similar research in the country, the study sought to understand the frequency of use, the obstacles to regular use and the students' perspectives on optical aids, ultimately aiming to facilitate improvements in educational and rehabilitative services.
Methodology:
The study involved students across Croatia diagnosed with visual impairments who either use or should be using optical aids. Data were collected through questionnaires administered to the students, which addressed the usage patterns of optical aid use and factors influencing it. The completed questionnaires were analyzed quantitatively to assess the frequency of use and qualitatively to identify potential challenges.
Results:
The analysis will provide an overview of the frequency of optical aid use and highlight a range of potential influencing factors. The results will be presented in terms of general trends and patterns, with an emphasis on understanding how different factors may affect optical aid use among students.
Conclusion:
This study highlights the need for a comprehensive approach to address both the physical and psychological barriers to the use of optical aids in children and adolescents with visual impairments. The results can guide future strategies to improve adherence and optimize the effectiveness of optical interventions.

Keywords: optical aids, visual impairment, children, adolescents

The Role of Social Play in Siblings' Relationship

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Objective:
We investigate the role of social play in siblings' relationships in developmental age.
Methodology:
We made an extension of our previous study (Battistin et al, 2023), which focused on being siblings of children with visual impairment. We specifically analysed the responses to three questions: "1. How do you spend your time at home? 2. Do you play with your sibling or alone? 3. What games do you play?" of 33 sighted siblings' interviews. We also interviewed 15 children with visual impairment (from moderate to total blindness), brothers/sisters of the previously mentioned sighted siblings. We included children with visual impairment <14 years and those with additional multiple disabilities able to answer, asking them the same three questions.
Results:
Findings show that social play is a daily experience for mostly all the siblings. The emphasis with which they talked about it highlights the significant role of social play in their relationship. Regarding the type of games, siblings prefer to play indoors and, in both groups, only a few of them have activities outdoors, even if often in a protected environment such as their home-garden.
Conclusion:
Our study suggests that social play has a key role in siblings' relationships. This seems relevant, considering that social play has an important role in child development in promoting social skills.
Our findings have a clinical implication in giving suggestions for healthcare professionals working with children with visual impairment, on possible interventions such as including sighted siblings in their activities.

Keywords: social play, relationships, siblings, visual impairment

Reading and numeracy in children with suspected higher functioning CVI: do cluster subtypes of CVI and specific visual spatial perceptual tests predict reading and numeracy outcomes?

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Objectives:
Visual perceptual skills have been associated with orthographic reading ability including reading speed (Korinth et al 2014) and numerosity (Zhou et al, 2015). This study examines whether particular visual perceptual skills or clustered 'subtypes' of Cerebral Visual Impairment (CVI) predict reading and numeracy performance.
Methodology:
Thirty-seven children (mean 11 years, range 8-17; mean Verbal IQ 93, range 45-130) with suspected CVI (logMAR 0.5 or better) were assessed in tertiary developmental vision clinic using standard validated assessment battery (Sakki et al. 2021) including Test of Visual Perceptual Skills-TVPS, Beery Visual Motor Integration-VMI and visual neuropsychological tests (NEPSY Arrows, Rey Complex Figure Test-RCFT) and WIAT-III Word Reading and Numeracy tests. Standard test scores were analysed according to k-means cluster analysis to explore subtyping and regression analysis.
Results:
Two clusters were established, one with visuo-motor deficits and the other broader motor-free visual perceptual deficits. Word Reading (mean 85, SD 19.1) and Numeracy (mean 80, SD 21) was lower than average (no significant difference between clusters $p>0.05$). Verbal IQ predicted Word Reading (beta .602 t 2.135 p.046). and RCFT predicted Numeracy (standard coefficient beta .454 t 2.233 p.037), but not Arrows as predictor.
Conclusion:
Word reading and numeracy were lower than average across the sample with no significant distinction between the clustered subtypes. Visuo-spatial complex figure test (which was low across both clusters) predicted numeracy, suggesting its contribution to this attainment. Verbal cognition (and no visual perceptual test) predicted word reading, but other areas like reading speed and crowded text need exploring.

Keywords: cerebral visual impairment, reading, numeracy, visual perception

Verbal and spatial abilities and microstructural integrity of white matter tracts in children with congenital ocular visual impairment: which tracts are protected or at risk?

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Objectives
Congenital visual impairment (VI) is associated with widespread structural and functional changes in the brain. Research predominantly focuses on optic radiations and occipital cortex, with little research exploring central structures. This study explores white matter (WM) tracts associated with language and visuo-spatial mapping in the literature.
Methodology
Diffusion-weighted imaging and tractography to analyse WM differences in the arcuate and uncinate fasciculus and the cingulate bundle (CB) in seven 8-12 year olds (mean age 9 years; verbal IQ > 75) with congenital disorders of the peripheral visual system and moderate-severe VI, were compared with matched sighted controls (n=11, mean age 10 years) (Bathelt et al. 2020). Verbal fluency (DKEFS) and spatial mapping (ITVIC House Plan) test scores were compared between vision groups.
Results
No significant differences in fractional anisotropy (FA) and mean diffusivity (MD) in arcuate and uncinate fasciculus between VI and sighted controls, but asymmetrical differences in arcuate found in the sighted. MD was significantly higher in the ventral CB of children with VI (Mann Whitney U 13, z 2.15, p .032). Verbal fluency did not differ between VI and sighted controls but spatial planning was significantly lower in severe VI subgroup (H 2.9, p .011).
Conclusions
The arcuate and uncinate fasciculus tracts appear preserved or protected despite reduced vision, which may be due to plasticity-induced changes. The ventral cingulum bundle shows less integrity than in sighted controls. The functional role of these tracts in children with VI is still underdetermined and further research needed.

Keywords - diffusion tensor imaging, visual impairment, white matter, visuo-spatial processing, verbal fluency

Delayed Initiation of Early Intervention in Children with Visual Impairment

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Objective:
This study aimed to investigate whether children with visual impairment were referred in time to the early intervention team (IET), allowing optimal visual stimulation during the period of maximal neural plasticity in early childhood. A retrospective analysis of referrals to the IET was conducted.
Methodology:
A 10-year retrospective review of referral data was performed to assess the timing and characteristics of the referrals.
Results:
More than 450 children with visual impairment were referred to the IET during the study period. Of these, 52 were high-risk newborns with complex medical conditions. Mean age at referral for this subgroup was 20 months. Notably, 21% of referrals occurred after 3 years of age, while 33% occurred within the first 6 months of life. Among the 30 children born very or extremely preterm, only 17% were referred before 6 months of age.
In contrast, children evaluated for 'delayed visual maturation' by pediatric ophthalmologists, were promptly referred with a mean age at referral of 4 months.
Discussion and Conclusion:
The findings of this study highlight the need for improved referral processes to ensure timely initiation of early visual stimulation in high-risk newborns and young children with visual impairment. Pediatric ophthalmologists demonstrated prompt referral of children with delayed visual maturation or ocular pathology, whereas delays were observed between the initial suspicion of low vision by parents or screening systems and the subsequent referral. Enhanced efforts are necessary to streamline the referral process and facilitate early intervention for every child with visual impairment.

Keywords: early intervention, preterm

Early neurodevelopmental assessment as a guide for early intervention and targeted support for parents in the infant's daily life: a case report

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Objectives:
Early assessment of visual functioning, General Movements Assessment (GMA) and Motor Optimality Score (MOS-R) are gold standard for predicting neurodevelopmental outcome and identifying risk for early visual or motor developmental delays or difficulties. Recognizing an infant's primary challenges enables targeted early developmental support.
Methodology:
The current case report describes a term-born infant who, at 12 weeks of age, presented with nonspecific abnormalities in visual and motor developmental behavior. The infant's visual functioning were assessed as insufficient for learning and interacting with the environment. At the same age, the GMA and MOS-R were classified as non-optimal. The findings from visual evoked potential (VEP) and brain magnetic resonance imaging (MRI) revealed abnormalities in the visual pathway, prompting genetic testing to evaluate potential genetic contributions. Both, VEP and brain MRI findings, along with the non-optimal results from the early neurodevelopmental assessment, was a red flag for immediate referral to an early intervention program based on the needs of the infant and parents.
Results:
The aim of this case study was to present changes between the assessment of visual functioning and neuromotor assessment at four different ages (3, 4, 7, and 12 months). Positive improvements were observed in visual functioning, motor behavior, social interaction, and cognition.
Conclusion:
Early detection of atypical behavior through visual and neuromotor assessments is crucial for providing early developmental support, leading to improved infant developmental outcome.

Keywords: Visual functioning assessment, General Movement Assessment, Early intervention program

Cerebral Visual Impairment in the Population of a Special School for Low Vision Children

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Objectives
Professionals supporting visually impaired children face significant challenges in addressing the needs of those with cerebral visual impairment (CVI). At the School for Low Vision in Budapest, educators observed that traditional teaching methods, adaptations, and materials designed for children with ocular diseases were insufficient for pupils with CVI symptoms. This study aimed to develop a comprehensive assessment tool to identify CVI-related symptoms among preschool and school-aged students, enabling tailored educational approaches.
Methodology
Our assessment targeted both primary visual functions (e.g., picture and form recognition, line orientation) and higher-order visual functions (e.g., global and local visual selective attention, visual-spatial perception, and crowding effects). A total of 120 students were analyzed, of whom 58 (48.3%) had a history of increased CVI risk.
Results
Among the high-risk students, 33 (56.9%) exhibited CVI symptoms, while only 4 (6.9%) had a formal CVI diagnosis in their ophthalmological records. These findings indicate a significant discrepancy between diagnosed cases and observed symptoms.
Conclusion
The results underscore the prevalence of CVI symptoms in children with low vision and highlight the urgent need for specialized teaching strategies. Addressing these needs can significantly enhance educational outcomes for this population. In our presentation, we will share insights from this assessment process, accompanied by video recordings that illustrate key findings and teaching adaptations.

Keywords: cerebral visual impairment, low vision, CVI assessment, teaching strategies, CVI features

Making Knowledge about Vision more Accessible: Online Support and Education Platform for Families and Professionals

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ABSTRACT :
In recent years, there has been an increased awareness of the importance of vision for the child overall development. However, the information about early vision development is still not generally accessible. Many families lack support from a vision specialist during the early stages of their child's development. The aim and purpose of my work is to create an online platform providing information about visual development, along with easily available content, materials, and services.
A clear and easy-to-navigate website, designed for families and professionals, allows for rapid access to vision-related content. The platform enables booking online consultation appointments, scheduling online webinars, purchasing digital products (eBooks, visually adapted worksheets and templates for creating activity materials), and downloading free brochures.
Families and professionals in Croatia are increasingly utilizing online consultation services and purchasing digital products. The field of vision-related education is also growing, and families are particularly interested in ways they can encourage visual development during daily activities with their children. Professionals working with children are increasingly seeking advice about early visual development and ways of recognizing early signs of visual impairment, and they are interested in visual rehabilitation as well.
The online platform has proven to be an excellent solution for everyone seeking support and advice from vision specialist, as well as for those who want to learn more about visual development.

Keywords: early visual development, online platform, vision-related content, digital products, support and education

The Views of Parents of Children with Cerebral Palsy about Research into Cerebral Vision Impairment (CVI)

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Objectives:
Children with Cerebral Palsy (CP) are known to be at increased risk of Cerebral Vision Impairment (CVI). Patient and Public Involvement (PPI) is important when designing research studies. The aim of this study was to understand whether families would be interested in participating in research into CVI and to identify participant centred outcomes.

Methodology
Parents of children with CP attending a regional clinic were consecutively invited to complete an author-designed questionnaire exploring whether they had concerns about their child's vision, and whether they would participate in research into CVI. Research outcomes of importance to them was sought.

Results
Twenty-three parents (25 /133, 18.8%) with a child aged 4-15 years age (mean age 10 years) with CP completed the questionnaire. This included children with motor severity of GMFCS I-IV. 56% of parents reported concerns about their child's vision, with many describing some functional visual deficits. In the four children diagnosed with CVI, this diagnosis was received much later than the CP diagnosis with an interval of 8-42 months (mean 22 months). 92% thought that research into CVI should be funded and that they would participate. 80% wanted an assessment as part of research that would benefit their child in some way.

Conclusion
Parents of children with CP commonly report concerns about their child's vision. The majority would be interested in participating in research into CVI especially if it allowed them to learn more about their child's vision and how to help them.

Keywords: Cerebral Vision Impairment (CVI), Patient Participant Involvement, Cerebral Palsy

Development of a Re-designed 'Turtle' Optotype for Testing Visual Acuity

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Objectives:
The original Turtle chart designed for Aboriginal and Torres Strait Islander people used a 2-AFC optotype. This research evaluated various components of a re-designed Turtle chart using a 4-AFC optotype co-designed with Aboriginal and Torres Strait Islander students.
Methodology:
Visual acuity (VA) measured with various turtle optotype designs presented on printed charts and a Landolt C chart were compared. Study 1 included three different designs of a 4-AFC turtle optotype, two of which included luminance-matching of the target and non-target components. Study 2 compared VA with the final re-designed optotype (Study 1) with Aboriginal and Torres Strait Islander student artwork included in the turtle shell, with no artwork.
Results:
Twelve adults participated in Study 1 (mean age = 34.9±5.7 years). There was a significant effect of turtle symbol design on VA ($p<0.001$). Post-hoc analysis showed that VA measured with the two luminance-matched designs and the Landolt C chart were not significantly different (mean differences = 0.04 logMAR, $p>0.4$); VA was significantly better with the non-luminance-matched design than Landolt C (mean difference = 0.18 logMAR, $p<0.001$). Fourteen adults participated in Study 2 (mean age = 29.1±8.8 years). Inclusion of artwork did not impact VA ($p=0.5$). VA of final 4-AFC turtle optotype (luminance-matched design) including shell artwork (-0.10 logMAR) was equivalent to Landolt C (-0.13 logMAR).
Conclusion:
Findings suggest the re-designed turtle optotype should be luminance-matched and that artwork in the shell does not impact VA. Future work will evaluate the re-designed Turtle chart with Aboriginal and Torres Strait Islander children.

Keywords : ABORIGINAL and Torres Strait Islander, first nations, turtle optotype, visual acuity

Orthoptic Testing for Cerebral Visual Impairment in Babies, Children and Young People – Protocol Development

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Objectives
There is currently no agreement of visual acuity thresholds for referral to sensory services nationally. Furthermore, 'Cerebral visual impairment (CVI)' as a diagnosis must be explicitly stated by the referring ophthalmologist for children to be eligible for sensory support. Despite potential long-term problems in development and quality of life in a child with CVI, there are only a few trials of systematic interventions for CVI. There is a need for evidence-based assessments and protocols to be developed.
Methodology
A literature review and protocol development for assessment of CVI as part of a multi-disciplinary assessment.
A local survey of Qualified Teachers of Visually Impairment (QTVI).
Results
We have selected a battery of repeatable tests that are adaptable to various patient abilities aiming to examine and document: visual acuity, contrast sensitivity, ocular movements and ocular motor control, strabismus and binocular vision, visual fields and inattention, and visuocognitive function / visual perception –the dorsal and the ventral stream
We have then surveyed local QTVIs for feedback upon the proposed protocol.
Conclusion
The broad aetiology of CVI highlights importance of understanding central brain structures at all levels including: subcortical, cortical and white matter as well as an understanding of co-impairments of pathology of the eye itself. Within CVI, all types of visual disorders described may not be present depending upon areas of brain affected or preserved. Although this proposed protocol does not aim to diagnose CVI it is hoped it will clarify some of the Orthoptic and Opthalmological parts and highlights the need for the multidisciplinary team assessment.

Keywords : orthoptic, CVI, protocol

Exploring Non-attendance of Appointments in Paediatric Ophtalmology

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Objectives:
To explore parents' barriers of attending ophthalmology appointments. To examine what are ophthalmology staff perspectives about engagement of parents and 'was not brought' (WNB) guidelines.
Methodology:
Paediatric patients WNB to their appointments causes delay in ophthalmology treatment during the visual development period. This study was mixed methods, including quantitative and qualitative methods. Questionnaires were sent to parents of paediatric patients who WNB to an ophthalmology appointment in a 2-month period in 2024 to identify barriers attending ophthalmology appointments. Semi-structured interviews were conducted with ophthalmology staff to establish their views on WNB and WNB guidelines.
Results:
121 parents responded to the questionnaire. 61.16% of parents reported family issues such as illness, mental health problems and transport affordability issues as reasons for missing the appointment. 44.63% of parents reported communication difficulties with the hospital or being unaware of the appointment as part of the issue. 23.14% of responses suggested that parents did not view the appointment as important.
17 ophthalmology staff participated. Staff also reported family issues, value placed on the appointment and communication difficulties with the hospital as perceived reason for WNB. There was variability in the management of WNB between staff and they identified the challenges associated with the management of WNB.
Conclusion:
In improving WNB rates, barriers families face in attending appointments should be addressed for paediatric patients' timely access to ophthalmology care such as improving communication regarding the appointment with parents. The WNB guidelines for staff should be reviewed and challenges in the management of WNB addressed.

Keywords: paediatrics, ophtalmology, appointment and schedules, did not attend, was not brought

Personalized Binocular Therapy for Amblyopia: Evaluating the Efficacy of Gameblyo, a Novel Therapeutic Application

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Objectives:
This study explores the effectiveness of Gameblyo, a personalized digital therapy application designed to treat amblyopia by enhancing binocular vision. Amblyopia is a binocular vision disorder often manifesting as monocular visual impairment. "Lazy eye," traditionally treated through monocular methods, is now increasingly targeted through binocular approaches to promote visual integration between both eyes.
Methodology:
The Gameblyo application uses red-blue glasses to split visual stimuli, compelling the brain to integrate inputs from both eyes into a unified perception. This helps the weaker eye cooperate with the dominant eye, enhancing overall binocular function. Ten participants (mean age 7.9 ± 1.9 years) completed 4 months of therapy using Gameblyo, starting from its release in November 2024. Visual and stereoscopic acuity were measured at baseline and post-treatment, with statistical analysis performed using the Wilcoxon Signed-Rank test.
Results:
Following 4 months of therapy, visual acuity in amblyopic eyes improved by an average of 0.22 dec units, representing a statistically significant improvement in visual function ($p=0.003$). Additionally, participants demonstrated significant improvements in stereoscopic acuity, further confirming the enhancement of binocular cooperation.
Conclusion:
The results suggest that Gameblyo provides a promising, personalized treatment option for amblyopia, leveraging binocular training to improve visual acuity and stereopsis. The therapy's accessibility and ease of use offer significant potential for home-based amblyopia management, promoting long-term visual development in children. Further research with larger sample sizes is warranted to confirm and expand on these findings.

Keywords: Amblyopia, Gameblyo,Application, Amblyopia therapy

Visual behaviour in early infancy relates to cognitive development

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Objectives:
The concept of developmental cascades, where early experiences or abilities lead to broader developmental outcomes are particularly relevant in the context of preterm birth. Given that preterm infants may experience challenges in developing typical sensory and motor skills, studying the relationship between early visual abilities and later cognitive outcomes in this group is particularly important. This study explores the critical role of visual abilities in the cognitive development of preterm born infants, specifically examining the correlation between visual fixation and tracking behaviors in early infancy and subsequent visuomotor performance at 3 years of age.
Methodology:
Neonatal Visual Assessment was used to analyze visual fixation and tracking behaviour in newborn period and early infacy in the cohort of very preterm born infants. Visual-motor integration at 3 years of age was evaluated by Beery-Buktenica Developmental Test of Visual-Motor Integration.
Results:
By focusing on visual fixation and tracking behaviors in early infancy, our results have shown a significant correlation with visual-motor performance at 3 years of age in preterm born children.
Conclusion:
Through a longitudinal approach, the research highlights significant relationships between early visual behaviors and later cognitive skills, suggesting that these visual competencies serve as foundational elements in the developmental cascades of cognition. This could be particularly crucial for preterm-born infants who may face unique challenges in developing these abilities.

Keywords: fixation, tracking, visual-motor integration, premature infants

Neonatal Visual Assessment to Expedit Visual Stimulation of the Very Preterms at Risk for Cerebral Visual Impairment

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Objective:
Despite the established efficacy of early intervention, a significant proportion of very preterm infants are not timely referred to specialized services, with over 20% of the referrals being after the age of 3 years. Furthermore, a notable percentage of preterm infants remain undiagnosed and unreferred, despite literature suggesting that 21-47% of preterm infants are at risk of developing cerebral visual impairment (CVI).
The current study aims to address this gap by developing a more effective method for early detection of visual disability in newborns. Specifically, we seek to identify infants who do not exhibit spontaneous visual curiosity, thereby necessitating targeted visual stimulation.
To achieve this objective, we will utilize the Visual Subset of the Hammersmith Neonatal Neurological Examination (VS-HNNE), a validated early visual assessment tool developed by Ricci et al. This assessment can be readily administered by trained personnel, providing a systematic approach to identify at-risk infants.
Methodology:
Very preterm newborns will undergo the VS-HNNE between 37 and 40 weeks of gestational age. Follow-up assessments will be conducted at corrected ages of 1, 3, 6, and 9-12 months. Infants with abnormal assessment results will receive early visual stimulation from the home intervention team.
Results:
We anticipate that the implementation of this systematic early assessment will enable the initiation of visual stimulation at an earlier age, thereby optimizing brain plasticity and promoting overall development. By capitalizing on the brain's inherent ability for plasticity during early life, we expect to improve developmental outcomes in very preterm infants at risk for CVI.

Keywords: early visual assessment, very preterm

Vision Screening of School-age Children in Oregon: What Have We Learned from 10 Years of Data

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Objectives:
Photoscreening has become widely used in school screenings. The screening yield for specific conditions and evidence-based analysis can be used to optimize the cut-off criteria for the SPOT photo-screener in a school-age population.
Methodology:
Screening yield data from a large population of school age children in the state of Oregon was analyzed to determine the best cut-off criteria for the SPOT based on expected prevalence from population-based studies and emerging data to help maximize sensitivity and specificity, particularly for hyperopia.
Results:
Initial yield using the manufacturer settings in 2014-2016 for hyperopia (2.5D, yield 0.8%), was far below expected based on population-based studies. Considering the algorithm used by the manufacturer and research comparing non-cycloplegic to cycloplegic SPOT measures to provide insights on maximizing sensitivity and specificity, the criteria for hyperopia was lowered to 1.75D in 2016-19 (yield 1.2-1.32%), 1.50D in 2020-23 (yield 1.98-2.41%) and 1.0 D in 2023-24 (yield 5.55%). Myopia criteria was also lowered from 1 D to 0.75 D with a corresponding increase in yield from 3.15% to 4.50%.
Conclusion:
Adjusting the SPOT failure criteria for school age children to 1 diopter has improved the screening yield for these at-risk children to expected levels. The Spot is really measuring accommodative lag of hyperopic children under the specific test conditions, a flashing light target at a 1 meter test distance. Hyperopic children who fail to accommodate accurately may be the most at risk for vision-related learning problems.

Keywords: vision screening, spot photoscreener, hyperopia

Comparison between Spot Vision Screening Results and Academic Test Scores in 3rd Grade Students

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Objectives:
The Spot Vision Screener has become widely deployed for school-age vision screenings. This study analyzes the associations between Spot screening outcomes and academic performance among 3rd grade students.

Methodology
Objective school screening data using the Spot Vision Screener were compared to 3rd grade state test scores in English Language Arts (ELA) and Math for students from a large school district over two consecutive years. Students who failed vision screening for multiple conditions as well as those who failed for isolated conditions were analyzed to evaluate the relative association of specific vision conditions and academic measures.

Results
Individual data analyzed in 2017-2018 (n=2801) and 2018-2019 (n=2244) to compare third-grade standardized test performance between children who passed and failed vision screening. Children who failed the vision screening for any condition showed at least a 13% lower median percentile rank on both state tests compared to students who passed vision screening (mean difference -10.87% ELA, ($t_{df=5184}$ = 9.76, $p<.001$, Effect Size = .37SD) and -11.29% for Math ($t_{df=5144}$ = 10.2, $p<.001$, Effect Size = .39SD). Hyperopia, astigmatism and strabismus were all associated with significantly lower test scores compared to students who passed vision screening. Myopia was associated with average test scores.

Conclusion
This study demonstrates that vision conditions detected by the Spot Vision Screener, specifically hyperopia, astigmatism and strabismus, are associated with significantly lower standardized test scores in both ELA and Math in a large population of 3rd grade students.

Keywords: Spot Vision Screener, refractive error, strabismus, academic performance

Associations Between Perceptual Performance and White Matter Microstructure of the Optic Radiations in Children with Perinatal Stroke

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Objectives:
Perinatal stroke (PS) is a group of focal neurological injuries that have an estimated effect on 5 million people. PS is known to affect visual function, but mechanisms are not well understood. Here, we aimed to assess structural differences in the optic radiations of children with perinatal stroke (PS) compared to typically developing children (TDC), and associated perceptual function.
Methodology:
Twenty-three children with PS and 23 age and sex-matched TDC underwent diffusion weighted magnetic resonance imaging and perceptual testing using the Motor-Free Visual Perceptual Test - 3rd edition (MVPT). Tractography isolated the optic radiations in both groups, and white matter metrics of fractional anisotropy (FA) and mean diffusivity (MD) were extracted. T-tests were used to compare FA, MD and MVPT scores between groups. Partial correlations, adjusted for age, were used to explore the association between white matter microstructure and perceptual scores.
Results:
Differences in white matter were present in the lesioned (MD p=0.01) and non-lesioned hemispheres (FA p<0.001) compared to TDC. Children with PS scored lower on the MVPT (p=0.005). In the lesioned hemisphere, higher FA was positively correlated with higher MVPT scores (R=0.302, p=0.04), and higher MD was negatively correlated with the MVPT (R=-0.412, 9=0.004).
Conclusion:
Altered white matter microstructure in the optic radiations is associated with poorer perceptual performance. Results suggest greater need for early visual and perceptual assessment of children with PS with the goal of providing early intervention.

Keywords: perinatal stroke, vision, perception, white matter, diffusion, weighted imaging, tractography

Propionic Acidemia: Characteristics of Visual Functioning – A Case Study

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Introduction:
Propionic acidemia (PA) is a rare metabolic disease resulting from a deficiency of the enzyme propionyl-CoA carboxylase, which leads to the accumulation of propionic acid in the blood. Propionic acidemia is characterized by metabolic crises, changes in neurological status, and psychomotor retardation. The spectrum of health problems also includes vision impairment, which is most often manifested by atrophy of the optic nerve and pathological changes in the center for visual processing.
Objective:
Monitoring the visual behavior of a seven-year-old girl with a diagnosis of PA in different situations, analyzing the obtained data and creating proposals for the adaptation of materials and environment.
Methodology:
The visual behavior and daily functioning of the girl was monitored over a long period of time in different conditions (time of day, context, complexity of the visual task, activity level, etc.), videos were created and analyzed.
Results:
At the time of examination, the girl has a normal ophthalmological status, but also marked differences in visual behavior in different parts of the day. Based on observation, a number of characteristics of cerebral visual impairment were registered, such as: latency in visual response, fluctuation of visual functioning in relation to the time of day, color preference, difficulty in recognizing objects that are in a visually complex environment, and difficulty in noticing moving stimuli. As a result of the profile of visual functioning, a vision stimulation and rehabilitation program were created, along with a proposal for adaptations of materials and environment.
Conclusion:
Propionic acidemia is a condition with a very unpredictable outcome, but constant evaluation and monitoring of visual functioning should serve the purpose of improving the quality of life.

Keywords: visual functioning, cerebral visual impairment, propionic acidemia

Association Between Binocular Vision Function and Motor Ability in Typically Developing Children

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Objectives
Visuomotor ability is a crucial aspect of everyday life, such as writing and throwing or catching a ball, and is the basis of how we interact with the world. The current study explored the association between binocular vision and motor ability using standardized clinical tests. It was hypothesized that, poorer motor skill performance would be associated with reduced visual function.
Methodology
Seventy typically developing children aged 7-14 years (mean 10.0 years, SD 2.1years, 30 males) were tested. Study protocol included standardized testing for binocular vision (visual acuity, stereoacuity, fusional vergence, vergence facility, phoria, fixation disparity, accommodation amplitude, accommodative facility), motor ability (Movement Assessment Battery for Children – 2nd Edition – MABC-2), visuomotor integration (Beery-Buktenica Test for Visuomotor Integration – Beery-VMI) and an experimental eye-hand coordination task which involved a bead threading task.
Results
Results were within the expected age range for both the Beery-VMI and MABC-2; however, the manual dexterity subtest of the MABC-2 showed children performed outside one standard deviation of the expected norm. Correlation analysis adjusted for age revealed a significant association between binocular accommodative facility and the manual dexterity scores (ρ= -0.32, p=0.017). Kinematic analysis of the eye-hand coordination task demonstrated a significant age-related improvement in the efficiency of object manipulation.
Conclusion
Study findings support a moderate association between accommodative function and fine motor skills performance in children. The results of this study aim to establish a better understanding between binocular vision and motor function and how each develop concurrently.

Keywords: visuomotor development, binocular vision, motor skill

Early Visual Intervention Through a Digital Personalized Platform in Infants at Risk for Cerebral Visual Impairment: the VIPPSTAR-G1 Project

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Objectives:
Infants with early visual impairment are recognized as being a highly vulnerable clinical population and specific strategies of early intervention are crucial, especially during their first years of life, when neuroplasticity is highest. While digital health technologies offer personalized care, clinical validation in paediatrics is limited. This study aims to evaluate a digital health-based early intervention protocol to enhance visual functions in infants with or at risk for cerebral visual impairment.

Methodology:
The VIPPSTAR project, funded by the European Commission (HORIZON-HLTH-2024-STAYHLTH-01-02-two-stage-101156763), addresses this gap by conducting a multicentre, multinational, single-blind randomized controlled trial. This trial aims to evaluate the effectiveness of early visual training in infants (0–35 months) diagnosed/at risk for CVI. The intervention is delivered through a digital health platform designed to improve visual and neurodevelopmental functions. Primary outcomes will concern visual and oculomotor functions (visual acuity, contrast sensitivity, fixations, smooth pursuit, and reactive saccades), assessed using clinical and eye-tracking approaches, and neurodevelopment (cognition, language, motor skills, and behaviour). Secondary outcomes will focus on adaptive functions, communicative and language development. Assessment will be conducted before, immediately after, and six months post-intervention. The study will enroll 48 subjects in the treatment group (TG) and 48 in the control group (CG) across three countries: Italy, Belgium, and Moldova. Families in the TG will access an e-Learning MOOC with individualized, parent-mediated activities, the CG will receive standard care.

Conclusion:
This study expects to validate the effectiveness of digital early visual training in improving children's abilities and enhancing family quality of life.

Keywords: cerebral visual impairment, infants, digital health technology, early intervention

Visual Function Score: A New Clinical Tool to Assess Visual Function and Detect Visual Disorders in Children

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Objectives:
Visual impairment (VI), especially if congenital, can interfere with a child's neuropsychiatric development. A comprehensive assessment of visual functioning is important for identifying VI and for planning personalized rehabilitation programs. To our knowledge, in literature there are currently few instruments evaluating visual functioning and they present some important limitations (e.g., they are based on qualitative reports, they do not take into account environmental adaptations of visual testing). The aim of this work is to present the Visual Function Score (VFS) and its statistical validation, as an instruments to detect and define VI since early age.
Methodology:
We retrospectively applied the VFS to 255 patients aged 0.3 to 17.9 years with both central and/or peripheral neuro-ophthalmological disorders. The protocol counts a total of 51 items, each of which is assigned a score from 1 to 9 (or from 0 to 9 in some cases). The VFS produces three sub-scores and a global score (from 0 to 100), resulting in a quantitative evaluation of visual functioning.
Results:
VFS has good convergent validity (evaluated in terms of concordance with the Visual Function Classification System) and reliability . Nevertheless we observe a correlation between VFS and clinical severity in neuromotor disease and a relative modifiability of VFS considering the environmental adaptations used.
Conclusion:
The VFS is a powerful tool for diagnosing and profiling visual disorder Moreover, it can be adopted to evaluate rehabilitation outcomes because it considers the level of environmental adaptations needed by, These properties allow to monitor re-habilitation outcomes, and define the most suitable re-habilitative intervention.

Keywords: visual function, rehabilitation, environmental adaptation

Is a Decline in Fine Motor Skills Associated with Reduced Visual Function?

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Objectives
Development and maturation of visual functions and motor control occurs in parallel during early childhood and continues into adolescence. Recent studies reported a significant decline in motor proficiency when children were compared to previous cohorts using standardized tests of motor skills. The objective of this study was to investigate whether the decline in visuomotor skills is associated with reduced visual function.
Methodology
Participants were typically developing children (age range 6-14 years). The first cohort (n=59) was tested prior to the COVID-19 pandemic (cohort A: 2016-2017), while the second cohort (n=55) was tested following the pandemic (cohort B: 2023-2024). Vision testing included visual acuity, stereoacuity, fusional vergence, vergence facility, phoria, accommodation amplitude, and accommodative facility. Visuomotor control was assessed by recording eye and hand movements during the performance of a precision grasping and placement task.
Results:
Results demonstrated a notable decline in fine manipulation skills. The total time to perform the task was significantly longer ($p<0.001$) in cohort B (1868 ms SD 402) compared to cohort A (1566 ms SD 308). The decline in performance was due to longer grasping duration (cohort A: 182 ms SD 80 vs. cohort B: 319 ms SD 113), and placement duration (cohort A: 565 ms SD192 vs. cohort B: 757 ms SD 315). In contrast, results from the vision tests did not reveal significant differences between the cohorts.
Conclusion
Findings from this study confirm a downward trend in the performance of fine motor skills. The decline in motor proficiency was not associated with a reduction in visual function.

Keywords: binocular vision, fine motor skills, visuomotor control

Visual functioning of children with cerebral palsy – are we looking in the same direction?

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Objectives
One in every ten children with cerebral palsy (CP) presents with severe visual impairment and 75-90% present with some degree of visual impairment. This study aims to evaluate the level of agreement among different professionals—special education teachers, psychologists, physiotherapists, occupational therapists and speech therapists— in using the Visual Functioning Classification System (VFCS) to assess vision in children with CP. Additionally, it examines whether familiarity with the child influences the classification level.

Methodology
Experts will independently classify the visual functioning of children with CP using VFCS. To assess inter-rater reliability, classifications will be compared across different professional groups using Cohen's kappa and intraclass correlation coefficients (ICC). To evaluate intra-rater reliability, the same experts will reclassify the children after two weeks. Expert familiarity with the child will also be documented and analyzed as a potential influencing factor.

Results
Results will be presented on the level of agreement among different profiles of professionals using the VFCS, while the impact of familiarity with the child will be evaluated to determine if professionals with greater familiarity with the child produce more similar classification results.

Conclusion
This study highlights the need for transdisciplinary collaboration and training to enhance knowledge on the visual functioning of children with CP and multiple disabilities in general. By improving understanding in this area, professionals can more effectively design teaching methods and materials that provide appropriate support for learners with visual and developmental challenges.

Keywords - Visual Functioning Classification System, cerebral palsy, visual impairment, transdisciplinary approach

Visual functioning and joint attention skills in a child with social communication difficulties – a case study

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Objectives:
Visual attention and social interactions play a crucial role in the development of joint attention skills. The maturation of visual attention is closely linked to the development of basic visual functions. Deficits in visual attention and visual functions may be associated with deficits in the development of social communication. This case study aims to analyze visual functions, functional vision, visual attention, visual-cognitive functions, and joint attention skills in a child with social communication difficulties.
Methodology:
This case study presents a child aged 24 to 30 months with deficits in joint attention skills, assessed at the Special Hospital for Orthopedics and Rehabilitation "Martin Horvat" Rovinj-Rovigno. Joint attention skills, visual functions, visual attention, and functional vision were assessed through standardized tests and structured task observations.
Results:
The child demonstrated deficits in joint attention skills, specifically in both initiating and responding to joint attention. Visual functioning deficits were observed, particularly in specific visual functions such as saccadic movements, visual attention and visual communication.
Conclusion:
The findings indicate that deficits in basic visual functions and skills may be present in children with deficits in joint attention skills. Further research is needed to investigate the specific characteristics of visual functioning in children with joint attention difficulties. Such studies would contribute to a deeper understanding of both typical and atypical developmental trajectories, emphasizing the importance of assessing visual functioning in the context of social communication development.

Keywords: visual functioning, visual attention, joint attention skills

Long-term anatomical and functional outcomes of treated retinopathy of prematurity

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Objective:
Retinopathy of prematurity (ROP) is a significant cause of visual impairment in children. This report aims to assess the anatomical and functional outcomes of ROP treatments.
Methodology:
We analyzed ROP screening data from 2011-2024. Children reaching the treatment threshold received either laser photocoagulation, intravitreal ranibizumab injection (0.2 mg/0.02 ml), or a combination of both under topical anesthesia.
Results:
Out of 420 children, 58 (13.8%) developed ROP, with 17 (4%) requiring treatment. Treatment included laser in 4 children, ranibizumab in 11, and both in 2. Three children were lost to follow-up, leaving 14 for long-term evaluation (1-11 years). In 12 children, retinopathy regressed with good anatomical outcomes, while 2 experienced progression despite treatment: one progressed to stage V in one eye and stage IVa in the other after laser, and the other to stage V in both eyes after combined treatment. Among the children with good outcomes, the median visual acuity was 0.63 for the right eye and 0.4 for the left. Non-verbal children's visual acuity was qualitatively assessed. No complications related to ranibizumab were noted.
Discussion and Conclusion:
Timely treatment of ROP generally results in favorable anatomical and functional outcomes.

Keywords: retinopathy of prematurity, outcome, anti-VEGF, photocoagulation of the retina

Procedural Comfort in Paediatric Ophtalmology

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Objectives
Diagnosis of visually impaired babies and toddlers can be a challenge. At Bartiméus Baby and Toddler Center, the Diagnostic Center for complex visual disorders in the Netherlands, we perform ophthalmologic diagnostics in a child-oriented way.
Methodology
In Pediatrics there is a tendency to more procedural comfort to prevent pediatric suffering. At Bartiméus our methods are based on Child and Family integrated Care: we translated the principles of procedural comfort (from the PROSA network) to the ophthalmological assessment. We conducted a procedural box with various tools and depending on the situation we use them. Content of the Toolbox: Language, desensitization, distraction, feeling of control, building trust and connection.
In addition, many examination methods and devices are adapted to very young children. This allows children from a few weeks of age to receive a complete ophthalmological examination in a clinical setting, including OCT.
Results and Conclusion
Thanks to our adjustments to the equipment and the child-oriented approach in the Baby and Toddler Center we can quickly provide clarity about the diagnosis and prognosis. We can start guidance at home and support parents in dealing with their young visual impaired child.

Keywords: procedural comfort, children, paediatric ophtalmology, prosa, child and family integrated care

Components of service delivery for children with Cerebral Visual Impairment (CVI): A scoping review protocol

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Objectives:
Cerebral visual impairment (CVI) is the most common cause of visual impairment in children in the developed world. Existing assessment methods and models of care vary widely. The objective of this scoping review is to identify and describe the components of existing service delivery models of care in relation to the detection, care, and management of visual impairment for children with CVI. Here, we present the protocol.

Methodology, Results, Conclusion
The review was conducted in accordance with the JBI methodology for scoping reviews. Alongside a call for evidence, we searched a range of resources to include MEDLINE, CINAHL, Embase, APA PsycINFO, Social Care Online, Cost-Effectiveness Analysis (CEA), Health Technology Assessment database, ERIC, British Education Index, Education Research Complete, and The Cochrane Library (CENTRAL and CDSR) from inception for English language publications only. Eligible studies described or assessed service delivery models for children (0-17 years) with CVI, in health, social care and education settings. Studies are now being selected for inclusion through a 2-stage process of screening; title/abstract followed by full text, conducted independently by two reviewers with any discrepancies resolved through consensus or discussion with a third reviewer. Data will be extracted by one reviewer and checked for accuracy by a second into a pre-piloted data extraction tool. Descriptions of service delivery components will be mapped onto an appropriate framework (agreed with our stakeholders) to inform an organisational analysis. Patient and public representatives have helped shape the review question and will contribute to the conduct and reporting of this scoping review.

Keywords: CVI, cerebral visual impairment, service delivery, evidence synthesis

The VIPPSTAR Registry. The Development of a European Registry for Childhood Visual Impairmement

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ABSTRACT
The VIPPSTAR project aims to offer the first holistic framework for a life-long enhancement of health, well-being, and autonomy of children and adolescents with Visual Impairment (VI). We will support personalized prevention of the profound and sometimes irreversible impacts of VI on individual psychological, educational, and social competence. VI can be identifiable shortly after birth, persists throughout the lifetime, and is likely to have an impact on all areas of development. VIPPSTAR will include families and young
individuals to overcome the burden of VI and achieve a healthy, independent life and full rights to engage critically and safely with future digital technologies for health, including AI systems. Self-empowerment and agency will be promoted moving from healthcare support to family, then self-administered serious gaming, personalized eLearning, and assistant-based coaching. This presentation will detail the proposed dedicated surveillance network (a registry) that will be established to collect data in different socio-economic and geographical groups to obtain an evidence-based comparison of the new programs with the national standard of care. Navigating complex ethics. We will pilot the registry in Italy, Moldova, and Belgium and build upon the work already done in Scotland with their own notification system.

Keywords: Childhood Visual impairment registry, European, Ethics, Notification

The role of teachers for blind and visually impaired in the rehabilitation process of children with cerebral visual impairment at the National Centre for Comprehensive Rehabilitation of the Blind and Visually Impaired

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ABSTRACT
In this presentation we will introduce the role of teachers for blind and visually impaired in the rehabilitation process of children with cerebral visual impairment (CVI) at the National Centre for Comprehensive Rehabilitation of the Blind and Visually Impaired - University Clinical Centre, Eye Hospital, Ljubljana, Slovenia (NCCRBV). We will also highlight the challenges and examples of good practices of rehabilitation process of children with CVI at the NCCRBV.
The rehabilitation process at the NCCRBV is conducted multidisciplinary and delivered by a group of experts. The first time the child enters the center, he or she is met with all the specialists. It is intended for a general identification of the child's abilities and needs and planning of further treatments.
The assessment carried out by the teacher for blind and visually impaired begins with a focused anamnestic interview with the parents. We assess the visual functioning by observing the child and using different diagnostic tools. The diagnostic tools are chosen based on the child's chronological age, needs and abilities and help us prepare a detailed CVI assessment report with adjustments and recommendations.
The goal of the rehabilitation is to provide strategies and adjustments that allow the child, parents, and significant others to better understand the behavior of a child with CVI, and to help them overcome the obstacles they encounter in their everyday lives. When the assessment is complete we reach out and work closely with other institutions that provide specialized training and rehabilitation of children with CVI.

Keywords: The role of teachers for blind and visually impaired, children with cerebral visual impairment, rehabilitation

Characteristics of Children with Suspected Brain-Related Visual Problems Seen by a Specialist Neurodevelopmental Service

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Objectives
Cerebral visual impairment is recognised as an important cause of childhood visual impairment. A heterogenous condition is acknowledged (Zihl 2014), with potential impacts on acuity and / or perceptual functions. Questionnaires that may help to identify perceptual difficulties have been developed. (Dutton 2003, Ortibus 2011)
Methods
During a two year period 80/238 new referrals were for children with suspected brain related vision problems. A retrospective case note review documented multiple factors including age, associated medical conditions, and assessment outcomes.
Results
Visual acuity ranged from none to normal. In children aged under five (48), no/very low vision was common (31/48) and was associated with significant developmental comorbidities in the majority. Only two children were referred with specific concerns about possible perceptual problems.
In children aged five and above, 6/32 had already been diagnosed with CVI by questionnaire. In 2 cases assessment did not support this diagnosis. Seven other referrals raised concerns about perceptual problems and two others were referred with specific concerns about reading.
19/32 had sufficient acuity and ability to complete cognitive/perceptual testing, which was informative regarding overall functioning and referral concerns. Two children were diagnosed with dyslexia.
Of those unable to complete tests (13/32), a diagnosis of CVI affecting acuity only was confirmed in 9. The remaining four children were diagnosed with severe intellectual disability
Conclusion
Children with suspected CVI require comprehensive assessment. Acuity reduction is an important feature in young children, and neurodevelopmental assessment identifies relevant comorbidities. In older children visual perceptual concerns may emerge, with comprehensive assessment crucial for diagnostic evaluation.

Keywords: neurodevelopmental assessment, visual perceptual skills, comorbidities, questionnaire tools

Clinical and Genetic Characterization of Microphtalmia, Anophtalmia and Coloboma (MAC) Spectrum Disorders: A Comprehensive Analysis of a Single-Center Cohort

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Objectives:
Microphthalmia, anophthalmia and coloboma (MAC) are rare developmental ocular malformations significantly impacting visual function and quality of life. Despite their clinical significance, a comprehensive characterization of large cohorts remains limited. The aim of our work is to understand the genetic and clinical features of MAC: this could be crucial for early diagnosis and clinical management, also considering genetic etiology.
Methodology:
We collected clinical data about 49 patients aged under 18 years old, affected by MAC disorders, followed up in our Centre during the last seventeen years. The cohort underwent neurological and neuro-ophthalmological assessment, genetic analysis, neuropsychological testing and neuroimaging.
Results:
In our cohort 51% of patients had a syndromic diagnosis. Bilateral ocular involvement were found in a percentual of 79.6% and the most common feature was coloboma (77.5%), followed by microphthalmia (53%) and anophthalmia (8.2%). Anterior segment abnormalities (e.g. inferior cortical cataract, pupillary asymmetry, microcornea and lens luxation) were documented in 83.7% of patients, while posterior segment defects in 68.4% (e.g. colobomatous defects involving retina, chorioretina, and optic nerve). The analysis of visual function revealed considerable variability in outcomes. Neurological features (e.g. hypotonia, fine motor impairment) and cognitive implications were more common in the syndromic group. Genetic testing showed higher diagnostic rate in syndromic versus non-syndromic. We also found several novel variants in non-classical MAC genes.
Conclusions:
This study contributes to expand our knowledge about MAC spectrum disorders, offering new insights into their manifestations, genetic findings and functional outcomes. These aspects could be crucial to plan a tailored re-habilitation program.

Keywords – microphtalmia, anophtalmia, coloboma, visual function

Towards a Conceptual Model for the Assessment of Higher-Order Visual Functions in Children with Cerebral Visual Impairment (CVI)

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Objectives:
1) validating the conceptual framework of higher-order visual functioning as proposed by Zuidhoek and colleagues [1], and 2) composing a test-battery for the assessment of higher-order visual functioning in children suspected of CVI based on this adapted model. The framework describes higher-order visual functions such as visual selective attention, visual perception, and functions that require (working) memory.
Methodology:
A qualitative systematic review using Grounded Theory was conducted to evaluate Zuidhoek's framework. Findings were used to validate or refine the model's domains of higher-order visual functioning and integrating validated elements and new insights. In a Delphi-study, expert panels evaluated the construct validity of clinically available tests by judging their ability to assess the identified higher-order visual functions and selected the most appropriate tests.
Results:
The systematic review provided robust support for the foundational elements of Zuidhoek's model, and identified areas needing improvement. The adapted model incorporated these improvements (e.g. addition of perceptual causality and animacy). The Delphi on this adapted model resulted in consensus on a set of ten functions and twenty-two corresponding tests, resulting in the newly composed test-battery.
Conclusion:
The validated and improved version of Zuidhoek's conceptual model and corresponding test-battery based on expert consensus and clinically available tests, offers a structured and validated approach for the assessment of higher order visual functioning in children. Further research will focus on the clinical usability and differential value of this test-battery in evaluating children with CVI.

Keywords: cerebral visual impairment, higher order visual functions, children, neuropsychological assessment

My vision changed

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Abstract:
The aim of this paper is to present the case of a 2.5-year-old boy and the difficulties in visual functioning that arose as a consequence of an illness with neurological manifestations. Additionally, the support provided to the parents and the improvements in the functional use of vision and developmental milestones will be discussed.
The results of the visual functioning and developmental assessments will be presented, along with the progression of resolving behavioral characteristics of visual functioning difficulties over a four-month period. A comparison of the initial and final assessments will also be made. The strategies implemented to empower parents in their daily interactions with their child will be systematically outlined.
The initial results indicated that, following the primary illness, the boy experienced significant difficulties in functional vision. In addition to visual impairments, challenges were observed also in other developmental areas. Professional support was provided through a parent counseling and coaching approach.
By comparing the initial and final assessment results (after four months), the paper will highlight which aspects of visual functioning and development are satisfactory and whether further professional support is needed.
In conclusion, it is crucial to recognize and thoroughly analyze visual functioning difficulties in children with various neurological conditions. Iti s also important to emphasize the consequences that CVI can have upon learning and social interaction, and how these can be given behavioral labels without the underlying visual causes being considered.
Timely identification and an appropriate approach that includes role of parents lead to better outcomes.

Keywords: acquired visual functioning problems, assesment, support in natural enviroment

Parental support and professional challenges in the rehabilitation of orientation and mobility of children with blindness and visual impairment

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Objectives:
The aim of this study was to investigate the experiences of educational rehabilitators on the role of parents and families in the process of (re)habilitation of orientation and mobility (O&M) of children with blindness and visual impairment (BVI) and to analyse the experience of professional stress in the work of rehabilitators.
Methodology:
Using qualitative methods, semi-structured interviews were conducted with educational rehabilitators working with children with BVI to investigate how parents are involved in children's O&M learning, how family support affects the child's motivation, and how educational rehabilitators communicate with parents and assess their knowledge of rehabilitation processes. At the same time, the causes of professional stress, the challenges of emotional engagement, institutional support and coping strategies were analysed.
Results:
The results will provide an overview of the different levels of parental engagement, their motivation and prior knowledge as factors for successful O&M rehabilitation. Rehabilitators will provide insights into the challenges of communication, job stress and administrative demands.
Conclusion:
The analysis of expert opinions provided data that contributes to a better understanding of the mutual dynamics and professional experiences in the rehabilitation process. It is important to understand the role of parents in the rehabilitation of children with BVI and the challenges faced by educational rehabilitators.

Keywords: orientation and mobility, parental support, professional stress, communication, motivation

Assessment of cerebral visual impairments in children at risk, a systematic review

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Objective:
This study aims to identify and evaluate screening and assessment instruments used to detect Cerebral Visual Impairment (CVI) in children with various neurological conditions. The overarching goal is to ensure that the instruments selected can reliably assess CVI and provide relevant functional information, especially for children with severe motor impairments (Manual Ability Classification System levels IV and V). The objective of the study is to identify screening and assessment tools used to detect CVI in children with the specified conditions, assess their psychometric properties and determine how these tools have been adapted for children with severe motor impairments.
Methodology:
A systematic literature search was conducted in multiple scientific databases (e.g., MEDLINE, EMBASE, Scopus, etc.). The search was aimed at identifying studies that assessed vision, functional vision, and visual impairments of cerebral origin in children.
Results:
We initially identified 1446 articles, which were screened based on titles and abstracts. After excluding irrelevant studies (1115), the remaining 317 studies were examined in full. Of these, 212 were excluded for various reasons, leaving 105 studies from which data was extracted. A total of 83 tests, 23 interviews and questionnaires, and three guidelines for structured observation were identified. Of the tests, the vast majority was only used in one or two studies and only 12 used in five studies or more.
Conclusion:
Based on the identified tests, we will present guidance on which tools are most appropriate for assessing CVI in children with severe motor impairments and neurological conditions.

Keywords: Assessment, Cerebral Visual Impairment, CVI, Motor impairment, Review

Early Glasses Study: First Final Results

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Objectives
In the Early Glasses Study, final examination takes place between September 2023-March 2026. We report first final results.
Methodology
Of 865 children recruited at Children's Healthcare Centres (CHCs), 601 had received orthoptic examination followed by cycloplegic retinoscopy at 14.7±1.7 months. Fifty-two exceeded AAPOS 2003 criteria and were randomized into wearing glasses or not, and are followed-up by research orthoptists, who perform final examination at 45 months, together with a pediatric ophthalmologist. In all other 522 children visual acuity (VA) is measured at CHCs at 45 months. Children not reaching VA of 0.63 are reexamined or a threating orthoptist is contacted.
Results
Five of 601 had anisometropia at 14 months, 3 even became isometropic in the year after. Between age 1-2, 49 had received follow-up examinations, change in spherical equivalent ranged between -2.375D and 2.75D, and decreased on average -0.12D. Currently, in 173 VA was measured at age 4, 152 of whom had sufficient VA, 3 glasses immediately after first signs of esophoria, and 1 glasses for high hypermetropia, all did not develop amblyopia. One had anisometropia and astigmatism developed later amblyopia, 1 partial accommodative esotropia and secondary amblyopia, 3 strabismus, 1 bilateral reduced vision of unclear origin, 1 myopia, 10 had insufficient VA measurement at CHCs and appointment with orthoptist will follow.
Conclusion
Ten of 865 had strabismus at 14 months, 7/173 examined at age 4 were added since, as expected, whereas 2 had amblyopia at 14 months, 2 were added since. Three cases of accommodative esotropia could have been prevented with early glasses, which possibly prevented development of amblyopia, whereas no cases of refractive amblyopia prevented with early glasses are known. It is, however, possible that the study causes increased awareness of earlier detection.

Keywords - amblyopia, screening, refractive errors, accomodative esotropia

Application of Facial Anthropometry to Spectacle Frame Design for Chinese Children

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Objectives:
If a child requires a refractive correction, or intervention such as myopia management, it is imperative to have spectacle frames designed specifically for children in order to achieve stability, comfort and the correct positioning of the lenses. This data informs on facial growth and facial parameters relevant to spectacle frame design in order to achieve an optimal fit and therefore maximising the benefit of any optical correction or intervention at such a critical stage in a child's development.
Methodology:
309 three dimensional stereophotogrammatic images were acquired from typically developed Chinese children aged from one to sixteen years. Fifteen head and facial parameters specific to spectacle frame design were measured and analysed.
Results:
Rates of growth were symmetrical for right and left sides of the face, successively higher for pupillary distance, head width, front to bend and temple width, illustrating how the face develops. The splay and frontal angles and front to bend measurements showed statistically significant differences between male and female results. Parameters that form the nasal bearing surface show very little relative growth, remaining low and flat in appearance thus requiring frame design features that can still achieve comfort, accurate lens positioning and stability for the child.
Conclusion:
This data shows how those facial parameters relevant to spectacle frame design alter during growth and what is required to achieve a better fit and therefore maximising the benefit of any optical correction or intervention at such a critical stage in a child's development.

Keywords: spectacles, frames, fitting, stability, myopia

Bayley III Assessment of Preterm Children Across Gestational Age Groups

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Objective:
Prematurely born children face a range of short- and long-term complications from birth and are at higher risk of developmental delays. Therefore, early diagnosis and monitoring are crucial for determining the optimal therapy. The Bayley III scale enables the assessment of psychomotor development at a very early age and is a valuable tool in achieving these goals. In our study, we analyzed performance on the Bayley III subscales in relation to gestational age to develop individualized therapy plans for further developmental support.
Methodology:
This study included 60 preterm children (aged 8 to 42 months), balanced by sex and classified into three groups according to the World Health Organization criteria: extremely preterm (<28 weeks), very preterm (28–<32 weeks), and moderate-to-late preterm (32–<37 weeks).
Results:
For the entire sample, a one-sample t-test assessing deviations from the standard score of 10 on the Bayley III subscales revealed significant differences. Preterm children scored lower on the gross motor subscale, while their scores were higher on the receptive communication scale.
Regarding group differences by prematurity, a one-way ANOVA showed significant differences in expressive communication scores. Very preterm children outperformed extremely preterm children, while differences between other groups were not significant.
Conclusion:
Prematurely born children show lower performance on the gross motor subscale, while the group of extremely preterm children also exhibits lower performance on the expressive communication subscale. This suggests a delayed development of verbal communication and highlights the need for stimulation of nonverbal communication, including the use of assistive and augmentative communication.

Keywords: Preterm children, Bayley III scale, assistive communication

Beyond the Blurred Disc Margin: Refining the Referral and Diagnostic Pathway in Paediatric Ophthalmology

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Objectives:
To refine the diagnostic pathway for suspected optic disc swelling in a paediatric NHS tertiary trust by evaluating optic disc swelling diagnosis accuracy, lumbar puncture (LP) performance discrepancies by clinician grade, and the clinical significance of ophthalmic tests, signs and symptoms.
Methodology:
A retrospective evaluation was conducted by reviewing notes for patients referred with suspected optic disc swelling who attended an ophthalmology appointment within 4 weeks of an LP between January 2016 and September 2023. Of 274 patients, 35 met the eligibility criteria, excluding those with known elevated intracranial pressure or insufficient records. Data on demographics, referrals, clinical tests, and LP results were analysed, with statistical significance set at $p < 0.05$.
Results:
Among 35 patients, 88.57% had elevated cerebrospinal fluid pressures on LP, confirming papilloedema. Visual acuity was assessed in all patients, with frequent investigations including optical coherence tomography (OCT) (92.5%) and colour fundus photography (81.9%). Diagnosis rates did not significantly differ across clinician grades ($p=0.756$-0.919). Papilloedema showed statistical significance with colour fundus photography ($p=0.001$), B-scan ($p=0.046$), OCT ($p=0.002$), and Frisen grade ($p=0.039$), whereas spontaneous venous pulsation demonstrated no statistical significance ($p=0.167$).
Conclusion:
The study found high diagnostic accuracy for papilloedema, with consistent performance across clinician grades. Key ophthalmic assessments were identified, highlighting areas for refining the diagnostic pathway. A proforma within the mediSIGHT system, tailored to the study's findings, could ensure standardised, complete testing. To address sample size limitations and clinicians highly specialised in paediatric ophthalmology, further research through regional or national collaboration is essential for improvement.

Keywords: optic disc swelling, paediatric papilloedema, diagnostic accuracy, clinician agreement, ophthalmic investigations

The Importance of an Interdisciplinary Approach and Family Involvement in the Management of Children with CVI: A Case Study

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Objectives:
Over the past decade, interest among professionals in the management of cerebral visual impairment (CVI) has grown in Slovenia. However, research on this topic remains limited in the domestic literature. This study aims to underscore the significance of a tailored interdisciplinary approach and family involvement in the effective management of children with CVI. Additionally, it seeks to illustrate current practices in the management of CVI in Slovenia through an in-depth case study.
Methods:
This qualitative descriptive study is based on an in-depth retrospective analysis of medical and special education records concerning a selected case of a child with CVI and additional motor impairments. In addition, data were obtained through a semi-structured interview with the child's parents. The collected research data were analysed qualitatively.
Results:
The findings indicate that a tailored interdisciplinary approach, combined with a collaborative partnership with the family over a five-year follow-up period, led to substantial improvements in the child's functioning and developmental progress. By the time of transitioning to primary school, the child demonstrated a marked resolution of CVI-related visual behaviours, intact cognitive abilities, and well-developed visual perceptual functions.
Conclusion:
Currently, Slovenia lacks universally accepted guidelines for the management of CVI. The findings of this study emphasise the critical importance of a collaborative interdisciplinary approach, timely and individualised support, and full family engagement and motivation. These factors were identified as potentially critical elements for the successful management of CVI, as evidenced in the case study presented.

Keywords: cerebral visual impairment, interdisciplinary approach, tailored support, family involvement