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Thursday 9th - Saturday 11th June 2022

Virtual Congress Abstract Booklet

Thursday 9th June 2022

Abstracts listed in presenting order, unless stated otherwise

Theme: Amblyopia, Screening Part 1 (vision)
Time: 13:05-14:00

Accuracy of Vision Screening Protocols for Young Children

Mythili Ilango[1], Dr Amanda French[1], Professor Kathryn Rose[1]
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Purpose: To investigate the impact of age, referral criteria and visual acuity (VA) test on the accuracy and pattern of referrals from childhood vision screening.

Method: Data from the Sydney Paediatric Eye Disease Study (SPEDS) and Sydney Myopia Study (SMS) was used to compare accuracy of screening at school age and preschool age. VA was tested using single-surround HOTV (EVA ATS; four years, n=215) and HOTV LogMAR (EDTRS; six years, n=1741). The comparability of the Sheridan Gardiner (SG) and HOTV LogMAR was investigated in a sample of 94 four-year-old children recruited from the New South Wales, Statewide Eyesight Preschooler Screening (STEPs) Program.

Results: There was no significant difference in accuracy for the detection of ocular conditions when screening was conducted at age six (AUC 0.78 (95% CI: 0.74 to 0.81)) compared to age four (AUC 0.68 (95% CI: 0.58 to 0.78)). Using a referral criterion of VA <6/9.5 yielded high specificity and sensitivity for detecting amblyopia at both ages. While sensitivity remained high using a lower criterion (VA <6/7.5), specificity was reduced. Of the children recruited via StEPS, referral rate (<6/9-2) was 19.1% higher with SG compared to HOTV LogMAR. The difference in mean VA between HOTV LogMAR (LogMAR: 0.108) and SG (LogMAR: 0.174) was statistically significant (p<.0001).

Conclusion: Vision screening at preschool age is accurate using a referral criterion of <6/9.5, and appropriate to ensure timely treatment of amblyopia. The gold-standard HOTV LogMAR chart produces higher VA measures and a lower referral rate compared to the Sheridan Gardiner test.

Evaluation of changes in visual function by parents at home

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Purpose: The Kay Amblyopia Tracker app changes the visual angles of the optotypes by changing test distance, not optotype size. The aims of this phase of the study are to evaluate the test-retest variability of the app used at home by parents and to explore parents' views of the app.

Methods: Parents tested their child three times at home following on screen instructions for the testing process. An online questionnaire was used to evaluate parents' perspectives of the app. On completion of the tests and questionnaire, a £20 voucher was given.

Results: So far, 34 parents have completed this phase. Paired t-test comparing uniocular and interocular acuity differences on the three tests showed only two significant differences (p<0.05) when comparing the left eye on the first test to the second and third tests. However, this was not significant after Bonferroni correction for nine tests (adjusted p=0.006). Questionnaire responses showed only one parent having difficulty understanding the app instructions, 87% said it was easy or very easy to carry out the test and 97.5% said they would use the app in future if it was available. Free text responses provided many positive experiences and a willingness to use the app in future to reduce hospital visits and give an insight to their child's vision during treatment.

Conclusions: Preliminary data show good agreement on repeated testing by parents at home. Positive parental responses show a willingness of participants to engage with home testing, citing many benefits.

Next Generation Home Vision Assessment: a paediatric study

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Purpose: The Covid-19 pandemic impacted delivery of face-to-face healthcare worldwide.
Innovative solutions were required for clinicians, particularly in ophthalmology.
We investigated whether remote orthoptist-led home visual acuity (VA) testing, via a web-based platform, could be an alternative to face-to-face hospital VA testing.

Methods: Children with appointments between April and May 2021 at Birmingham Children's Hospital and NHS Forth Valley had VA tested at hospital, before repeating the test at home. Digital optotype logMAR targets (Tumbling E, Sloan letters, Kay Pictures) were screenshared to available digital device in the patient's home.
Orthoptists controlled stair-casing whilst observing children's responses, and co-operation.
Binocular and uniocular VA were measured; a subset undertook home testing twice for evaluation of repeatability. Results were compared via Bland-Altman analysis.

Results: 50 children (mean age 9.0 years, range 2.8 – 16.2years) completed hospital and home VA testing.

Both binocular and uniocular home vs hospital VA testing showed virtually no bias (binocular -0.004, 95% CI -0.06–0.05 logMAR, uniocular -0.004, 95% CI -0.04–0.03 logMAR), but wide upper and lower limits of agreement (binocular: 0.31 and -0.32 logMAR , uniocular -0.34 and 0.33 logMAR). Repeatability of home testing had a bias of 0.00, 95% CI -0.01-0.02).

Mean testing duration for hospital and home testing was 5 and 6 minutes respectively.
Children were compliant with home testing, clinicians were confident end points were reached and meaningful results obtained.

Conclusions: Orthoptic-led home VA testing via telemedicine is reliable enough to inform clinical decision-making. Clinicians reported ease of use, and preferable to parent-led solutions.

Dose-response relationship and treatment efficiency for gaming vs occlusion therapy for amblyopia

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Purpose: To compare dose-response rate and treatment efficiency between dichoptic video gaming using VR goggles and occlusion therapy in children with amblyopia.

Methods: In this RCT (NCT 03767985) newly diagnosed children with amblyopia were recruited. Visual Acuity (VA) was measured using crowded tumbling E-chart. After informed consent they were randomized to occlusion therapy: 2 hrs/day; or dichoptic video game therapy using VR goggles: 1 hr/wk under direct supervision. Mann-Whitney U test was used to investigate differences between groups.

Results: Ninety-four children were recruited; 29 subjects refused and 2 were excluded. After refractive adaptation, 23 subjects (24%) attained interocular VA<0.2 logMAR rendering them ineligible for the RCT; 7 terminated participation. Thirty-three were included; median age was 5.4yrs. Sixteen were treated with gaming; 9 (5.3yrs) dropped out and 7 (6.7yrs) completed treatment. Seventeen were treated with occlusion; 3 (4.5yrs) dropped out and 14 (5.1yrs) completed treatment. Reasons for drop-out in the gaming group were primarily due to young age and logistics. After 24 weeks of treatment median dose-response for gaming was 8.00h/0.1 logMAR VA gain; for occlusion 71.78h/0.1 logMAR. Treatment efficiency was 1.25 logMAR per 100 hours (range 0.42–2.08) with gaming and 0.08 (range -0.19–0.68) during occlusion ($p<0.001$).

Conclusions: Treatment efficiency and dose-response were better with gaming therapy compared to occlusion therapy after 24 weeks of treatment. However, majority of children, mostly young, failed to complete gaming therapy. Dichoptic gaming using VR goggles seems to be most suited for older children with anisometropic amblyopia in whom amblyopia persists after refractive adaptation.

Significant refractive error increases prevalent and incident childhood strabismus

Dr Felicia Adinanto[1], Dr Amanda French[1], Professor Kathryn Rose[1]
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This study aims to determine the impact of refractive error on prevalent and incident strabismus. The Sydney Childhood Eye Disease Studies involved comprehensive ocular assessments on a total of 7266 children ranging from 6 months to 17 years of age in Sydney, Australia. As part of these studies, 2090 children in two age cohorts, 6 and 12 years, received a 6-year follow-up examination at age 12 and 17 years.

Children were grouped into 7 age groups and overall, there was a significantly higher prevalence of strabismus in children aged 12 years (4.1%) and 17 years (4.3%) compared to the younger age groups (2.7-2.9%; p=0.03). In a multivariate analysis including age, gender, refractive error and ethnicity, children who were hyperopic (> +3.00D) or had anisometropia were at greater risk for all types of strabismus. Myopia (≤ -0.50D) increased the risk of developing strabismus (OR, 3.05; 95% CI 1.83-5.09) and exotropia (OR 3.92; 95% CI 2.13-7.22).

Longitudinal data of 895 children aged 6 years at the initial visit found 4.3% of children with hyperopia and 25% of children with myopia had developed intermittent exotropia upon follow-up examination, compared to only 1.3% of emmetropic children (p<.0001). In the older cohort, incident strabismus at 17 years was not associated with refractive error at age 12 years (p=0.91).

Intermittent exotropia appears to be strongly influenced by significant refractive errors at a young age. As the prevalence of myopia has been rising globally, there could also be subsequent increases in the prevalence of intermittent exotropia.

Theme: Neuro-ophthalmology
Time: 14:15-15:35

Profile and recovery of cranial nerve palsies due to stroke

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Purpose: Little is reported on the occurrence of cranial nerve palsies (CNP) following acute onset stroke. We report the profile of stroke survivors with CNP in a UK-based prospective epidemiology study.

Methods: Research ethical approval was obtained from the UK Health Research Authority. We recruited all adult stroke admissions admitted to three acute stroke units over a 15-month period. We obtained full documentation of stroke demographics and orthoptic assessments, including visual acuity, visual fields, visual perception, ocular alignment and motility, and binocular function. Descriptive quantitative analysis was undertaken.

Results: 1500 stroke admissions were collected over 15 months; 1204 survived and were assessed. 290 had ocular motility disorders; 39 had cranial nerve palsies (10 III-CNP, 8 IV-CNP, 14 VI-CNP and 7 combined CNP/gaze palsy). Mean age was 68.3 years (SD 15.7) with 38.5% female and 61.5% male. Stroke was due to infarct in 90% and haemorrhage for 10%. Mean stroke severity (Barthel score) was 13.6 (SD 5.5). CNPs often occurred with other visual impairments. CNP recovery was full for 11, partial for 17 and no recovery for 11. Average time to full recovery was 130.6 days (SD 111.8).

Conclusions: Overall incidence and prevalence of CNP in acute stroke survivors was 2.9% and 3.2% respectively and, in those with ocular motility deficits, was 12.1% and 13.5% respectively. One quarter fully recovered; the remainder required further management over a longer term. Despite a cerebrovascular cause for these CNPs, the recovery is significantly less than that expected with microvascular causes of CNP.

Non-invasive treatments for ocular cranial nerve palsy and neurological gaze disorders: A systematic review

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Aim: To systematically review and evaluate the evidence of the acceptability and efficacy of non-invasive treatments for ocular cranial nerve palsy and neurological gaze disorders.

Method: A systematic review was undertaken inclusive of randomised controlled trials, controlled trials, cohort studies, observational studies and case controlled studies. Case series and studies were excluded. Search terms included a range of terms relating to ocular motility conditions, ocular cranial nerve palsies, and non-invasive treatments for ocular motility conditions. Studies relating to convergence insufficiency as a result of neurological pathology were included.

Results: Of 25,813 results, nineteen articles were included in the overall review. The search revealed there are limited studies exploring the non-invasive treatments of ocular motility and neurological gaze disorders, and where the evidence is available, the numbers of patients included within the studies were typically small. It was also found that the non-invasive option of 'adopting a head posture' to eliminate diplopia has not been investigated as a treatment option within the literature. Orthoptic exercises for convergence insufficiency secondary to mild traumatic brain injury is supported within the literature.

Conclusion: This systematic review highlights the lack of high quality research investigating non-invasive treatment methods for ocular cranial nerve palsy and neurological gaze disorders. Further research is required for the acceptability of commonly used non-invasive treatments such as prisms, occlusion and head postures, and for the efficacy of treatments such as exercises.

An orthoptist-led Neurofibromatosis type 1 clinic: a cost-effective model of care

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Purpose: Optic pathway gliomas (OPG) develop in up to 20% of patients with Neurofibromatosis Type 1 (NF1) and can result in irreversible vision loss. Screening for an OPG is crucial for early detection and prompt intervention. At the Royal Children's Hospital (RCH) Melbourne, we introduced an orthoptist-led NF1 screening clinic as an alternative to a consultant-led model of care. A subsequent costing study was conducted, comparing orthoptist-led with consultant-led clinics for OPG screening of children with NF1.

Methods: This retrospective time and motion study examined individual patient flow through either consultant- or orthoptist-led OPG-screening clinics between June 2014 to October 2018. The time points between the patient seeing an orthoptist, a nurse, and an ophthalmologist, where applicable in each model, was converted into minutes and multiplied by the cost per minute for each profession.

Results: Patient data for 130 consultant-led and 234 orthoptist-led clinic appointments were available for analysis. The mean time per appointment for the consultant-led clinic was 45 minutes compared to 26 minutes for the orthoptist-led clinic. This represented a mean reduction of 19 minutes (95% CI: 14-25). Similarly, the mean cost per appointment for the orthoptist-led clinic compared favourably to the consultant-led clinic at AUD$20 and AUD$84 respectively. This represented a cost-saving of AUD$64 per appointment (95% CI: 52-75). No cases of OPGs were missed using the orthoptist-led model of care.

Conclusion: Compared to the consultant-led clinic, an orthoptist-led OPG screening clinic represents a time-efficient and lower-cost model of care.

Using eye-tracking technology as an objective measure of cognition in mild traumatic brain injury: A scoping review

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Purpose: Determine the utility of eye-tracking technology for the detection of cognitive impairment in patients with mild traumatic brain injury and survey the types of eye tracking tasks being used in the literature to assess cognition.
Background: Cognitive impairment is a common and debilitating symptom of mild traumatic brain injury. Despite this, there is no universally accepted protocol for assessment. Conventional neuropsychological assessment tools rely on verbal or manual responses. Current methods are influenced by extraneous factors such as stress, intelligence, and motivation, suggesting the need for more objective tools.

Methods: Six academic databases were searched for studies related to brain injury, eye tracking, and cognition. Data from nineteen articles were extracted and synthesized.

Results: In most cases, when neuropsychological methods detected cognitive impairment, the eye-tracking methods were in accordance. Interestingly, in many cases, eye tracking measures detected impairments when neuropsychological tasks did not. Eye tracking methods were also found to be unaffected by factors such as premorbid intelligence and post traumatic stress disorder whereas neuropsychological methods were heavily influenced.

Conclusions: This review suggests that eye tracking could provide an effective and objective method to detect cognitive impairment in mTBI.

Management of diplopia in adults with abnormal posture from neurodegenerative or skeletal causes.

Professor Gill Roper-Hall[1], Dr Rafif Ghadban[1], Dr Oscar Cruz[1]
[1]Saint Louis University Medical Center, St. Louis, United States

Introduction/Purpose: Adults with diplopia seen in a neuro-ophthalmology practice may have other comorbidities that interfere with standard management of strabismus. These include abnormal posture in Parkinson disease (PD), nuchal rigidity in Progressive Supranuclear Palsy (PSP), weakness in cervical musculature from demyelinating disease (MS), myasthenia gravis or stroke, kyphosis from osteoporosis, scoliosis, and restricted head mobility following cervical injuries or surgical fusion.

Methods: Patients with abnormal posture affecting subjective control of binocular vision were examined at our institution between Jan 2018 and March 2020. All underwent full ophthalmic and orthoptic evaluation. Direction and severity of head position and body posture were noted. Ocular deviations in default position were compared with primary gaze position.
Results: Fourteen patients (5 females and 9 males) were included. Age range was 49-84 (mean 76) reflecting mechanisms in older adults. Causes of abnormal posture included PD (5), nuchal rigidity in PSP (1), spinal or cervical disorders caused by spondylosis, osteogenesis imperfecta, osteomyelitis, osteoarthritis, cervical fusion or injury (5), kyphosis (2), MS (1).
Spectacle modification (8) and surgical correction (3) was effective. Neck support devices were ineffective and did not correct the diplopia.

Conclusions: These deformities pose clinical testing challenges when using a chin or head rest. Marked spinal curvature or limited neck flexion may interfere with intubation or obtaining a supine operating position. Patients with abnormal posture from neurodegenerative or skeletal causes combined with strabismus may require modifications in standard surgical or spectacle management to utilize the gaze direction with the least deviation and allow comfortable fusion.

Australian children with CVI - using what we know now to improve future approaches

Dr Sue Silveira[1], Natalia Kelly[2], Rosa Wright[1]
[1]Nextsense, Sydney, Australia, [2]La Trobe University, Melbourne, Australia

Purpose: Little has been reported on Australian children with Cerebral Vision Impairment (CVI). This paper aims to present the outcome of a data audit that focused on children with the primary diagnosis of CVI, using findings from the Australian Childhood Vision Impairment Register.

Methods: Records on 132 children (49% girls, 51% boys) provided by both the child's family and their eye health professional were reviewed. The child's demographics, birth history, secondary ocular diagnoses, co-morbidities and level of vision were analysed. The relationship between suspicion of vision loss and diagnosis was explored using Kendall's T coefficient.

Results: The majority of children were born full term (86%) children, with 85% of children weighing >2000gms. Two children met the International Newborn Standards classification for small for age; both of these children were born full term. 48% of children had a secondary ocular diagnosis with 44% having nystagmus; 85% of children had additional health problems and 80% of children had additional disabilities; and 39% of children were blind.

Children with more severe vision loss tended to be suspected earlier by their family. 80% of children were suspected of vision loss by their family within the first 6 months of life, however most (90%) were not diagnosed until their first birthday. Preterm children tended to be suspected of vision loss later than full term children.

Conclusion: While revealing valuable vision and health profiles, these findings demonstrate current shortfalls in detection, assessment and diagnosis of children with CVI in Australia.

Can Imaging of Temporal Raphe Orientation be helpful for Assessment of Ocular Torsion in Patients with Cranial Nerve Four Paresis?

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[1]Dalhousie University, Halifax, Canada, [2]IWK Health Centre, Halifax, Canada, [3]Department of Ophthalmology and Visual Sciences, Dalhousie University, Halifax, Canada

Background Strabismic deviations can be horizontal, vertical, cyclorotational, or a combination of all three. Previous literature has established the difference between subjective and traditional objective torsional angles; however, often there is a failure to consider the physiological position of a normal fovea-optic nerve head (ONH) relationship. Using the temporal raphe (TR) orientation has been suggested as a solution for this discrepancy.

Methods The current study, approved by IWK Health Center research ethics board was created to assess the viability of using the TR in assessment of ocular torsion as well as investigate the effect of the physiological position of the fundus. Subjective tests were compared to traditional fundus photographs and novel TR scans in patients with long-standing unilateral fourth nerve palsies.

Results Results found no differences between subjective and objective angles when considering the physiological fundus position and that TR angles were not comparable to other torsional testing methods.

Conclusion Therefore, it was concluded that the physiological position should be considered when determining the true amount of abnormal fundus torsion. As well, we found no significant value to using TR imaging by optical coherence tomography compared to the traditional fovea–ONH relationship by fundus photography to assess ocular torsion.

Theme: Education session
Time: 16:00-17:00

Tackling Clinical Placement Shortages through Equitable Allocation: A National Scheme

Dr Sonia Toor[1], Claudine Wallace[2], Leena Patel[3], Craig Murray[4], Joanne Adeoye[4]
[1]The University of Sheffield, Sheffield, United Kingdom, [2]Glasgow Caledonian University, Glasgow, United Kingdom, [3]University College London, London, United Kingdom, [4]The University of Liverpool, Liverpool, United Kingdom

Purpose: There has been a historical shortage in Orthoptic placement provision in the UK. The National Equitable Allocation Scheme (NEAS) was introduced to achieve a sustainable placement model to support the education of undergraduate Orthoptic students and to maintain and increase growth in the future Orthoptic profession.

Methods: The Universities providing the Orthoptics degree have taken a collaborative approach. Equitable allocation is based upon the following formula: number of placements required (+10%)/whole time equivalent (WTE) of all placement staff. The formula produced a ratio of 1.1 placements/WTE as the benchmark. This ratio was increased to 1.51 in 2020/21 to accommodate increasing student numbers.

Results: Prior to the launch of the NEAS, there was spare capacity of just 29 placements with a deviation of 128 placements from the benchmark mean 1.2 (SD5.6; range +26 to -23). 31% of sites were over providing and 53% underproviding. Improvements in placement capacity were seen each year, rising to 99 spare placements in 2019/20 (269% increase). The deviation from the benchmark, reached equity at 0 in 2019/20 (mean 0; SD2.5; range +6 to -8). The NEAS enabled increased intakes on the established degree courses and the launch of a new Orthoptics degree course in 2021. An evaluation revealed that 96% of clinical tutors agreed that the NEAS is a fair scheme.

Conclusions: There was a significant increase in orthoptic clinical placement capacity with the launch of the NEAS. The scheme achieved the overall aim of equity with positive support and feedback from clinical tutors.

Students' perception of e-lectures from the undergraduate orthoptics programme

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Purpose: Technology in higher education has rapidly developed, increasing student satisfaction, improving academic performance and developing communication and team-building skills. Observations of infrequently accessed e-Lectures alongside mixed student feedback within the orthoptics programme suggest that research is required to capture the views of this specific cohort to inform the use of e-lectures.

Methods: A focus group was completed in May 2019, comprising 8 participants across the 3 years of the orthoptics programme at the University of Liverpool. Institutional ethical approval was sought. A topic guide was developed to direct the discussion. Audio recordings from the 58-minute focus group underwent transcription, and the transcript was thematically analysed by the two facilitators.

Results: Students' perceptions of e-lectures generally coalesced with their expectations and perceptions of higher education. E-lectures were perceived to be less relevant and lower priority than face-to-face teaching. Perceived facilitators to engagement included optimal topics, structure and timing of the e-lectures and familiarity of educators, whilst barriers considered technical issues, and the loss socialising and peer learning. The perception of "value for money" and the impact of this expectation regarding e-lectures was also discussed.

Conclusions: The findings from this research allowed for changes to facilitate better engagement with e-lectures. Necessary adjustments are required to alter the perception that e-lectures are low priority, including providing support tutorials and additional resources, "attendance" monitoring, limiting the length of the e-lectures and communicating the educators' expectations. The findings from this research raise awareness of student's perceptions to e-learning which have otherwise not been published.

Impact of the Placement Expansion Resource Library (PERL) for pre-registration Orthoptic students in the UK.

Karzan Hughes[1], Craig Murray[2], Anne Bjerre[1], Joanne Adeoye[2], Dr Sonia Toor[1], Claudine Wallace[3], Leena Patel[4], Professor Helen Davis[1]
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Introduction: Rising student numbers in response to workforce needs and impact of the Covid-19 pandemic has put increasing pressure on the provision of practice-based learning within UK pre-registration Orthoptic programmes. The Placement Expansion Resource Library (PERL) was developed to provide recordings of patient consultations captured using the Hololens2 (Microsoft) device, and additional case-based resources. The purpose is to evaluate the use of this resource within higher education settings to explore the impact it has on student learning and experience.

Method: A cross-sectional, anonymised survey was conducted with Orthoptic students enrolled at four pre-registration programmes across the UK. Further, an online survey relating to the impact of PERL on student education was undertaken by Orthoptic lecturers. The two surveys examined the use of PERL, self-reported clinical and theoretical knowledge of students, and overall learning experience.

Results: Preliminary results of 8 respondents showed that PERL improved self-reported, student clinical knowledge (88%) in a classroom-based setting. Self-reported improvements in clinical knowledge were less evident as a self-directed learning resource (63%). All students (n=8) and lecturers (n=2) reported that learning resources containing video content were preferable over non-video content.

Conclusions: This preliminary survey evaluated the use of a novel, online resource for providing authentic practice-based learning to Orthoptic students across the UK. The survey highlights the positive impact of PERL on student learning experience and the preferred format of learning resources, which will be helpful for the future development of PERL.

Peer Enhanced e-Placement - an effective alternative to traditional clinical placements

Dr Sonia Toor[1], Deborah Lewis[2], Dr Gail Maconachie[1], Professor Helen Davis[1]
[1]The University of Sheffield, Sheffield, United Kingdom, [2]Royal Hallamshire Hospital, Sheffield, United Kingdom

Purpose: An assessed Peer Enhanced e-Placement (PEEP) was introduced as an alternative to traditional clinical placements during the Covid-19 pandemic. This study provides a comparison of marks achieved by the PEEP and traditional placement to determine its effectiveness as a suitable alternative.

Methods: Second year Orthoptic students at the University of Sheffield undertake 3 four-week clinical placements (placement 4, 5 and 6). Placement 5 was reconfigured to a two-week clinical placement with the other two weeks replaced by a PEEP, arranged by Orthoptists at the Royal Hallamshire Hospital in Sheffield. Individual and group work activities took place to guide the students to achieving the placement learning outcomes. Half the students completed the PEEP first and half completed the traditional placement first. Both parts of the placement were scored out of 10.

Results: Thirty-four students completed the placement. The mean PEEP mark (7.06 ±1.53; range 4-10) was not statistically different from the mean traditional placement mark (6.63 ±1.72; range 4-10). If the overall mark was calculated with a 50% weighting for each part, then the overall mark (6.85 ±1.39) was not statistically different from the previous academic year placement 5 mark (7.13 ±1.63). Although those that completed the PEEP first had a higher overall placement mark (7.04 ±1.59 vs 6.71 ±1.25), this difference was not statistically significant.

Conclusions: A PEEP is an effective and fair alternative to traditional clinical placements and reduces the pressures associated with clinical placement capacity.

Interactive Poster session 1
Time: 17:15-18:00
Alphabetical by presenting author

Using Role Playing for Educating to inter-professional work team

Anna Barducco[1], Silvia Mancioppi[1], Alice Parisi[1], Professor Francesco Parmeggiani[1]
[1]Orthoptic and Ophthalmologic Assistance Degree Course, University of Ferrara, Ferrara, Italy

Purpose: WHO together with the scientific community deeply believe in the importance of the interprofessional education-IPE and its crucial role in the academic education, becoming a fundamental part of the university curriculum. As College of Orthoptics, we support this line of thought and have decided to develop an IPE project, as role play, through our Athenaeum's Rehabilitation Degree Courses.

Methods: Time: Third Year Spring Semester (a.y. 2020-21).
Sample: 36 third year students, randomly selected from Rehabilitation Degree Courses (speech therapy, psychiatric rehabilitation technician, orthoptics and physiotherapy), divided into 3 homogeneous groups.
Development: Preliminary meeting: one student representative for each degree course explains their professional skills and tutors introduce the clinical case.
Group work: cooperating, subject to their knowledge, students plan the rehabilitation.
Role Play: decided the characters (professionals, patient, two family caregivers, observers), one group at the time, the rehabilitation plan is shared with patient and caregivers as in the office.
Completed the three sessions all the students filled out the IPE project satisfaction questionnaire
(Score: 1-5 Likert Scale).

Results: Questionnaire results are grouped in 6 macro-areas and presented as percentage average of maximum score (5) of the evaluation scale:
Environments-materials-preliminary information's suitability: 57%
Eligibility of the time dedicated to the project: 51%,
Teamwork: 74%
Effectiveness of the methodology: 75%,
Internship relevance and future applicability: 57%,

Project overall evaluation: 85%.

Conclusion: This IPE project confirms WHO position therefore the need to insert and commit more time and introduce new forms of learning and new interprofessional opportunities in the core curriculum.

The accommodation response in anisometropic amblyopes measured using Nott dynamic retinoscopy

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Purpose: Accommodation in anisometropes is considered to be a symmetrical process. However, recent research using the PlusoptiX photorefractor has identified 81% have asymmetrical accommodation: 58% with aniso-accommodation and 23% with anti-accommodation, where the sound eye accommodates appropriately whilst the amblyopic eye accommodates more for distance fixation. This study aimed to investigate if anti-accommodation could be identified using Nott dynamic retinoscopy (DR).

Methods: Anisometropic amblyopes, aged 5-10 years, watched a cartoon, with both eyes open, at 0.33m, 0.5m and 1m, with and without glasses. The accommodative response was measuring using Nott DR.

Results: Twenty-one anisometropes had resolved and five had residual amblyopia. Measurements without glasses was used to determine the type of accommodation response. 81% of resolved amblyopes and 80% of residual amblyopes had aniso-accommodation. No participants demonstrated anti-accommodation.

Without glasses, there was no significant difference in mean gain between the amblyopic eye of the resolved (0.66±0.55) and residual (0.28±0.54) amblyopes. However, there was a close to significant difference between the sound eye (resolved, 0.89±0.50; residual 0.41±0.40).

At 33cm with glasses, the residual amblyopes (1.04±1.03D) had a significantly greater lag of accommodation in the sound eye than the resolved amblyopes (0.00±0.84D). In the amblyopic eyes, there was no significant difference in lag between the resolved (0.87±1.18D) and residual amblyopes (1.47±1.07D).

Conclusions: Anti-accommodation was not identified using Nott DR but the majority of anisometropic amblyopes had aniso-accommodation. There was a greater accommodative lag in the sound eye of residual amblyopes than resolved amblyopes, although there was no difference between the amblyopic eyes.

The Erasmus+ mobility programme at the Lisbon School of Health Technology: Characteristics and motivations of participants from 2009-2019

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Purpose: The Erasmus+ programme, with over 4 million participants, aims to promote intercultural communication and cooperation and the development of higher education at a European level. The participation rates by Science and Technology students are low in Portugal and across Europe. Therefore, it is important to analyse the profile of these students.
This poster aims to:
- characterise the participants in mobility programmes at the Lisbon School of Health Technology between 2009 and 2019.
- To understand the motivations of incoming students and to determine the overall satisfaction with the mobility experiences.

Method: a descriptive study, using a questionnaire survey using closed questions on a Likert scale, to determine the motivations of incoming students to ESTeSL, the quality of support services, teaching, facilities, and overall satisfaction with the academic and personal experience.

Results: During the 10-year period studied, 66 students (71.2% female and 28.8% male), aged between 20 and 28 (22.33 ± 1.56) participated in mobility programmes at ESTeSL.

62.5% of survey respondents chose ESTeSL based on module choices.
54.5% of respondents were satisfied with the academic and personal experience, and 87.9% of respondents found the global experience very satisfactory.

Conclusions: The typical mobility participant profile at ESTeSL was female, under 25 years old, agreeing with the current literature around mobility student profiles. Module choice motivated incoming students to choose ESTeSL, other authors citing factors such as personal development, linguistic competencies, and living abroad as motivations for mobility students. The global experience for participants at ESTeSL was positive.

Esotropia, Proptosis and Chemosis: Primary Presentation of an Orbital Mass

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Purpose: We report on the case of an eighty-one year old female patient presenting with recent onset painless diplopia associated with esotropia, proptosis and chemosis.

Methods: Retrospective case report including the clinical Orthoptic and Ophthalmic findings, radiographic and biopsy results.

Results: An eighty-one year old female presented to the district general hospital ophthalmology service with three month history of diplopia and a four week history of left eye redness. Orthoptic examination revealed left eye proptosis, esotropia with diplopia and limited left abduction. Ophthalmic examination showed chemosis of the left eye, with tortuous epi-scleral vessels. Magnetic resonance imaging (MRI) revealed a large diffuse mass arising from the left lateral rectus with globe displacement, suggestive of lymphoma. A biopsy was taken from the left lateral rectus.

Conclusions: This case presented with left eye proptosis, a moderate limitation of abduction and localised chemosis on the lateral aspect of the left eye. These findings, in combination with the prism cover test measurements the presentation did not correlate with the typical features of a sixth nerve palsy, leading to neuro-imaging. MRI findings localised an orbital mass arising from the left lateral rectus. Orbital lymphoma is the most common primary orbital malignancy in the elderly, usually presenting with painless proptosis and ocular motility deficit. It is important to give early consideration to lymphoma within the differential diagnosis as prompt treatment can prevent irreversible visual loss and reduce morbidity.

Acquired pendular nystagmus in Multiple Sclerosis (MS)- case review of pharmacological treatment of five patients.

Francesca Lynch[1], Karen Knowles, Valerie Trimble
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Purpose: A review of different pharmacological treatments of five patients with acquired pendular nystagmus attending the Orthoptic clinic in the Multiple Sclerosis (MS) Multi-Disciplinary Team Neurology clinic at The Walton Centre, Liverpool UK.

Method: The aim of the study was to review the visual outcomes both subjectively via reported changes to oscillopsia symptoms and objectively via recording of visual acuity (VA) levels pre and post medication related to the most current evidence. The rationale for the medication selected is also discussed.

Case Reviews:
case 1-
case 2-
case 3-
case 4-
case 5-

Conclusion: The ‘off licence’ use of either high dose gabapentin or memantine is well documented as a pharmacological treatment choice for acquired pendular nystagmus in multiple sclerosis patients (5-8). Other studies have also compared the combined use of both Memantine and Gabapentin. (9,10) However, these studies looked at outcomes in congenital nystagmus, not acquired pendular nystagmus, making it difficult reliably review the management of such a such cases. Some suggests a benefit of combination of treatment in acquired cases thus warrants further study of the combined use of these pharmacological treatments particularly in MS patients.

On line diploma course for Healthcare Science Associates in Ophthalmic and Vision Science

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Purpose: expanding demand for diagnostics, rapidly changing technology and new techniques require a level of understanding of the equipment and the disease process being investigated. Ophthalmic assistants have a career path within Healthcare Science, part of the physiological sciences division of NHS careers, with the specialism of Ophthalmic and Vision Science (OVS).

Method: The Association of Health Professions in Ophthalmology (AHPO) provides an on line course for ophthalmic healthcare science associates to achieve a level 4 BTEC diploma in OVS. Course material has been designed and written to provide the knowledge, skills and behaviours required for the role. There are 10 generic and 11 bespoke modules with on line books and learning resources. Pearson is the organisation responsible for awarding the diploma and quality assuring AHPO's delivery of education and training. Each learner whether part of an apprenticeship or as an individual, has an on site mentor and external assessor. The mentor carries out work place assessments of behavioural and clinical competencies.

Assessors mark assignments and perform direct observation and oral questioning of the core skills in visual acuity, visual field, imaging and optical prescriptions assessment and administering eye drops. The 24 month course requires protected off the job training time of 7 hours per week.

Conclusion: this is the first national BTEC qualification and apprenticeship for healthcare science associates in Ophthalmic and Vision Science. It provides a national standard for the delivery of diagnostics and quality assurance for patients accessing ophthalmic services.

Perceptions of online teaching in the academic community at a higher education health institution

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Purpose: Faced with the COVID-19 pandemic situation, higher education institutions needed to adapt, moving from face-to-face teaching to distance learning online. The aims is to analyze the perception of the academic community in a higher education health institution (students' and lecturers` perception; and lecturers' perception of students) in the face of transition, emotional states and visual changes.

Methods: Descriptive research, with the application of online questionnaires translated and adapted from the Aguilera-Hermida, between April and June 2021, using SPSS26. A significance level of 0.05% was considered. Ethical and legal guidelines were followed.

Results: 590 responses (517 students, 73 teachers).
84.3% (n=436) of students were female, and 81% (n=419) were between 18 and 22 years old.
62.5% (n=45) of male teachers and 72.2% (n=52) were between 41-60 years. 69.7% of the total sample (n=411) preferred face-to-face teaching.
74.8% (n=353) of students and 47.3% (n=34) of lecturers felt greater difficulties adapting to practical teaching.
47.4% of students (n=245) and 55.6% of teachers (n=40) said they were more satisfied with theoretical classes than with practical classes.
Tired, burning, heavy eyes and headaches increased by 71.3%, n=174 in students and 48.6%, n=33 in teachers. Stress increased (78.3%, n= 405 in students, 62.5%, n= 45 in teachers) and anxiety increased in students (73.1%, n= 378) but remained stable in lecturers 44.4% (n= = 32).

Conclusion: Students and teachers were dissatisfied with distance learning, especially in practical classes, with an intensification of negative emotional states, decreased motivation and academic skills and a preference for face-to-face teaching.

Ophthalmic Side Effects of Immunosuppressant Drugs

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Purpose/Aim: To present a complex dermatology case presenting with ophthalmic signs, as a possible side effect of immunosuppressive drugs.

Methods: Timeline review 67 year old male who presented to dermatology, with chronic plaque psoriasis treated with a range of immunosuppressant drugs. Additional literature search was conducted to determine the prevalence.

Results: June 2014 was commenced on anti TNF injectable Adalimumab. Oct 2014 presented to orthoptics with new onset diplopia of 4 week duration. Diagnosed Left 6th CN palsy; Oct 2014 dermatitis flare, reported as an adverse drug reaction to Adalimumab. March 2016 discharged to own optometrist for prismatic incorporation. Adalimumab stopped Feb 18. May 18, re-referral to orthoptics marked increase in diplopia, no deterioration in motility. June 18 commenced on oral retinoid, Acitretin. June 18 diplopia increased developed marked upper limb tremor, with weakness in LUL and horizontal nystagmus on side gaze. MRI scan showed clear of de-myelination or vascular incident concurrent with 6th nerve region.
Feb 19 patient reported headache, developed vertical deviation and vertical nystagmus. Referred for further MRI Oct 19; referred for bloods for consideration of other autoimmune diseases. Side effects of anti TNFα therapy well documented in literature, (Kaltsonoudis et al (2014)). There is limited literature exploring the side effects of stopping anti TNFα, patients often swapped from one form to another.

Conclusion: Case review highlights need for further investigation into ophthalmic side effects of stopping anti TNF α therapy. Orthoptists should be aware of effects of disease modifying drugs.

Do families prefer gaming to patching? A qualitative study on experiences and preferences with amblyopia treatment.

Emily Tan[1], Aveen Kadhum[1], Annemieke Treur[2], Marieke Telleman[1], Janna Bruijning[2], Maurits Joosse[3], Professor Huibert Simonsz[1], Dr Sjoukje Loudon[1]
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Purpose: To explore parents' experiences and preferences with dichoptic action video gaming or patching as amblyopia treatment. In addition, information needs from parents to support patient participation in clinical decision making was investigated.

Methods: A qualitative study using semi-structured interviews was carried out in purposively selected parents whose children participated in a RCT (NCT 03767985) comparing the effect of dichoptic action video gaming using VR goggles at the out-patient clinic with patching therapy. The interviews were audio-recorded and transcribed verbatim. The data were analyzed thematically using Braun and Clarke's approach.

Results: So far, parents of 10 children have been interviewed. Three themes have emerged from the data in both the gaming and patching group: 1) misunderstanding the diagnosis of amblyopia and the role of refractive correction in its treatment; 2) the need to establish a routine and 3) the influence of the child's age on explaining the need for treatment and participation with treatment. In the gaming group, parents reported the feeling of not being responsible for carrying out treatment themselves as a positive element. In the patching group parents experienced the treatment as flexible and easy to understand. In both groups, parents reported the efficiency and effect of treatment as main reasons for choosing the type of amblyopia therapy. Most parents prefer to leave the decision up to the professional.

Conclusions: Despite the differences in treatment experience, efficiency and effectiveness of treatment are the most important aspects when deciding the type of amblyopia therapy for parents.

A case report: Isolated fourth nerve associated with Herpes Zoster Ophthalmicus

Farah Virani[1], Genevieve Larkin[1]
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Purpose: We report a rare finding of an isolated left fourth nerve palsy associated with Herpes Zoster Ophthalmicus (HZO), giving an overview of the investigation and treatment plan.

Method: Retrospective case report

Results: A 70-year-old woman; who presented at a tertiary hospital; with sudden onset reduced left visual acuity found to have herpes simple keratitis of the left eye. Subsequently, she suffered from HZO; which localised to a rash on the left side of her face. She later developed vertical diplopia and a severe headache found to be caused by an isolated fourth nerve palsy as evidenced by the neuro-ophthalmological tests. Reduced corneal sensation suggested involvement of the ophthalmic branch of the trigeminal nerve.

Conclusion: Literature rarely reports isolated fourth nerve palsies in conjunction with HZO. The underlying causal mechanism of nerve palsies in HZO is not clearly understood. Therefore, a full ocular motility examination should be conducted in the event of HZO to aid treatment.

Theme: Screening Part 2 (Vision & Strabismus)
Time: 18:15-19:15

Availability of data for cost-effectiveness comparison of paediatric vision screening programmes in all countries in Europe

Professor Huibert Simonsz[1], Jan Kik[1], Dr Eveline Heijnsdijk[1], Professor Anna Horwood, Professor Maria Fronius, Dr Jill Carlton
[1]*Erasmus Medical Center, Rotterdam, Netherlands*

Background: Vision screening programmes in Europe are diverse. When methods and data of these programmes were known, their cost-effectiveness could be compared. We assessed the current state of data collection and its availability.

Methods: In the EUSCREEN Survey representatives of 42 European countries provided data on demography, existing screening programmes, coverage and attendance, screening tests, follow-up, diagnosis, treatment, benefit and adverse effect of screening. Software was developed to calculate the cost-effectiveness of screening programmes (miscan.euscreen.org). By sensitivity analysis 6 items essential for cost-effectiveness analysis were identified: prevalence, sensitivity, specificity, coverage, attendance, loss to follow-up. Five others: age at screening, screening test, test threshold, screening professional and costs are determined in the screening protocol or can be calculated.

Results: Data was obtained from all but two countries in Europe and Israel and Turkey. The practice of data collection was reported in 36% (N=42) of countries; collected data were published in 10%. Procedures for quality assurance in vision screening were reported in 19%, research of screening effectiveness in 43%, whereas cost-effectiveness analysis was performed in 12%. Data on prevalence of amblyopia were reported in 40% of countries, on sensitivity of screening tests in 17%, on their specificity in 19%, on coverage of screening in 45%, on attendance in 21% and on loss to follow-up in 12%.

Conclusions: Data collection in vision screening programmes is poor: data essential for cost-effectiveness comparison could not be reported from most countries. The resulting inability to compare cost-effectiveness of screening programmes perpetuates their diversity and inefficiency.

Photoscreening vs Visual Acuity Screening. Marginal benefit vs much higher costs

Professor Anna Horwood[1], Dr Eveline Heijnsdijk[2], Dr Jan Kik[2], Dr Frea Sloot[2], Dr Jill Carlton[3], Dr Helen Griffiths[3], Professor Huibert Simonsz[2]
[1]*University of Reading, Reading, United Kingdom,* [2]*Erasmus Medical Centre, Rotterdam, The Netherlands,* [3]*University of Sheffield, Sheffield, UK*

Purpose/Background: Vision screening in children is recommended to detect low vision acuity (VA) and amblyopia within the critical period. Photoscreening is possible with younger children and detects amblyopia risk factors. It is an apparently low-cost, low-expertise option compared to expert VA screening.

Methods: The multi-million Euro EUSCREEN study used data from 40+ countries, literature reviews, and interactive cost-effectiveness modelling to establish the optimal population-level screening mode in children under 7 years. This presentation demonstrates models of long-term costs of different screening models.

Results: Photoscreening increases referral rates and referrals become a mixture of reduced VA and refractive risk factors for that reduced vision. It is much less sensitive and specific for amblyopia and low vision than VA screening at 4-5 years. Earlier, less precise referrals, longer treatment times and correction of modest refractive errors in non-amblyopic children increase costs dramatically for marginal public health benefit. Multiple testing and adding photoscreening to an established VA screening service, especially if treatment is given by ophthalmologists, can be x8 more expensive.

Conclusions: Refractive error alone does not fulfil as many WHO criteria for a screenable condition. Decision-makers need to clearly identify their target conditions and evaluate different models of screening delivery in their national context. Photoscreening changes the target condition for vision screening from amblyopia and low vision, to include refractive error. Public health outcomes may only be marginally better in terms of final visual acuity, and developmental advantages of early spectacles are unclear. There is currently limited evidence that photoscreening is cost-effective.

Evaluation of a new method to test visual acuity remotely.

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Purpose: To determine if visual acuity (VA) tested remotely using the modified iSight Professional app is repeatable and comparable to measuring VA in person.

Methods: Right VA was measured twice, both remotely and in-person, using the iSight Professional app, with participants wearing refractive correction. Single letters were presented within a crowding box at 1.5m. For remote testing the examiner screen-shared the app to participants' smartphones, calibrated the presentation before testing using a modification added to the app and monitored participants using a synchronous video call. The conventional iSight Professional app was used for in-person testing.

Results: Thirty-six participants were tested (29 female; 5 male). Mean age was 21 +/-3.8 (SD) years (range 18-35 years). Mean remote VA was -0.04 +/-0.09 logMAR and -0.04 +/-0.10 logMAR for first and second assessment respectively. Mean in-person VA was -0.14 +/-0.07 logMAR and -0.16 +/-0.07 logMAR for first and second assessment respectively. In-person VA was significantly better than remote VA ($p<0.0001$) but there was no significant difference between first and second VA, using either method ($p>0.05$). Test-retest variability was within 0.10 logMAR for remote VA and 0.12 logMAR for in-person VA. The coefficient of agreement between the two methods was within 0.20 logMAR.

Conclusion: Testing VA remotely, using the modified iSight Professional app, and in-person, was repeatable. In-person VA was slightly better than remote VA, but there was good agreement between the methods.

A Systematic Review of Clinical Practice Guidelines for Strabismus

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Background: The World Health Organisation's (WHO) report on vision recommendations, included the development of a Package of Eye Care Interventions (PECI) to facilitate the integration of eye care into Universal Health Coverage. The identification of evidence-based eye care interventions from relevant clinical practice guidelines (CPGs) is a critical step in the development of the WHO's package of interventions.

Purpose: To systematically review and critically appraise CPGs and summarise the recommendations for strabismus.
Methods: CPGs published related to strabismus between 2010 and 2020 were reviewed, evaluated, and selected using nine items from the Appraisal of Guidelines for Research and Evaluation (AGREE) II tool. CPGs with an average score for items 4, 7, 8, 12, or 22 below 3 and/or a sum of the two researchers' average score for all nine items less than 45 were excluded. Two authors independently extracted and validated the data using standardised forms.
Results:

A total of 45 potential CPG's were identified following a systematic literature search. Application of the AGREE II tool excluded all but 5 CPG's due to failure to meet the required criteria and score. Valid and robust CPG's in the field of strabismus were identified in the areas of paediatric eye and vision examination, vision screening, treatment for Graves' orbitopathy and use of fibrin glue for conjunctival closure in strabismus surgery.
Conclusion:

There is a lack of high quality CPG's in the area of strabismus management with many failing to meet basic criteria which ensures their independence and lack of bias.

Current practice, challenges and facilitators in screening for visual perception deficits after stroke

Dr Kathleen Vancleef[1,2], Michael J Colwell[2], Professor Nele Demeyere[2], Dr Olivia Hewitt[2,3]
[1]Durham University, United Kingdom, [2]University of Oxford, United Kingdom, [3]University of Warwick, United Kingdom

Purpose: We aimed to document current clinical practice and needs in screening for visual perception problems shortly after stroke.

Methods: In a mixed methods design, we explore the issues in-depth through qualitative interviews with 12 occupational therapists and 13 orthoptists. Subsequently, we investigated generalisability of our findings in a survey that was completed by 168 occupational therapists and 41 orthoptists involved in visual perception screening after stroke.

Results: Participants' understanding of visual perception varied greatly: 40% of orthoptists in our survey classified sensory visual deficits as visual perceptual deficits. Interview participants reported that screening generally occurs during functional assessments and/or with in-house developed tools. The survey confirmed that most orthoptists screen by interviewing (80%) or observing (68%) the stroke survivor and only occasionally use assessments (23%). Challenges to practice reported in our interviews were: lack of time and training, environmental and stroke survivor factors (e.g. alertness), insufficient continuation of care, and test characteristics. Our survey participants rated the following as most important: stroke survivor factors (mean on 1-5 scale: 3.56), lack of time (3.34), lack of training (3.31) and guidance on rehabilitation (3.31).

Conclusions: Our service evaluation demonstrated varied understanding of visual perception problems after stroke and a clear training need. Most stroke survivors are screened through subjective methods such as interview and observations. Our data suggest that current practice would benefit from performance-based visual perception tools that are accessible for all stroke survivors, quick to administer, require no specialised training, and include rehabilitation guidance.

Oxford Visual Perception Screen, a new screening tool for visual perception deficits

Dr Kathleen Vancleef[1,2], Xiaotong Ding[2], Sam Webb[2], Dr Federica Guazzo[2], Professor Nele Demeyere[2]
[1]Durham University, United Kingdom, [2]University of Oxford, United Kingdom

Purpose: Visual perception deficits are difficulties with interpreting visual information following a brain injury, for example difficulties with recognising objects, faces, or letters. The Oxford Visual Perception Screen (OxVPS) is a short and easy-to-use screening tool for such problems. Our aims were: 1) to collect normative data and establish cut-off scores for normal performance on OxVPS; 2) to evaluate the diagnostic accuracy of OxVPS.

Methods: Normative data on OxVPS were collected from 80 people without neurological or psychiatric conditions. In the diagnostic accuracy study, 24 stroke survivors completed OxVPS and a gold standard visual perception test (Visual Object and Space Perception). In both studies, we documented sensory visual impairments as a potential confounding variable.

Results: Median performance of healthy volunteers was at least 80% on all tasks except for the Face Recognition task (60%). The median 5th percentile cut-off score over all tasks was 80% with an outlier for the Face Recognition task (38%). This indicates people without visual perception deficits find most OxVPS tasks easy. The diagnostic accuracy study showed that OxVPS correctly identified 85% of the patients with visual perception deficits as diagnosed with the gold standard (sensitivity) and correctly categorised 95% of the patients without such deficits (specificity).

Conclusions: OxVPS has empirically established cut-off scores and high levels of sensitivity and specificity in detecting visual perception difficulties after stroke. After a revision of the face recognition task with poor performance by healthy volunteers, OxVPS can be a suitable screening tool for visual perception deficits after stroke.

Theme: Stroke
Time: 8:30-10:05

The sociology of post-stroke vision impairments, and the associated health inequalities

Dr Kerry Hanna[1], Dr David Mercer[1], Professor Fiona Rowe[1]
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Purpose: Inequalities exist within the visually impaired stroke population on an individual level, relating to transport, employment and financial repercussions. Exploring the long-term impact of living with post-stroke visual impairments will identify complications accessing NHS services, informing possible changes to service planning and delivery. The aim of this qualitative research was to explore health inequalities within visually impaired stroke survivors in the North-West of England, and discuss potential solutions.

Methods: Focus groups and interviews were conducted between October 2016 and January 2017. Transcription and inductive thematic analysis of the transcripts was undertaken, using line-by-line coding, underpinned with Social Constructionism.

Results: Two semi-structured focus groups and five in-depth interviews (n=13 stroke survivors and n=1 spouse) were conducted. The findings draw on respondents' lived experiences from pre-stroke to life after stroke. The overarching experience that emerged was constructed in terms of 'loss', concerning the physical being, the psychosocial being and the systematic organisation of healthcare, with physical losses, such as driving and employment, subsequently impacting on the loss of the respondents' psychosocial being and self-identities.

Conclusions: Visually-impaired stroke survivors frequently report a complete lack of orthoptic care, often resonating power imbalance in the healthcare system. Where orthoptic care is being offered after stroke, a desire for person-centred rehabilitation featured strongly in the accounts. The findings from this research highlight the longer-term implications of vision impairments, beyond those collected in the clinic setting, emphasising a need to inform and educate orthoptists of the support available to patients following hospital discharge.

The experience of vision impairment among stroke survivors in NSW

Shanelle Sorbello[1], Dr Amanda French[1], Professor Fiona Rowe[2], Professor Kathryn Rose[1]
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Purpose: Describe the experiences of stroke survivors with post-stroke visual impairments in NSW and determine if their vision needs are being met by current care practices and pathways.

Methods: Semi-structured interviews were conducted with stroke survivors and their carers residing in NSW at the time of their stroke and who were aged over 18 years at time of interview. Inclusion criteria was the presence of any visual impairment post-stroke. NVivo12 was used for thematic analysis of interview transcripts.

Results: 21 stroke survivors aged 17-84 years at time of stroke were included. Mean duration from last stroke to interview was 4.7 years. The majority of participants lived in major cities (71%) and 29% in regional or remote areas of NSW. Five major themes emerged: gaps in formal vision care, limited information, mixed feelings towards care, barriers to vision care, and impact on daily life. Barriers were identified in the areas of access to care, delayed diagnosis, health professionals that were unsupportive or lacked vision-specific training, and inability to access vision care due to other stroke-related deficits.

Conclusion: Stroke survivors with visual impairment in NSW often felt that their vision care needs were not adequately met during their recovery. Barriers to successful vision care stemmed from a lack of awareness and understanding of post-stroke vision problems among both the general population and stroke care professionals. This resulted in inappropriate or no information given, poor referral and support for visual rehabilitation. Post-stroke vision pathways need to be refined to better address care needs.

Applying "Plan, do, study act" to a service-enhancement; initiating and sustaining a specialist orthoptic post stroke vision service.

Elizabeth Lomas[1]
[1]*Royal stoke university hospital, Stoke-on-Trent, United Kingdom*

Purpose: This project was an opportunity to apply a "Plan, Do, Study, Act" tool, recognising need for change and initiating service-enhancement to improve quality of care. Using this tool allowed the barriers and facilitators of change to be examined.

Methods: A systematic literature review underpinned this project: descriptive synthesis of 23 articles suggested post stroke visual impairment has a significant impact on patients. Orthoptic led-interventions have been shown to reduce this impact. Small-scale specialist post stroke vision service cycles were planned to ascertain the impact on patient experience, determined by Quality of Life questionnaires and reading assessment. No ethical approval was required as the intervention represented normal clinical practice.

Results: 3 cycles were planned and 1 completed; follow-up data was collected for 3 patients, although the findings were inconclusive, inferences were made. Several themes represented substantial barriers, principally limited resources due to lack of commissioning, ineffective multi-disciplinary team integration and leadership.

Conclusions: Reflection on the factors that influenced success or represented barriers during this project allow some recommendations that could contribute to effective change in this area to be made. In this context the unmet-need was substantial, understanding these factors is relevant to rectify this.

Substantial opportunities for future work to support the commissioning of Specialist Orthoptic Post Stroke Services include; robust qualitative and quantitative work to determine the impact of post stroke visual impairment and Orthoptic-led interventions in varied post stroke visual impairment, particularly the working-age cohort, in addition to determining the impact on the health economy.

Rate of stroke referrals to orthoptics, before, during and after the Impact of Visual Impairment following Stroke (IVIS) study

Dr Kerry Hanna[1], Dr Lauren Hepworth[1], Professor Fiona Rowe[1]
[1]*University of Liverpool, Liverpool, United Kingdom*

Purpose: Integrated stroke and vision services are unequal within the UK, and many stroke survivors fail to receive adequate vision care. Better understanding of this inequitable care will allow for careful planning of stroke services. This service evaluation aimed to compare the rate of stroke admissions referred to orthoptic outpatients before, during and after cessation of an inpatient orthoptic stroke screening service.

Method: Stroke admissions were recruited to the IVIS study over a 15month period. The presence of post-stroke vision impairment was confirmed with a full orthoptic screen. Stroke referrals to orthoptics before the IVIS study commenced, and following study closure, were evaluated.

Results: Between 2013-2014, 27(5.7%) stroke referrals of 475 stroke admissions were made to orthoptic services, for visual field (VF) and ocular motility (OM) disorders. During the IVIS study (2014-2015), detection of visual impairment was 58% (of 555 admissions). The in-patient service reduced the need for referrals, as patients were assessed and managed on the stroke unit. One-year after cessation of the IVIS study, referrals fell to 4.3% (n=21/490). However, visual conditions referred after IVIS included a wider range of conditions (OM, VF, visual perception and reading difficulties).

Conclusions: Detection of visual impairment increased during the time of the IVIS study due to the inclusion of orthoptists in the acute stroke multi-disciplinary team. After IVIS, referrals quickly dropped, highlighting the need to maintain orthoptic presence on stroke units to ensure accuracy and quality of vision screening. The range of visual conditions referred after IVIS increased, indicating improved awareness.

Development of core outcome measures for vision assessment in stroke: a Delphi and consensus study.

Professor Fiona Rowe[1], Dr Lauren Hepworth[1]
[1]University of Liverpool, Liverpool, United Kingdom

Purpose: Incidence of visual impairment following stroke is reported as 60%. Assessment of visual function following stroke is not standardised and varies considerably not only across different countries but also within countries. To reduce inequalities that result from such variation, core outcome sets (COS) have been developed that aim to standardise visual assessments for stroke survivors. The aim of this study is to define the core outcome measures that should be contained within the COS.

Methods: Research ethical approval was obtained from the University of Liverpool. A list of potentially relevant visual assessments was created from a review of the literature. The consensus process comprised an online 3-round Delphi survey followed by a consensus meeting of the key stakeholders. COS stakeholders included orthoptists, occupational therapists, ophthalmologists, stroke survivors and other users such as researchers, journal editors and guideline developers.

Results: Following the consensus process we recommend outcome measures across eleven elements of visual assessment; case history, observations, visual acuity, eye alignment position, eye movement assessment, binocular vision assessment, eye position measurement, visual field assessment, visual neglect assessment, functional vision assessment, reading assessment and quality of life questionnaires. Despite some variances for outcome measures reported across different countries, there was remarkable similarly for the majority of outcome measures chosen.

Conclusions: Core outcome measures are defined for visual assessment of stroke survivors. This provides added weight to previously developed COS for stroke-related visual assessment and should aid in reducing heterogeneity in routine clinical practice whilst improving standardisation and accuracy of vision assessment.

The impact on cognitive screening assessment completion as a result of visual impairment

Dr Lauren Hepworth[1], James Bould[1], Dr Claire Howard[2], Jim Currie, Professor Fiona Rowe[1]
[1]University of Liverpool, Liverpool, United Kingdom, [2]Northern Care Alliance NHS Foundation Trust, Salford, United Kingdom

Purpose: Around 60% of stroke survivors experience visual impairments. Further, it has been reported over half of inpatient stroke survivors' refractive corrections were not available or in an unacceptable condition. Approximately 80% of stroke survivors encounter acute cognitive impairment. Therefore, there is a high likelihood of cross-over of the two diagnoses. To evaluate this, we aimed to appraise cognitive screen assessments completed by inpatient stroke survivors with and without visual impairment.

Methods: The Oxford Cognitive Screen (OCS) was used to assess for presence of cognitive impairment. Data from the orthoptic visual assessment (including glasses use, visual acuity, visual fields, eye movements and visual perception evaluation) were analysed to determine whether presence and/or type of visual impairment had an impact on scores of the overall cognitive screen or any of the specific tasks.

Results: 197 stroke survivors with a recorded OCS were identified from the IVIS study database of 1500 stroke admissions. Individuals reporting visual symptoms had a statistically poorer performance in nine of the eleven tasks, with the exception of recall recognition and executive tasks. Poorer performance on picture naming, semantics, sentence reading, orientation, numbers, gesture and visual field tasks was noted in the presence of all groups of visual impairment. Not wearing requisite near refractive correction also resulted in poorer performance in sentence reading, broken hearts and executive tasks.

Conclusions: Many OCS tasks were impacted by visual impairments. Adjustments should be made to provide good lighting and availability of near refractive correction to facilitate accurate completion of cognitive screens.

Measurement of saccades to monitor adaptation to post-stroke homonymous hemianopia

Dr Claire Howard[1,2], Dr Paul Knox[2], Dr Helen Griffiths[3], Professor Fiona Rowe[2]
[1]Northern Care Alliance NHS Foundation Trust, Salford, United Kingdom, [2]University of Liverpool, Liverpool, United Kingdom, [3]Sheffield Children's NHS Foundation Trust, Sheffield, United Kingdom

Purpose: To report saccadic parameters in post stroke homonymous hemianopia.

Methods: In a prospective observational case cohort study, adult stroke survivors with new onset homonymous hemianopia were recruited. Using a saccadometer, saccade parameters were measured and compared between the hemianopic and non-hemianopic sides. Two participants with longitudinal measurements were compared with age-matched controls to compare between sides and control parameters.

Results: Of 144 participants in the full clinical study, quantitative saccade measurements were only possible in 14, due to an inability to visualise targets on the hemianopic side in the majority. In nine of the 14 participants, at four-week post-stroke, mean (±SD) saccade latency was significantly longer to the hemianopic (328.4±105.9 ms) compared to the non-hemianopic side (234.7 ± SD53.6 ms; t=4.2, df=8, p=0.003). The number of correct saccadic responses to visual targets was significantly lower to the hemianopic side (t=-3.1, df=8, p=0.014). In two participants studied in detail saccadic differences to the hemianopic side persisted despite recovery of visual field.

Conclusion: As participants with residual visual field loss were unable to perform saccadometer tests, the general usefulness of this approach in this setting is questionable. However, in those whom measurement were possible, there were statistically significant differences in saccade parameters between hemianopic and non-hemianopic sides that persisted and continued to change post visual recovery. Exploration of saccades in relation to adaptation to hemianopia and response to saccadic training requires further examination.

Returning to driving following adaptation to post-stroke homonymous hemianopia

Dr Claire Howard[1,2], Jim Currie[3], Professor Fiona Rowe[2]
[1]Northern Care Alliance NHS Foundation Trust, Salford, United Kingdom, [2]University of Liverpool, Liverpool, United Kingdom, [3]Patient and Public Representative, United Kingdom

Purpose: We report results in relation to returning to driving under the exceptional cases rule for visual field loss, under UK Driving and Vehicle Licensing Agency (DVLA) regulations.

Methods: We undertook a prospective observation case cohort study, recruiting adult stroke survivors with new onset homonymous hemianopia. The mobility assessment course (MAC), was used to measure navigational visual scanning. Car drivers were offered a 1-year post-stroke assessment to consider referral for driving assessment.

Results: Of 144 study participants, 51 were eligible for driving assessment, with 13 (25.4%) accepting an appointment for DVLA referral. A statistically significant difference in gender was found between the those requesting referral and those declining (p=0.046); the majority requesting referral to DVLA were male (92.3%). There was a statistically significant difference between the baseline Barthel (stroke severity) scores (p<0.001). All 13 referred to DVLA had a baseline Barthel of the maximum score 20. MAC outcomes were significantly different, with those referred having a lower percentage of target omissions (9.0%) and faster mean course completion time (46.0 seconds), than those not referred (28.3% / 72.5 seconds) (p=0.006 / p<0.001). Twelve of the 13 referred were offered driving assessment by DVLA. All 12 passed and returned to driving.

Conclusion: There is evidence to support use of the MAC as a clinical measurement of adaptation status. Due to the small numbers of participants requesting referral for driving assessment, clinical guidelines for return to driving cannot be based on these findings alone. More research is recommended to explore this relationship further.

Theme: Orthoptic assessment & management
Time: 10:20-11:25

Motor skills in children with strabismus

Veronica Goossens[1], Dr Demet Yüksel[1,2], Dr Hemptine Coralie[1,2]
[1]*Cliniques universitaires saint-luc ucl bruxelles, Hippokrateslaan, Belgium,* [2]*Universite catholique de louvain, Saint lmabrechts woluwe, Belgium*
Purpose: To assess the extent to which strabismus in children was associated with motor difficulties and to examine which parameters of strabismus were most closely associated with motor development.

Methods: The motor skills of children who were suffering from strabismus, were tested binocularly using the Movement Assessment Battery for Children, Second Edition (MABC-2) and compared with the motor performance of monocularly tested healthy controls without any ophthalmologic disease.

Results: A total of 40 children with strabismus (mean, 7.25 ± 3.83 years; 19 females) and 18 controls (mean age, 8.33 ± 5.42 years; 6 females) were tested. According to the MABC-2 test, of the 40, 19 had no motor disability, and 21 were at risk of or already presented significant motor disabilities. Results of the MABC-2 were significantly lower for strabismic children without binocularity compared to those with binocularity (P = 0.002). Lack of binocularity was associated with significantly lower performance for static balance (P = 0.003) as well as for catching tasks (P = 0.042).

Conclusions: Lack of binocularity and stereopsis in children is associated with significant motor skills impairment, in particular for static balance and catching tasks. These results should be confirmed with a larger sample, including older patients, to assess the compensation mechanisms that develop with age and the actual effects of strabismus on overall motor performance.

Causes, incidence and orthoptic treatment of orbital fractures: an overview

Yvette Braaksma-besselink[1], Hinke Marijke Jellema[1]
[1]*Amsterdam UMC, Amsterdam, Netherlands*

Purpose: Highlight the relevance of orthoptic examination and treatment in orbital fractures

Methods: patients with any type of orbital fracture, in a 2 year period were documented. Cause and type of orbital fracture were recorded. The initial type of diplopia, orthoptic intervention and the final binocular status were registered as well as orbital and/ or strabismus surgery were evaluated.

Results: Over 2 years time, patients with an orbital fracture presented in our clinic was recorded. 37 patients were evaluated: 28 males (76%) versus 9 females (24%). Main cause: traffic accident (43%), 22% fall. 22% related to aggression and 13% other. Orbital floor fractures (59.5%) dominated. 18 patients (48%) underwent orbital reconstruction surgery. Of the 37 patients only 6 were in absence of diplopia at presentation. 4 patients underwent strabismus surgery and 6 consider strabismus surgery pending recovery. 38% were in need of orthoptic aid at the start of treatment. Awaiting surgery/ recovery, 5 patients wore occlusion, 4 were helped with a prism and 5 obtained single vision with an abnormal head posture. 25 patients (67%) did not need orthoptic treatment. 14 patients (38%) showed no diplopia at the end of treatment, 18 patients (48%) were left with gaze dependent diplopia. 9 patients (24%) are considering treatment possibilities, three patients(8%) were discharged with prism correction.

Conclusion: Starting off, 38% of the patients could be helped by orthoptic treatment, 24% of the patients were still in need/ considering some form of orthoptic support while 9(24%) wear permanent prism correction.

Treatment of Symptomatic, Oblique Strabismus with Press-On Prism: A Simplified Approach

Professor Alex Christoff[1]
[1]*The Wilmer Eye Institute at Johns Hopkins Hospital, Baltimore, United States*

Determining the correct amount and orientation of prism to be prescribed for patients with symptomatic, oblique-angle strabismus can be challenging and confusing, prone more to clinician gestalt than science or methodology. The author reviews historic methods previously described but shares a simplified, but accurate approach not previously described in the scientific literature that utilizes commercially available equipment and freely available on-line tools for accurately, scientifically and successfully quantifying the strabismus, choosing the correct Press-On prism power, positioning the

prism correctly on the spectacle lens, and ultimately determining the correct prism prescription to be ground into the patient's spectacles. Three case studies are shared exemplifying this technique.

Environmental drivers of the myopia epidemic and the impact of the COVID-19 pandemic

Dr Amanda French[1], Professor Kathryn Rose[1]
[1]*Discipline of Orthoptics, Graduate School of Health, University of Technology Sydney, Sydney, Australia*

Purpose: To examine environmental risk factors for myopia and how these may interact to drive the myopia epidemic.

Methods: A population-based sample of children in two age cohorts, 6 (n=1765) and 12 years (n=2353), from the Sydney Myopia Study (SMS) were followed-up after 5-6 years (51%). Of 21 secondary and 34 primary schools, 2 (n=161) and 4 were academically-streamed (n=127), respectively. Myopia was defined as a spherical equivalent refraction (SER) of ≤-0.5 dioptres (D) based on cycloplegic autorefraction. The findings of the current study are presented in the context of a review of other relevant literature.

Results: In the older cohort, children who combined low time outdoors (<14 h/week) with high near work (>25.5 h/week) had a more myopic SER than those who engage in high time outdoors and low near work (all p<.0001). When near work exceeded time outdoors odds of myopia was increased at baseline (OR 2.69, 95% CI 2.06-3.53) and follow-up (OR 1.94, 95% CI 1.44-2.62), with similar trends observed in the younger cohort. A higher myopia prevalence was evident in academically-streamed schools (all, p<0.01), with children who attended these schools spending less time outdoors at all ages (all p<0.04). There was no clear relationship between screen time and refraction.

Conclusion: Patterns of activity that are myopiagenic feature low time outdoors and high time in near work, with the balance of these risk factors outside of school hours being important for myopia prevention. This may have contributed to recent observations of increased myopia following pandemic-related home

Effect of Axial Length on Subjective Refraction and Uncorrected Visual Acuity

Yuta Nakaniida[1], Fumiko Higashikawa[2], Kana Tokumo[1], Yuki Yuasa[1], Hiromitsu Onoe[1], Naoki Okada[1], Yuko Nakamura[1], Yuji Sato[1], Kenji Yokoyama[1], Kotomi Yamamoto[1], Chunyan Zhang[1], Norie Kitayama[1], Naoko Oda[1], Natsumi Yamaguchi[1], Tomomi Nishikawa[1], Kanako Tano[1], Yuka Masumoto[1], Suzu Sawada[3], Shunsuke Nakakura[4], Ryo Asaoka[5,6], Yoshiaki Kiuchi[1]
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Purpose: We investigated the effect of axial length (AL) on subjective refraction and uncorrected visual acuity (UCVA) in healthy individuals.

Methods: One hundred and forty-two eyes of 71 healthy Japanese individuals were included. Eyes were excluded if they had previously undergone any surgical procedure, including cataract surgery and laser in situ keratomileusis (LASIK). Visual acuity was examined at 5 m; subjective refraction and UCVA were measured. AL was measured using the IOL Master®. Prediction equations were generated using subjective refraction or UCVA as the response variable and AL as the explanatory variable.

Results: Using subjective refraction as the response variable (y) and AL as the explanatory variable (x), the regression curve was y=36.30474-1.57743x (R2 = 0.62). The estimated subjective refraction for each AL was 23 mm (0.02 diopter), 24 mm (-1.55 diopter), 25 mm (-3.13 diopter), 26 mm (-4.71 diopter), and 27 mm (-6.29 diopter). Using UCVA as the response variable (y) and AL as the explanatory variable (x), the regression curve was y=-6.5054698 + 0.2842101x (R2 = 0.53). The estimated UCVA for each AL was 23 mm (0.03 logarithm of the minimum angle of resolution [logMAR]), 24 mm (0.32 logMAR), 25 mm (0.60 logMAR), 26 mm (0.88 logMAR), and 27 mm (1.17 logMAR).

Conclusions: For every 1 mm of AL elongation, subjective refraction becomes myopic by approximately -1.60 diopter and UCVA decreases by approximately 0.28 logMAR.

An investigation into the accuracy of measuring interpupillary distance on the synoptophore

Katie Morton[1], Dr David Buckley[2], Dr Sonia Toor[2]
[1]Orthoptic department, united lincolnshire hospitals trust, Boston, United Kingdom, [2]Division of ophthalmology and orthoptics, the university of sheffield, Sheffield, United Kingdom

Purpose: There are no published instructions on how to measure interpupillary distance (IPD) on the synoptophore but two methods are used clinically: 'moving head' and 'without moving the head'. This study aimed to determine the most accurate method for measuring IPD on the synoptophore.

Methods: Twenty-one participants had their IPD measured by the same examiner using four methods: Victorin's method with a city rule, synoptophore 'moving head', synoptophore 'without moving head' and the gold standard PD meter. For both synoptophore methods, the aim was to align the lines on the synoptophore eyepieces with the patient's corneal reflections.

Results: There was a statistically significant difference in IPD measurements between all testing methods. The mean IPD measured using the gold standard PD meter was 61.36 ±0.62mm. The synoptophore 'moving head' method (58.43 ±0.67mm) had the greatest difference from the PD meter measurement. The synoptophore 'without moving head' method (60.83 ±0.65mm) was closest to the PD meter measurement. The three methods were significantly positively correlated with the PD meter (Viktorin's method, r=0.98; 'moving head' method, r=0.68; 'without moving head' method, r=0.94). When analysing the data of only the final third of participants, there was no longer a significant difference between IPD measurements using the four methods.

Conclusions: The synoptophore 'without moving head' method was the most accurate assessment of IPD, which although was significantly different from the PD meter, produced a clinically accurate measurement. There was improved accuracy of all methods after a period of practice, suggesting they are all clinically acceptable.

How accurate is the iPhone compass application at measuring abnormal head turns?

Annabel Mynett[1], Dr Charlotte Codina[1], Dr Anne Bjerre[1]
[1]The University of Sheffield, Sheffield, United Kingdom

Purpose: To determine whether the iPhone compass application can accurately measure head turn, by comparing the application to a bespoke chin mounted device (BCMD) during induced abnormal head turns (AHT) to the right and left, in healthy young adults.

Methods: This was a prospective, repeated-measures study. Twenty-four healthy volunteers participated (mean age 21±1.36 years, 18 female and 6 male). Primary position and AHTs were induced at 10, 20 and 30 degrees right and left using the BCMD. At each AHT, three recordings from the iPhone 11 compass application were taken and compared to the BCMD position. The iPhone was placed horizontally on the upper surface of the head, stabilised using GoPro straps. Order of testing was randomised.

Results: Mean angle of error in degrees from the iPhone compass application compared to the BCMD ranged between 1.27±0.33 (95% CI) and 1.96±0.53. Comparing head turn angle induced on the BCMD and mean errors recorded from the iPhone compass showed no statistical significant difference for each AHT position ($F_{6,138} = 1.450$, $p = 0.199$).

Averaging three iPhone compass measurements for each AHT position resulted in no more than 5.7 degrees difference than those induced by the BCMD. If only one iPhone compass measurement was taken, large variations in measurements and poor levels of reliability were seen (Cronbach's alpha <0.40).

Conclusion: The iPhone compass application can accurately and reliably measure AHTs at 10, 20 and 30 degrees to the right and left, when the mean of three measurements are taken for each.

Burian Lecture
Time: 12:30-13:15

Binocular Vision and Test Design

Professor Helen Davis [DBO(T)]
Professor of Orthoptics, Academic Unit of Ophthalmology & Orthoptics, Department of Oncology & Metabolism, The University of Sheffield

The theme of the 2022 Burian Lecture will be how my research carried out at the University of Sheffield has been integrated into clinical practice. The focus of this work has been the investigation of binocular single vision and in particular stereopsis. It has provided further understanding and evidence for testing binocular vision and methods of clinical application.

I will share my experience of designing a new test, the FD2, and the challenges that can bring. By considering the literature on current clinical assessment of stereoacuity, the talk will include discussion of test design and what should be considered when administering and interpreting the results from clinical tests.

Theme: Collaborative and/or Extended practice
Time: 13:30-14:40

Visual function risk factors for falls in older adults.

Dr Jignasa Mehta[1], Dr David Newsham[1], Professor Simon Harding[1], Dr Gabriela Czanner[2]
[1]University of Liverpool, Liverpool, United Kingdom, [2]Liverpool John Moores University, Liverpool, United Kingdom

Purpose: Falls in older adults are a major public health concern and visual impairment has been identified as one of the risk factors associated with falls. Our aim was to investigate the association of impaired visual function and falls in older adults.

Methods: Visual function risk factors; ETDRS visual acuity (VA), contrast sensitivity (CS), stereoacuity (SA), binocular vision (BV) and visual fields (VF) were measured in a prospective observational individually age matched case control study. Socio-demographic factors, general health, number of medications, health quality, fear of falling and physical activity data was also collected for each participant.

Results: Older adults have an increased risk of experiencing a fall if they have reduced visual function (odds ratio (OR): 3.49, 1.64-7.45, p=0.001), specifically impaired stereoacuity worse than 85" of arc (OR: 3.4, 1.20-9.69, p=0.02) and reduced (by 0.15 log unit) high spatial frequency CS (18 cpd) (OR:1.40, 1.12-1.80, p=0.003). Older adults with a hearing impairment are also at higher risk of falls (OR: 3.18, 95% CI: 1.36-7.40, p=0.007). The falls risk decreases with living in a less deprived area (OR: 0.74, 0.64-0.86, <0.001), or socialising more out of the home (OR: 0.75, 0.60-0.93, p=0.01).

Conclusion: Impaired SA, CS and hearing are significant independent sensory risk factors for further falls in older adults ≥ 65 years. Health professionals need to consider interventions for modifiable biological risk factors (hearing and vision) for older adults as well as key public health messaging and social prescribing to reduce health inequalities for social and behavioural risk factors.

"Watch that step!" Older adult's perspectives on the role of sight in falls incidents.

Dr Jignasa Mehta[1], Professor Jude Robinson[2], Professor Simon Harding[1], Dr David Newsham[1]
[1]University of Liverpool, Liverpool, United Kingdom, [2]University of Glasgow, Scotland

Purpose: Much of the evidence on the association of visual risk factors and falls stems from quantitative clinical studies. Therefore, the aim of our study was to qualitatively explore the lived experience of a fall with respect to vision in older adults with age-related ophthalmic conditions.

Methods: A phenomenological framework was used to explore the lived experiences of the fall in fifteen participants with an age-related ophthalmological condition: age-related macular degeneration (AMD) (n=5), glaucoma (n=5) and cataracts (n=5). Semi structured interviews with a narrative sensibility were carried out within 6 weeks-11 months of the fall. Clinical data on visual acuity and stereoacuity were also recorded for each individual.

Results: Generally, the participants did not highlight their ophthalmic condition and vision as the main cause of their fall. However, difficulties with depth perception and lighting were the main themes that emerged from the interviews when they described their "sight". The clinical stereoacuity data supported the narratives of "difficulty judging depth and levels" and "missing steps". Mostly participants with glaucoma described having difficulties with lighting and "adapting to different light levels".

Conclusion: Falls prevention strategies for older adults should include addressing the functional significance of impaired depth perception and where possible manage avoidable depth impairment e.g. by minimising the time between first and second eye cataract removal. Difficulties with lighting in older adults with age-related ophthalmic conditions raises strategic issues around effective lighting in the home when making home safety modifications and with policy makers for the built environment.

Visual field assessment in children: a systematic review

Michaela Sherlock[1], Dr Lauren Hepworth[1], Professor Fiona Rowe[1]
[1]*University of Liverpool, Merseyside, United Kingdom*

Aim: To systematically review the assessment of visual fields in children. The main aims of the review were to determine the indications for visual field testing in paediatric ophthalmology and the types of perimetry most performed on children. The reliability of perimetry assessment in children and any adaptations required when testing this population were also examined.

Method: Numerous electronic bibliographic databases and registers were searched, including Cochrane Register (CENTRAL), MEDLINE, Scopus and AMED. Search terms included a range of terms relating to visual field/perimetry assessment and children/adolescents. The following types of studies were included in the review: randomised controlled trials, controlled trials, prospective and retrospective cohort studies, observational studies and case-controlled studies. Case reports, editorials and letters were excluded. Quality appraisal of included studies was performed using the appropriate tool for the type of study methodology.

Results: Of 51,246 results, 2545 full texts were retrieved and 392 were included in the review. The main indications for visual field testing in children include the diagnosis of brain lesions, hydrocephalus and optic neuropathies. The types of perimetry most frequently performed on children include kinetic perimetry and confrontation testing. Various adaptations to visual field testing procedures have been reported, including using a 'video game' approach. The reliability of perimetry testing in paediatric ophthalmology is frequently stated as a barrier to conclusive findings.

Conclusion: This systematic review highlights the indications for visual field testing in paediatric ophthalmology. Further research should investigate how automated perimetry can be adapted to ensure good reliability when testing children.

Biofeedback rehabilitation of eccentric viewing in patients with central vision loss: A pilot study

Natalia Kelly[1,2], Dr Meri Vukicevic[1], Dr Konstandina Koklanis[1]
[1]*Discipline of Orthoptics, La Trobe University, Melbourne, Australia,* [2]*Vision Matters, Melbourne, Australia*

Purpose: The purpose of this study was to evaluate the efficacy of biofeedback eccentric fixation across multiple visual function parameters in patients with macular pathology and bilateral central scotoma (BCS).

Methods: A retrospective review of patients with BCS who underwent biofeedback eccentric viewing training was performed. The program included up to 10 biofeedback sessions with the macular integrity assessment (MAIA) microperimeter in addition to home exercises. Outcome measures included near and distance visual acuity, contrast sensitivity and fixation stability. Fixation stability incorporated MAIA P1 and P2 indexes which represent the percentage of fixation points and MAIA bivariate contour ellipse area (BCEA) which describe the statistical distribution of all fixation points from the trained retinal locus. Correlation between microperimetric parameters and visual acuity and contrast sensitivity was also assessed.

Results: The study included 17 patients (mean age of 82 years) with BCS due to macular pathology. The mean number of biofeedback training sessions received was 6.3(±2.3). A significant improvement was found for all outcome measures post training, including near visual acuity($p<0.001$), distance visual acuity ($p<0.001$), contrast sensitivity($p<0.001$), P1 ($p<0.001$), P2 ($p<0.001$), 63%BCEA ($p=0.007$) and 95%BCEA ($p<0.001$). A large positive correlation was also found between most microperimetric parameters and visual acuity and contrast sensitivity ($r=0.503–0.728$). A medium correlation was found between 63%BCEA and near visual acuity ($r=0.312$).

Conclusions: This study indicates that biofeedback eccentric viewing training is a promising rehabilitation technique that improves visual function. Future research should focus on implementing rigorous research methodologies to develop an evidence base for this intervention.

'My CVI' a serious game for psycho-education for children with cerebral visual impairment (CVI) in the age of 6-12 years.

Florine Pilon[1]
[1]*Bartimeus, Zeist, Netherlands*

Purpose: CVI has become the most common cause of visual impairment in children. Orthoptists in the Netherlands play a key role in the diagnosis of CVI. It is complicated to understand CVI and children with CVI experience a lot of misunderstanding.

The purpose of this presentation is to present the game 'My CVI' and the results of an effect measurement study. 'My CVI' is a serious game for psycho-education for children with cerebral visual impairment (CVI) in the age of 6-12 years old.

Methods: In 2018, 'My CVI' was developed. The aim of 'My CVI' is to give children insight into their own CVI, what influence CVI has on their performance and how they can deal with this in their daily lives. They also develop a sense of self-esteem and learn how to participate in daily life. In addition, the knowledge about CVI will increase among professionals and parents after watching the videos.

Results: 'My CVI' consists of a digital series of 8 lessons with interviews of children who have CVI themselves. These interviews explain what CVI means for them and what helps them.

Conclusions: Through the use of psycho-education, early attention can be paid to giving insight into one's own limitation, the development of a positive self-image and disability management. Furthermore by viewing the Interviews of the 'My CVI' orthoptists get more insight in the problems of CVI children so it will help them to improve their history taking in CVI Children and hopefully recognise more CVI children.

Perspectives of orthoptists and speech pathologists working with patients with dual visual and communication impairments

Sonia Lau[1], A/Prof Emma Power[2], Dr Amanda French[1], Ms Martha Kavelin[2]
[1]*Discipline of Orthoptics, Graduate School of Health, University of Technology Sydney, Sydney, Australia,* [2]*Discipline of Speech Pathology, Graduate School of Health, University of Technology Sydney, Sydney, Australia*

Purpose: To investigate the experiences of orthoptists and speech pathologists in providing care to patients with dual visual and communication impairments.

Methods: An online survey of orthoptists investigated approaches to adult and paediatric patients with communication impairments and any communication tools and resources used. Semi-structured focus groups with orthoptists and speech pathologists discussed experiences and challenges of working with this population. Analysis of quantitative survey responses was conducted using IBM SPSS v27. Transcriptions and field notes from focus groups were analysed thematically.

Results: Orthoptists employed simple supportive communication strategies (eye contact, repeating and rephrasing) more commonly than complex strategies (visual aids and writing down instructions), and this did not vary by years of work experience (all p=>0.05). The majority of participants reported no further communication training after completion of their degree (58.5%) and most were unaware of any resources available to support communication (82.5%). Communication difficulties during clinical interactions with these patients such as with establishing rapport and ensuring patient participation in management, were significantly and positively correlated and not influenced by years of experience, workplace clinical specialty or training during or after their degree (all p=>0.05). Focus group responses indicated a need for more coordinated multidisciplinary care for patients with communication and visual impairments.

Conclusion: Although orthoptists reported use of some adaptive communication strategies, there was little formal support or training in working with patients complex communication needs. Orthoptists and speech pathologists would benefit from further knowledge of and access to a multidisciplinary team to support best patient care.

The relevance of cooperation between orthoptist and athletic trainer in sports vision for the enhancement of sports performance

Alice Parisi[1], Ms Anna Barducco[1], Ms Silvia Mancioppi[1], Professor Francesco Parmeggiani[1]
[1]Orthoptic and Ophthalmologic Assistance Degree Course, University of Ferrara, Ferrara, Italy

Purpose: Vision and visual skills, play a key role in a sport performance and crucial is the integration of the visual and motor systems. Athletes need to process a visual information and execute an accurate motor response guaranteed through the therapy by the athletic trainer's supervision. As College of Orthoptics, we believe in professional partnership; we have created a project to aware them of the essential role of sports vision for the enhancement of sports performance.

Methods: Since Academic Year 2018/2019 University of Ferrara has introduced in the university curriculum of Motor and Sport Science, Undergraduate and Graduate Degree, an elective course "Visual perception during sports activities" to educate students about the efficacy and the know-how of the Sports Vision Therapy for the enhancement of sports performance and the role they play in both assessment and therapy. In the past three Academic Years, the course was elected by 60 students. This current Academic Year 2020/2021 38 students have participated in the elective class evaluating the course with a 13 items final questionnaire. (Score: 1-10 Likert Scale).

Results: The questionnaire analysed results can be grouped in 6 macro-areas:
-Topic: 7.8
-Teaching: 7.9/10
- Interest to the topic: 8.8/10
- Satisfaction: 7.8/10
- Evaluation test: 7.8/10

Conclusions: The elective course wants future athletic trainers to become aware and recognise the importance of the quality of the incoming visual stimulus and visual skills during sports like other countries where professionals as orthoptist, athletic trainer, coach, eye-doctor, and sports medicine doctor cooperate

Interactive Poster session 2
Time: 15:00-15:45
Alphabetical by presenting author

Orthoptic findings and visual perception in adolescents born moderate-to-late- preterm

Associate Professor Eva Aring[1,2], Dr Alexandra Lind[1], Professor Jovanna Dahlgren[3], Dr Arzu Karatepe[2], Professor Marita Andersson Grönlund
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Introduction/Purpose: Children born moderate-to-late preterm (MLP), defined as gestational age 32-36 weeks, have an elevated morbidity risk compared with full-term individuals, including neurodevelopmental disabilities and cognitive impairment. At school age, motility problems, heterophoria and refractive errors have been described. The purpose of this study was to evaluate orthoptic findings and visual perception skills in adolescents born MLP, and in age-matched controls born full-term.

Methods: Best corrected visual acuity (BCVA), cycloplegic refraction, strabismus, motility, near point of convergence (NPC), near point of accommodation (NPA), binocular single vision (BSV) and test of visual perception skills (TVPS) were evaluated in 50 MLP adolescents (mean 16.5 years) and in 50 controls (mean 16.7 years).

Results: Hyperopia (≥0.5 dioptre (D) spherical equivalent (SE)) was more commonly found in the MLP-group (27/47 vs 39/50, p=0.02). Myopia (≤0.5 D SE and ≤1.0 D SE) was more frequent in controls (13/50 vs 2/47, p=0.004;10/50 vs 1/47, p=0.008). The MLP-group showed worse BSV compared with controls (p=0.03). Subnormal NPA (<13.6 D according to Hofstetter´s formula) was more frequent in MLPs (26/50 vs 16/50) however, not significant (p=0.057). No differences between the groups regarding heterotropia, heterophoria, BCVA, NPC or motility were noted. Among MLP individuals, a week correlation between BSV and visual spatial relationship (p=0.021, r=-0.33) and between NPA and visual form constancy (p=0.034, r=-0.30).

Conclusions: Hyperopia and affected BSV are more common among MLP adolescents compared with full-term controls. Furthermore, BSV and NPA seems to be correlated to some visual perception abnormalities.

The value of an Orthoptist in a joint Ophthalmology and Endocrinology clinic for thyroid eye disease.

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Purpose: To report on the role of a senior orthoptist within a joint speciality thyroid eye disease clinic provided by ophthalmology and endocrinology departments at Leeds Teaching Hospitals.

Method: The orthoptist is primarily triaging all patients. New and follow up relevant patients undergo an orthoptic assessment examining visual function, binocular status and ocular motility. Patients requiring diplopia management undergo a prism review in the joint clinic. Patients with restrictive motility and diplopia are referred to the orthoptic department for a full assessment. Follow up patients, whose signs/symptoms are not changing significantly are assessed in the joint clinic. Patients that present with a change are highlighted to consultants and where necessary referred to orthoptics.

Results: 27 clinics took place in a continuous 12 month period, of which 20 had a sit in orthoptist. The attendance rate for the clinic was 93% from 420 appointments that were allocated. 302 patients were seen by the orthoptist; contributing care to 65% of patients attending the service. A patient satisfaction survey rated the overall experience with all clinicians seen at 72% excellent and 28% good.

Conclusion: The orthoptists role provides ophthalmology support to the consultants, improves patient experience with a same day review and reduces the demand on orthoptic clinics. The orthoptist assists in delivering immediate management for symptom relief and informs the patient of their orthoptic diagnosis. This combination of departments working together has not only benefitted patients but also provided the opportunity for orthoptists to enhance their skills.

Procedures for measuring the Near Point of Convergence and the Point of Asthenopia in individuals with Postural Deficiency Syndrome

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Purpose: Postural Deficiency Syndrome is a multifactorial proprioceptive dysfunction with varied signs and symptoms, including convergence insufficiency and asthenopia which impact visual performance. The near point of convergence measurement is used to diagnose and clinical explore convergence insufficiency. Test speed and stimulus size influence values obtained. Definition of the most effective method to measure the near point of convergence and the point of asthenopia will allow early detection of alterations. This study aims to investigate the accuracy of measurements and variations in values obtained using different methods for the near convergence point and the point of asthenopia measurements in cases of Postural Deficiency Syndrome.

Methods: The sample contained 39 patients, 27 with and 12 without Postural Deficiency Syndrome, measuring the near point of convergence and point of asthenopia with two stimuli (standard RAF rule and modified RAF rule) at two speeds (1cm/s and 3cm/s).

Results: Neither method of measuring the near point of convergence had statistically significant values. The RAF near point rule at 1cm/s is more sensitive for alterations in the point of asthenopia (AUC 0.761 ± 0.084 standard error, $p = 0.010$). At 1cm/s, higher values for near point of convergence and point of asthenopia were measured, chiefly in the Postural Deficiency Syndrome group.

Conclusion: Methods used to measure the parameters studied influenced the final values. No statistically significant values were obtained in the measurement of the near convergence point. To measure the point of asthenopia, the standard RAF rule at 1cm/s has the highest accuracy.

Red flags in orthoptics: patient safety for children without referral of a physician

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Purpose: Since 2011 the orthoptist in the Netherlands can provide care for children without referral of an GP or ophthalmologist, using Red flags. Red flags are signs and symptoms found in the patient's triage (phase 0), history (phase 1) and orthoptic examination (phase 2). This presentation investigates the use of the Red flags by the orthoptist in pediatric ophthalmology without referral.

Method: Three new presenting cases without referral and a reported strabismus by the parents, were reviewed based on the Red flags during the three phases. Case 1 was a pseudo strabismus of 13 months of age, case 2 a micro-esotropia with amblyopia of 4 years of age and case 3 an esotropia with retinal coloboma of 20 months of age.

Results: None of the cases revealed any Red flags during phase 0 and phase 1. During the orthoptic examination (phase 2) case 1 and case 2 did not show Red flags and were given appropriate orthoptic treatment. Case 3 showed a Red flag during the retinal exam and was referred to an ophthalmologist.

Conclusion: The most likely cause of a unilateral visual deficit in children who present to the orthoptist is due to refractive error or amblyopia. However, it might be a feature of a more serious eye condition. To correctly identify these patients, a thorough orthoptic examination including fundoscopie is required. Red flags provide guidance who to refer to a physician, assuring patient safety and quality insurance for orthoptist, especially in areas where ophthalmic care is scarce.

Atropine Express vs Cyclopentolate 0.5% - A new reliable alternative to a rapid cycloplegia?

Athéna Lallouette[1]
[1]*Swiss Visio Network, Lausanne, Switzerland*

Purpose: To assess and compare the cycloplegic effectiveness between the classic Skiacol protocol, and a new Atropine Express protocol, in a Caucasian and pigmented population of young, healthy adults.
In a young and healthy population, is there a significant difference of cycloplegic efficiency between the two protocols, depending on the iris pigmentation?

Protocols: Two prospective interventional protocols were performed in two groups, divided according to their degree of pigmentation.
One eye received 3 drops of Skiacol 0,5%, respecting 5 mins intervals, and the other eye was applied 2 drops of Atropine 1%, with a 5 mins interval. Both eyes were subject to an objective refraction at T+60 mins along with the measurement of their residual accommodation and IOP. The drops were then switched during the 2nd protocol, and the same measurements were made.

Results: 28 volunteers (64% Caucasian and 36% Black), of an average age of 24,1 years old (± 2,6), were recruited.
The mean Spherical Equivalent (SE) measured in the Caucasian population at T+60 mins, was of +0,18 δ (±1,89) post-Skiacol, and was of +0,13 δ (±1,78) post-Atropine Express.
In the more densely pigmented population, the mean SE measured were of +0,31 δ (±1) post-Skiacol, and of +0,47 δ (±1) post-Atropine Express.

Conclusion: Atropine Express may present itself to be a suitable replacement of the Skiacol 0,5% protocol. 2 drops of Atropine 1% proved to be as efficient as 3 drops of Skiacol 0,5% in our Caucasian population, whereas it showed greater effectiveness in the pigmented subjects.

The effect of test method on visual acuity in school children aged 4-5

Rebecca Lewis[1], Dr Charlotte Codina, Dr Helen Griffiths
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This study compared two different methods of testing visual acuity (VA) in children aged 4-5 years (The UK's school vision screening target age). The conventional vision test method was compared to a reversed logMAR presentation order, where letters were presented in ascending size order up to vision threshold. Threshold VA, test duration and concentration were compared, to assess accuracy and efficiency of either VA testing method in this age group.

Thirty-four participants completed the study (15 males, 19 females, age range 53-65 months, mean 59 months' ±3.7 months). VA was measured using Keeler Crowded logMAR, test duration was recorded in seconds and a concentration score based on the Child Concentration Inventory (CCI) was given by the examiner.

The median VA was 0.17 logMAR for each test method. There was no significant difference in the VA outcome between each test method (p = 0.46). The reversed method was significantly quicker to complete, with a median reduction in test duration of 28 seconds (p = 0.002). There was no difference in concentration levels between the test methods (p=0.18).

Both test methods gave the same VA results, and were therefore comparable. The reversed method was significantly quicker to complete which could be beneficial to both school vision screening services and orthoptic clinics.

Primary paediatric eye care in rural Bihar: the core orthoptic skill of measuring visual acuity is an essential tool

Rowena McNamara[1], Dr Lucy Mathen[2], Dr A Anand[3], Dr K Kumar[4], Dr R Hassan[4], Dr S Murmu[5], Dr S Joseph[6]
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Purpose: to evaluate the use picture vision tests when added to the skills of ophthalmic teams providing eye services in rural Bihar

Method: Four hospitals supported by Second Sight Charity from regional quadrants were selected. Trained support staff carried out hut-to-hut vision screening and ophthalmologists provided comprehensive eye services and free surgery for the blind. Hospital (1) received orthoptic training in Kay Picture charts and books, (2) used an electronic Kay picture test in a rural hospital, (3) had an optometrist with some paediatric skills, and (4) did not test vision in children under 6 years. Out-patient records were reviewed retrospectively from November 2018-Oct 2019 collecting: age at attendance, gender, symptoms, visual acuity, diagnosis and treatment.

Result: Total number of paediatric (<14yrs) out patient attendance in hospitals 1-4 ranged from 234-835. The most common pathology was conjunctivitis including allergic, fungal, bacterial and vernal. In 0-6yrs subgroup the mean attendance age range = 2.7-3.24yrs; rate of paediatric VA recorded range= 1.1%(hospital 3) to 28% (hospital 1); refractive error diagnosis range = 0.24% (hospital 3) to 29.5% (hospital 4)

Conclusion: Kay pictures had a dramatic effect on the rate of diagnosis of paediatric eye conditions. The test is cheap, quick to learn and can be used in hospitals and in the field. It has transformed the reach and coverage for detection of treatable paediatric eye conditions including refractive error. The resultant increase in paediatric workload is being met by utilising trained support staff to improve eye care services in rural areas.

Cyclical esotropia – a case series

Eve Shillan[1]
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Purpose/ Background: To review an interesting case series of patients with cyclic esotropia

Method: A retrospective case note review of seven patients which present with a cyclical esotropia across a 3 year period. Cyclical Esotropia is rare strabismus characterised by periods of esotropia followed orthophoria not related to accommodation, acuity or fatigue but a cycle of '24 hours squinting' and '24 hours straight'. It has been calculated that an ophthalmologist, with an interest in strabismus, would practise for 14 years for each cyclic esotropia patient seen.

Results: Seven patients were reviewed and diagnosed with a cyclic esotropia once a clear pattern had been established. Patterns of genetics, refractive error and presence of esotropia were examined. All were listed for surgery and outcomes measured. All cases presented age 2; literature cites onset 4-6 years. Some presented initially with a more sporadic presence of esotropia on squinting days but all became 48 hour cycles or more frequent prior to surgery.
All cases noticed behaviour changes on squinting days which resolved post-op. Two of the seven patients are twins and one has a family history of esotropia indicating and element of hereditary aetiology.

Conclusions: All patients who have had surgery on the angle measured most frequently when squinting are binocular with the cycle broken post-op. Recent studies support surgery aimed to correct angle present after refractive correction

and most often on the squinting day provides a good outcome that is stable long-term, with minimal risk of over correction.

Evidence Based Care Pathway for Isolated Adult Orbital Blowout Fractures

Jessica Wood[1], Joanne Adeoye[2]
[1]*Stockport NHS Foundation Trust, United Kingdom,* [2]*University of Liverpool, Liverpool, United Kingdom*

Purpose: This review aims to develop an evidence-based pathway for isolated adult orbital blowout fractures (BOFs). Evaluation of assessment methods, outcome measures, imaging modalities, and crucially, the optimal timing of surgical intervention was critically examined to develop a clinically applicable care pathway.

Methods: A literature search was carried out using Scopus, PubMed and Web of Knowledge. The literature included was all of retrospective design from an international radius. The care pathway focuses on isolated BOFs; facial and systemic injury were excluded.

Results: The literature favours the use of HAR% ratio, Field of Binocular Single Vision (FOBSV) and Exophthalmometer as the core tests that should form part of the standardized assessment for BOFs. CT imaging remains gold standard, particularly to identify 'red-flags' warranting early intervention. There was some disagreement in relation to timing of intervention in adult fractures who continue to be symptomatic without initial extraocular muscle (EOM) entrapment and enophthalmos >3 mm, where early intervention within two weeks is not indicated. The limited literature available agreed that successful functional and radiological outcomes can be achieved with conservative or late surgical management following an extended observational period of four weeks, opposed to the conventional two weeks.

Conclusions: An evidence-based care pathway has been created, confidently including the initial assessment methods, imaging modality, and the criteria for observation. A four-week observational period has been advocated due to evidence suggesting that there is no significant difference in outcomes from two-week observation, plus with careful functional evaluation, surgery may be avoided in some cases.

Interactive Poster session 3
Time: 11:30-12:15
Alphabetical by presenting author

Evaluation of Objective and Subjective Ocular Refraction in Refraction System with Binocular Simultaneous Looking-in Type

Megumi Fukushima[1], Dr Masakazu Hirota[2,3], Dr Takafumi Yukimori[4], Dr Akio Hayashi[4], Dr Yoko Hirohara[4], Dr Makoto Saika[4], Professor Kumiko Matsuoka[2,3]
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Purpose: We investigated the objective ocular refraction consistency between Binocular Simultaneous Looking-in Type (Chronos) and a conventional autorefractometer (KR-800) that measures eyes one by one and the subjective ocular refraction between Chronos and real space.

Methods: Twenty-eight healthy volunteers (21.2 ± 1.5 y.o.) participated in this study. Chronos and KR-800 achieved the objective ocular refraction in all subjects. The subjects were undergone visual acuity tests at 5.0 m under four conditions in a random order: performing the subjective refraction test using Chronos with the Chronos objective value (Condition i); performing the subjective test using the real space with the Chronos objective value (TCU-600) (Condition ii); performing the subjective test using Chronos with the KR-800 value (Condition iii); and performing the subjective test using the real space with the KR-800 value (Condition iv). The best-corrected subjective ocular refraction was defined as −0.18 logMAR. The subjective ocular refraction was converted to spherical equivalent (SE). The SE was compared between Chronos (merged Conditions i and ii) and real space (merged Conditions iii and iv).

Results: The objective and subjective SEs were significantly and negatively greater in Chronos (objective, −4.02 ± 2.80 D; subjective, −3.50 ± 2.66 D) than in KR-800 (objective, −3.80 ± 2.68 D; subjective, −3.29 ± 2.76 D) ($P < 0.004$).

Conclusions: The differences in objective and subjective SEs were less than 0.25 D. These results suggest that the Chronos is useful as a device for performing objective and subjective refraction tests.

Restrictive Strabismus Secondary to Glaucoma Drainage Device

Carrie Griffiths[1], Dr Stewart Lake[1], Professor Jamie Craig[1]
[1]Flinders Medical Centre, Australia

Purpose: Diplopia and ocular motility abnormalities have been well reported, however opportunities to see these complications may not arise for some orthoptists.
This case reports a patient with restrictive strabismus and diplopia following Molteno3 glaucoma drainage device (GDD) implantation requiring strabismus surgery.

Methods: A 70 year old female presented to the orthoptic clinic with diplopia following GDD surgery. A longstanding patient of a tertiary referral centre, she had a complex ocular history including Varicellar Zoster Virus (VZV) uveitis, uncontrolled intraocular pressure (IOP), epiretinal membrane and macular hole in the right eye. Adequate IOP was not maintained right eye and a GDD was implanted supero-temporally in an attempt to control IOP.

Results: Postoperatively, orthoptic assessment showed a right exotropia with right hypertropia, the patient noted persistent diplopia. Ocular motility right eye was most significantly restricted in laevo depression, directly related to the GDD site.
Diplopia management involved total occlusion and Fresnel prism. Following a stable 2 years post GDD implantation the patient opted for strabismus surgery. A 6mm inferior rectus recession and 6mm lateral rectus recession was performed left eye due to ongoing uveitis right eye. The patient reported a significant improvement in diplopia post operatively with no prism required.

Conclusions: Current literature reports that GDD may cause temporary or persistent ocular motility abnormalities which may require strabismus surgery. This case illustrates a single outcome following GDD implantation. It is important to be aware of the possible ocular motility complications that GDD can cause especially as their use becomes more common.

Automatic Semi-Realtime Measurements of Eye Movements using Video Oculography and Artificial Intelligence

Dr Masakazu Hirota[1,2], Professor Takao Hayashi[1,2], Dr Emiko Watanabe[2], Dr Yuji Inoue[2], Professor Atsushi Mizota[2]
[1]Department of Orthoptics, Teikyo University, Itabashi, Japan, [2]Department of Ophthalmology, Teikyo University, Itabashi, Japan

Purpose: To accurately record the movements of a hand-held target together with the smooth pursuit eye movements (SPEMs) prompted by video oculography (VOG) combined with deep learning-based object detection through a single-shot multibox detector (SSD).

Methods: VOG was used to record the SPEMs of 11 healthy volunteers (21.3 ± 0.9 years). The subjects focused on a moving target manually moved at a distance of 1 m by the examiner. SSD was employed to develop an automatic recording system for predicting the type and location of objects in a single image. A total of 400 images acquired from one subject using a VOG scene camera were categorized into two groups (300 and 100) for training and validation. A total of 1100 images from all the subjects (100 images/subject) comprised the testing data. The proposed method achieved 75% average precision (AP75) considering the relationship between the location of the fixed target (as calculated by SSD) and the position of each eye (as recorded by VOG).

Results: The AP75 obtained by SSD for all subjects was 99.7% ± 0.6% with a mean sampling rate of 32.25 fps. Significant and positive correlations of the horizontal and vertical target locations with each eye position in the horizontal and vertical directions (adjusted $R2 \geq 0.955$, $P < 0.001$) were observed.

Conclusions: These findings indicate that the combination of VOG and SSD can facilitate a semi-real time analysis of the hand-held stimulus target movements and SPEM.

Diplopia after Periocular Injections with Botulinum Toxin

Wendy Hordijk-Noordhuizen[1], Marian Verkaik-Rijneveld[1]
[1]The Rotterdam Eye Hospital, Rotterdam, The Netherlands

Purpose: Diplopia after periocular injections with Botulinum Toxin A (BTX) is a rare and transient complication. It is associated with inferior oblique paresis or rarely with lateral rectus paresis or superior oblique paresis. Here, we report a case of diplopia after periocular (eyelid) BTX injections.

Methods: A retrospective chart review was performed of a patient who presented at our Orthoptic Department in March 2018 with diplopia after BTX injections.

Results: A 54-year-old women presented at our Orthoptic Department with diplopia at distance after BTX injections for blepharospasm. She had been injected with bilateral injections in the pretarsal M. Orbicularis Oculi of the medial and lateral upper eyelid, lateral lower eyelid, and the outer canthus. In addition the M. Orbicularis was injected at two locations above the brows. Diplopia gradually developed in the first week after the injections. Patient presented a slight esotropia and hypotropia of the right eye. Motility of the right eye showed a slight elevation deficit in adduction and a slight abduction deficit. After about eleven to twelve weeks the diplopia resolved.

Conclusion: Diplopia is a potential, but rare adverse effect of BTX injections in the periocular and periorbital area. When the BTX diffuses to the extra ocular muscles this produces a transient paresis of the muscle which results in diplopia. The diplopia will disappear spontaneously within a couple of weeks. Patients who experience focusing difficulties or diplopia after a BTX injections may have a greater risk of recurrence of this complication.

The need for psychological support in Thyroid eye disease: A literature review

Melanie Joyce[1], Dr David Newsham[2]
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Purpose: This literature review aims to critically evaluate the psychological consequences of Thyroid eye disease (TED) and determine whether there is evidence that psychological support would be beneficial to patients with TED.

Methods: Online database searches conducted with the following search terms: psychological, TED, graves orbitopathy, quality of life and psychotherapy. Boolean operators such as AND, OR and NOT were used with the terms to determine the inclusion/exclusion criteria. Articles were cross-referenced with non-Medline journals including the British and Irish Orthoptic Journal and American Orthoptic Journal and hand based on the number of citations to strengthen the impact and relevance of the topic reviewed.

Results: Despite the variability of psychological impact in TED patients, deficits in visual functioning and altered appearance/facial disfigurement consistently cause psychological consequences. Despite frequent and extensive documentation of the psychological implications of TED, there is limited evaluation of different types of psychological support for TED patients or research to demonstrate their effectiveness. This review established that support interventions such as self-care, education and counselling and cognitive behavioural therapy (CBT) may prove beneficial for TED patients.

Conclusions: Comprehensive treatment of TED should include the patient's psychological wellbeing alongside physical signs and symptoms. Evidence demonstrated that psychological support can be effective in improving quality of life for patients with chronic conditions, but further research is need specifically relating to TED.

Randomised controlled trial of a specialised mobile application for amblyopia treatment

Kristine Kalnica-Dorosenko[1], Dzmitry Viarenich[2], Andrei Karola[2], Aliaksei Haraks[2], Artsem Makarau[2], Aliaksandr Katolik[2], Professor Aiga Svede[3]
[1]Children's Clinical University Hospital, Latvia, [2]Gameblyo Team, [3]University of Latvia, Department of Optometry and Vision Science, Latvia

Purpose: The field of healthcare gaming is currently experiencing a "boom" - technology costs are dropping, clinical and professional interest in gaming is growing, and more and more studies are showing the effectiveness of gaming in healthcare. Modern technologies provide opportunities to develop and improve traditional methodological approaches in the treatment of amblyopia. With the help of attractive computer graphics, various objects, images, and task characteristics, visual stimuli should induce impaired functions to participate in visual processes.

Methods: We conducted a two-phase randomised controlled trial to evaluate the safety and efficiency of a digital therapy for amblyopia.

Results: The results show statistically significant improvement in visual acuity in all treatment groups after amblyopia therapy.

Conclusions: Our results confirm the efficacy of the therapeutic method in clinical practice for the treatment of amblyopia.

Did parents reliably measure children's visual acuity during the Covid-19 lockdown in New Zealand?

Miriam Langeslag-Smith[1], Grace Yung[1], Christin Coomarasamy[1]
[1]Counties Manukau Health, Auckland, New Zealand

Background: Telehealth services were implemented on the back of the COVID-19 lockdowns as an adequate solution to provide safe and quality healthcare for patients while promoting distancing across services. All scheduled orthoptic appointments at Counties Manukau Health were cancelled during New Zealand's highest level lockdown in 2020 and telephone consultations were offered instead. Families of children were asked to conduct a home visual acuity (VA) test using a mobile application or a paper-based test.. We investigate the compliance, feasibility and reliability of home VA testing.

Methods: 'Snellen Chart' by João Meneses and 'Kay iSight Test Professional' by Kay Picture were identified as suitable for Android OS and iOS smartphones respectively. Paper-based 'Tumbling E'/'Snellen Eye Chart' test devised by

publication called All About Vision were also offered to families who did not own a smartphone. Results were then compared to the clinic VA test performed by an orthoptist at the follow-up appointment.

Results: The clinic based VA was slightly better than the home VA. This was not statistically significant for the right but was statistically significant for the left eye. 72% of eyes had clinically significant agreement, whereas, 94% of eyes demonstrated agreement within the 95% limits of agreement. There were no significant effects on mean difference between the methods for the right and left eyes across gender, age or ethnicity.

Conclusions: There are limited validated acuity tests available for home devices. Although compliance to perform home VA test was poor, correctly achieved results were mostly agreeable with clinic VA results.

Challenges in developing an Ophthalmic Common Clinical Competency Framework (OCCCF) and Ophthalmic Practitioner Training (OPT)

Rowena McNamara[1]
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Background: In 2014 the Centre for Workforce Intelligence recommended the British and Irish Orthoptic Society (BIOS) support and enable orthoptists to take on more complex medical ophthalmology responsibilities. The Royal College of Ophthalmologists (RCOphth) published the results of a census identifying gaps in recruitment of ophthalmologists amid a predicted 40% increase in demand for eyecare services. To meet demand postgraduate orthoptists, optometrists and ophthalmic nurses have extended their core skills to work in extended roles. However, they were being trained locally which left patients exposed to non standardised skills and potentially variable quality of care. To meet the need for validation of clinical competencies the healthcare professions collaborated to produce a framework of 3 skill levels in four clinical areas of need: cataract, medical retina, glaucoma, and acute & emergency care.

Process: the following challenges for the professions had to be addressed:
• mapping competencies from the ophthalmology curriculum
• prior competency accreditation
• equal access to work-based learning for HCPs working in all sectors
• training multi-professional clinical trainers, education supervisors and external assessors
• developing an easy-to-use portfolio
• OPT being accepted as basis for apprenticeships

Conclusion: The OCCCF was launched in 2016 and with the support of Health Education England (HEE) has developed into work based ophthalmic practitioner training (OPT). Higher Education Institutes (HEIs) have developed modules in education, leadership and research which when combined with level 3 OPT clinical pillar completes the requirements of a masters qualification in Advanced Eye Care.

A factual survey for the environment surrounding amblyopia training in Japan.

Shuri Okamura[1], Kozue Sasaki[1], Maki Nakagawa[1], Haruka Minoda[1], Professor Takao Hayashi[1], Professor Atsushi Mizota[1]
[1]*Department of Ophthalmology, Teikyo University, 2-11-1 Kaga, Itabashi, Japan*

Purpose: In Japan, the number of children attending daycares and kindergartens has been increasing. Accordingly, the cooperation of daycare or kindergarten teachers is necessary for treating amblyopia. In this report, we surveyed how daycare teachers take care of amblyopic children under the treatment and ask for their parents how cooperative the teachers for wearing glasses or occlusion and/or atropine therapy is.

Methods: The questionnaires on the cooperation system were distributed to 157 daycares around the areas of Teikyo University Hospital, and we also do the questionnaires for parents of amblyopic children how the daycare and kindergarten teacher's cooperation was. Amblyopic children treated at Teikyo University Hospital were included 35 wearing glasses and 17 training occlusion or atropine therapy.

Results: A total of 67 daycares responded to our survey, 97% were able to wear glasses, 76.1% were able to undergo occlusion treatment, and 67.2% were able to receive atropine therapy. All parents answered that they could wear glasses at the daycares and kindergartens, however, 1 out of 17 (5.9%) children under treatment with occlusion was refused by a daycare teacher. An individual agreement between parents and the daycare or kindergarten regarding the children for wearing glasses or training was made. 17 out of 35(48.6%) were for wearing glasses, and 2 out of 11 (18.2%) were for training.

Conclusion: In training amblyopia, it is necessary to understand the background of the children and to establish a cooperative system of daycare and kindergarten teachers.

Ocular repercussions in COVID-19 patients: structural changes of the retina

Professor Ilda Maria Poças[1,2], Dr João Paulo Cunha[1,3], Professor Pedro Camacho[1,4], Professor Carina Silva[1,5], Professor Edna Ribeiro[1,4], Professor Rui Miguel Brito, Professor Paula Mendonça[1,5], Inês Nicho[6], Dr Isabel Prieto[6], Dr Júlio Almeida[6], Olga Barroqueiro[6], Patricia Condado[6], Pedro Lino[3,6], Rita Carmo[6], Francisca Carvalho[3], Mariana Castelhano[3]
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Purpose: It is known that SARS-COVs have neurotropism and that the viruses reach the CNS by hematogenous or retrograde neuronal dissemination. As the human retina is an extension of the CNS with high energy requirements and enormous vascular dependence, it is important to know the impact of COVID-19 on the human retina. The aims is to describe the ocular changes in patients infected with COVID-19 at the level of the retina compared to a control group.

Methods: Cross-sectional study of a correlational quantitative paradigm. The sample is divided into two groups (PCR positive vs PCR negative). The tomographic study of the retina and optic nerve was performed using optical coherence tomography - Spectral Domain (SD-OCT) RNFL retinal nerve fiber layer) and Fast macular programs. The ethical and legal guidelines were considered.

Results: A total of 40 controls (13 men [32.5%]) and 56 COVID19 participants (22 men [39.2%]) were included in this first report. Statistical significance was found for macular total thickness: nasal 3mm (p=0.025), inferior 3mm (p=0.049) and temporal 3mm (p=0.009). A decrease in neural layers was clear in the macula (nasal [p=0.049]; temporal [p=0.029] and in the peripapillary sectors of RNFL (TS [p=0.019], NI [p=0.002], TI [p=0.046] and total [p=0.014]).

Conclusion: These results differ from the preferentially vertical locations (typical of glaucoma), approaching the classic description of the “tie knot” observed in other neurological, toxic and/or metabolic pathologies. These exploratory results will allow us to describe/clarify retinal changes in patients due to Sars Cov 2 neurotropism.

Postoperative uncorrected visual acuity of eyes implanted with Lentis Comfort

Yuka Sasaki[1], Hisae Nakamura[1], Ritsuko Miyata[1], Mutsumi Mitamura[1], Tsukasa Mabara[1], Megumi Fujisada[1], Aki Okagaki[1], Haruhiko Yamada[1]
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Purpose: We previously reported that Lentis Comfort® LS-313 MF15 (Oculentis GmbH) outperformed a monofocal intraocular lens (IOL) for both monocular and binocular uncorrected visual acuity (VA) at all distances. In this study, we assessed the ideal refractive value for satisfactory far and near vision after implantation of Lentis Comfort.

Subjects and methods: Sixty-nine eyes of 49 patients who underwent cataract surgery with Lentis Comfort implantation at Kansai Medical University Hospital from May 2019 to February 2021 were evaluated. Postoperative uncorrected monocular VA was measured at 13 distances ranging from 5.00 m to 0.32 m. We divided patients into two groups by spherical equivalent (SE) value: 0 D to -0.625 D (Group A) and -0.75 D to -1.50 D (Group B). In addition, uncorrected binocular VAs at 6 selected distances were extracted and compared between patients with and without monovision.

Results: Uncorrected VAs of Group A were significantly better than those of Group B at 5.00 m, 4.00 m, 3.20 m, and 2.50 m (p value range, 0.000 to 0.013). In contrast, no statistically significant differences were found between groups for uncorrected near VAs (0.50 m to 0.32 m). Binocular VAs did not differ significantly between patients with and without monovision at any selected distance.

Conclusion: When implanting Lentis Comfort, setting the refractive value of the IOL to a far target gives better far vision without sacrificing near vision. Lentis Comfort does not require monovision to extend clear visual areas, while monofocal IOLs do.

International Strabismological Association Symposium: Update on the management of ocular motor palsies
Time: 12:45-13:45

This symposium will be an update on the characteristics and treatment of cranial nerve paralysis. Selected types of supranuclear and peripheral disorders will be discussed outlining controversy and/or advancement in treatment. Topics include updates on use of botulinum toxin, classification of bilateral IV nerve palsy, surgical approaches to IIIrd cranial nerve, management strategies for monocular elevation deficit and internuclear ophthalmoplegia, and an overview of the characteristics of cranial nerve palsy arising from stroke.

Chair: Rosario Gomez de Liaño

Update on the use of botulinum toxin in paralytic strabismus
Dr Seyhan Özkan - Turkey

Bilateral IV nerve palsies
Dr Alejandro Armesto - Argentina

Surgical management of 3rd nerve palsy
Dr Gill Adams – United Kingdom

Management of monocular elevation deficit
Dr Galton Vasconçelos - Brazil

Management of internuclear ophthalmoplegia
Dr Saurabh Jain – United Kingdom

Oculomotor problems due to stroke
Professor Fiona Rowe – United Kingdom

Theme: Strabismus & Paediatrics
Time: 14:00-15:00

Inferior Oblique Recession with 5 mm Loop to Correct Vertical Deviation and Inferior Oblique Overaction Secondary to Superior Oblique Palsy

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Purpose: To evaluate the effect of augmented inferior oblique recession (recession + 5mm loop) on the vertical deviation in primary position (PP) and the inferior oblique overaction (IOOA) in patients with unilateral congenital or acquired superior oblique palsy.

Patients and methods: The medical records of patients who underwent unilateral inferior oblique recession with 5mm loop during 2012 and 2021 were retrospectively reviewed. All patients had small to moderate manifest or intermittent hypertropia in PP and overaction of the inferior oblique muscle of +2 or +3 in lateral gaze. Patients who had combined inferior rectus surgery of the contralateral eye or who had previous vertical muscle surgery were excluded.

Results: A total of 28 patients were included. Of these, 4 patients had combined horizontal muscle surgery. In 24 patients, the superior oblique palsy was congenital or longstanding, in 4 it was acquired and stable for more than 9 months. The mean preoperative vertical deviation in PP at distance and near was 14.7 and 11.7 respectively. The mean postoperative vertical deviation was 5.4 and 4.5 after a mean follow-up of 19.8 months. The IOOA improved in all patients, 16 patients had an improvement of +2 and 10 patients had an improvement of +1.

Conclusion: Inferior oblique recession with a 5mm loop is a simple and quick technique to correct small to moderate hypertropia in primary position and inferior oblique overaction in contralateral gaze in patients with congenital, longstanding or acquired superior oblique palsy without risk of overcorrection.

Indications for and effect of nasal and temporal partial tenotomy of the vertical rectus muscles in strabismus

Dr Parinaz Rostamzad[1], Helma M. van der Meulen-Schot[1], Professor Huibert Simonsz[1], Dr Sjoukje Loudon[1]
[1]Erasmus MC, Rotterdam, Netherlands

Nasal and temporal partial tenotomies of the vertical rectus muscles differentially correct vertical deviation (VD) in adduction, VD in abduction, V- or A-Pattern and ex- or incyclotropia. In an initial analysis of a large case series we aimed to define indications and differences in effect.

A retrospective analysis was conducted. Included patients had a nasal or temporal partial tenotomy of the vertical rectus muscles. The Mann-Whitney U test was used to find differences in outcome.

In total 126 patients were included, 100 of which were treated by nasal and 26 by temporal partial tenotomy. Effect of surgery was analyzed for inferior and superior rectus together, so that absolute values were used for change in angle. For nasal tenotomy, VD in adduction was 1.32º, in gaze ahead 2.78º, in abduction 3.76º, V/A pattern of 1.04º and ex/incyclotropia of 0.78º. For temporal tenotomy VD in adduction was 3.81º, in gaze ahead 2.92º, in abduction 1.67º, V/A pattern of 1.21º and ex/incyclotropia of 0.74º. There was a significant difference between nasal and temporal partial tenotomy for VD in adduction ($Z= 4.215$, $p<0.001$) and for VD in abduction ($Z=-2.365$, $p=0.018$).

Large differences were found in the change of VD in adduction as compared to abduction for the nasal and temporal partial tenotomy. It remains unclear why the change in cyclotropia for the temporal partial tenotomy, in whom it could be measured, was so small.

Botulinum toxin as adjuvant to rectus muscle surgery in high myopia

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[1]Erasmus MC Rotterdam, Dr. Molewaterplein 40, Netherlands, [2]Deventer Ziekenhuis, Deventer, Netherlands
We report on a novel application for Botulinum Toxin in 2 patients with large esotropia-associated high myopia (EAHM).

The first patient had long standing slowly progressive esotropia of 61º with limited abduction in both eyes. Myopia was high: RE S-14, and LE S-13 with an axial length of 30.88mm and 29.34mm, respectively. Visual acuity (VA) was 20/20. He was given 2.5u BTX in the MR of the LE followed by 8mm resection of the LR of the LE 2 weeks later. Three months later 2.5u BTX was injected in the MR of the RE followed by an 8mm resection of the LR of the RE. The second patient had an esotropia of 30º. Myopia was high: RE S-17 with an axial length of 33.06mm and S-9 with an axial length of 27.19mm in the LE. VA in the RE was counting fingers. VA in the LE was 20/20. She was given 2.5u BTX in the MR of the RE followed by 7.5mm resection of the LR of the RE 2 weeks later. All procedures were performed under general anesthesia.

In the first patient we found an overall reduction of esotropia of 57º. Six months after the second surgery there was an esotropia of 4º with minimal abduction limitation. In the second patient the esotropia had improved to 12º of esotropia with an improved abduction 6 months later.

We found a large reduction in esotropia using BTX as adjuvant to a resection of the rectus muscle in patients with EAHM.

Stereopsis for Microsurgery: Does It Really Matter?

Hanouf Alkharashi[1], Dr Robert Laroche[2,3]
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Purpose: There remains a lack of objective evidence on whether stereopsis is necessary for an ophthalmic surgical career. The present study attempts to address this question by comparing the surgical performance of subjects with different levels of stereoacuity using a virtual reality (VR) intraocular surgical simulator (EYESi, VRmagic Holding AG, Mannheim, Germany).

Methods: Subjects were tested based on their stereoacuity level and stratified in 3 age-matched groups: normal stereo (60 seconds of arcs or better), subnormal stereo (worse than 60 seconds of arc), and patients with no measurable steroacuity. 33 subjects with no previous surgical experience were recruited from IWK Health Centre, Halifax, NS. Subjects performed 3 attempts on a standardized microsurgical module on the EYESi VR simulator. Mixed repeated measure ANOVA was used for statistical analysis.

Results: There was no significant main effect of the stereo-group that the participants belonged to on their scores [F (2, 28) = 0.21, p=0.81], or on the time needed to complete the task [F (2, 28) = 0.04, p=0.96], or on the odometer value [F (2, 28) = 0.45, p=0.64] or on the amount of injury to the cornea [F (2, 28) = 0.56, p=0.57] or to the lens [F (2, 28) = 0.50, p=0.61].

Conclusion: This study showed that the microsurgical performance on the EYESI intraocular surgical simulator of individuals with reduced and absent stereoacuity were statistically indistinguishable from those with normal stereoacuity. Caution is recommended when advocating high level stereopsis as a requirement for admission to residency programs in ophthalmology.

Blepharoplasty: A cause of diplopia?

Carrie Griffiths[1,2], Dr Deepa Taranath[1,2]
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Purpose: To report an unusual case of overcorrected lid position and diplopia following cosmetic lid surgery.

Method: A 65 year old female presented to a ophthalmology practice with troublesome vertical diplopia following bilateral blepharoplasty. The patient had undergone bilateral blepharoplasty 4 months prior with use of a hyaluronic acid–based filler injected into the right lid plus a revision procedure on the right lid 2 months after the initial procedure.

Results: On presentation orthoptic investigation showed right lid retraction, a right hypotropia with diplopia and limitation of the right eye in elevation. Lid retraction was reported post-blepharoplasty and a plastic surgeon had attempted to rectify this with release of the original scar.

Due to the unusual presentation and unclear aetiology a number of investigations were conducted including MRI orbit, full blood count, thyroid stimulating hormone levels and acetyl choline receptor antibody levels. Test results showed Thyroid Eye Disease (TED) and the patient started appropriate medication.

Conservative orthoptic management using total occlusion was preferred by patient. Further development of TED was noted with increasing bilateral lid retraction and significant ocular motility restrictions. Once clinically and medically stable strabismus surgery was performed, requiring 2 separate procedures.

Conclusion: This case illustrates the importance of a thorough work up when dealing with all cases of diplopia. Presenting history may be a misleading, masking underlying aetiology.

This patient may have already had clinical signs of thyroid eye disease or the surgery and/or use of cosmetic fillers produced a localised inflammatory response unmasking the condition.

Exploring the ocular complications of intra-arterial chemotherapy and their recovery time for refractory retinoblastoma: a 5 year retrospective review

Zishan Naeem[1], Dr Catriona Duncan[2], Dr Tanzina Chowdhury[2], Dr Mette Jorgensen[2], Dr Fergus Robertson[2], Dr Adam Rennie[2], Dr Jane Herod[2], Professor Mandeep Sagoo[1], Maddy Ashwin Reddy[1]
[1]Barts Health NHS Trust, London, United Kingdom, [2]Great Ormond Street Hospital, London, United Kingdom

Purpose: Intra-arterial chemotherapy (IAC) is widely used in the treatment of retinoblastoma. Visual loss and ocular motility problems have been documented; a lack of data exists regarding other ocular complications. This study aims to explore ocular complications of those treated with IAC, particularly their recovery time which has not yet been documented.

Method: A 5 year retrospective chart review of patients with retinoblastoma requiring IAC following relapse from systemic chemotherapy. All patients were followed up for at least 1 year from last course of IAC. Ocular complications were identified using orthoptic findings and fundus fluorescein angiography and rate of recovery was calculated. The correlation of complications with doses of chemotherapeutic drugs used and catheterisation complications was assessed.

Results: Twenty-nine eyes (26 patients) received IAC from 2014 to 2018. All eyes treated with melphalan +/- topotecan, three of which had carboplatin when melphalan was unsuccessful. All had age-appropriate doses unless unresponsive to treatment. Ocular complications occurred in twenty-five eyes (86%) consisting of ptosis (52%), periorbital swelling (34%), erythema (34%), visual acuity loss (28%), ocular motility deficits (14%), pupil abnormalities (14%), and eyelash/eyebrow loss (14%). Median recovery time was 4 months. Persistent ocular complications, mainly ptosis,

occurred in 10 eyes (34%) associated with increased IAC doses in attempt to achieving globe salvage. Three eyes were enucleated. No significant correlation found between ocular complications and catheterisation complications.

Conclusion: Families of patients treated with IAC should be counselled regarding the high likelihood of ocular complications, in particular the types and their expected recovery time.

Theme: Quality of Life
Time: 15:15-16:05

What do patients report after strabismus surgery?

Gemma Arblaster[1,2], Dr David Buckley[1], Professor Helen Davis[1], Dr Sarah Barnes[3]
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Purpose: Strabismus surgery for psychosocial reasons aims to align the eyes into a straighter position and improve the patients' quality of life. This study explored patient experiences of their outcomes from strabismus surgery performed for psychosocial reasons.

Methods: A qualitative study using semi-structured interviews was conducted with adults (n=13) who had undergone strabismus surgery for psychosocial reasons 4.5-20 months earlier. Maximum variation sampling was used to recruit patients, the dimensions were sex (male (n=6) / female (n=7)) and age group (younger 18-35 (n=6) / older 36+ (n=7)). Patients were asked what they felt had changed (improved or worsened) or not changed for them following strabismus surgery. Interviews were recorded, transcribed verbatim and a coding framework was developed. The data were analysed thematically using the principles of grounded theory.

Results: All patients had strabismus surgery for psychosocial reasons, none had diplopia or demonstrable binocular single vision pre or post-operatively. Four themes emerged from the data: improvements in vision; task performance; physical symptoms and confidence. Patients described a range of ways in which their vision, abilities to perform tasks and physical symptoms had improved.

Conclusions: Many adult patients perceived their vision, task performance or physical symptoms improved following surgery, in addition to improved confidence and self-perception, which are typically expected in this patient group. Whilst not reported by every patient, greater improvements are perceived by patients post-operatively than are currently measured clinically.

Investigating the outcomes of adult strabismus surgery undertaken for psychosocial reasons

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Purpose: In the absence of binocular single vision and diplopia, strabismus surgery can be undertaken for psychosocial reasons, to improve eye alignment and health related quality of life (HRQoL). This study investigated whether adults undergoing strabismus surgery for psychosocial reasons could achieve outcomes from surgery, in addition to improved eye alignment and HRQoL.

Methods: Adults with strabismus who had elected to undergo strabismus surgery for psychosocial reasons (surgery group) and adults with strabismus who were not seeking surgery (control group) were recruited prospectively. All participants underwent a range of measures of their vision, task performance, physical symptoms and confidence and emotions, before and after surgery. Objective measures and patient reported outcome measures (PROMs) were used.

Results: Compared to the control group (n=15), the surgery group (n=12) had objective evidence of improved vision (binocular summation at 100% contrast, coarse stereotest (CST) performance) and improved task performance (time to perform two different screen based tasks) postoperatively. Most other measures of vision and task performance were unchanged. Some worsening of task performance postoperatively was measured (bead threading and grooved pegboard). Subjective improvements were also reported in vision, task performance, physical symptoms and confidence and emotions, using PROMs.

Conclusions: Strabismus surgery undertaken for psychosocial reasons in adults can lead to some objective improvements in vision and task performance and subjective improvements in vision, task performance, physical symptoms and confidence and emotions. These improvements were in addition to the expected outcomes of improved eye alignment and improved HRQoL.

Psychometric properties of the Dutch version Adult Strabismus-20 Questionnaire (AS-20)

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Purpose: The Adult Strabismus-20 questionnaire (AS-20) is an instrument developed to assess the strabismus-specific quality of life (QoL). The aim was to investigate several psychometric properties of the Dutch-AS-20 among adult patients with strabismus.

Methods: Patients with any type of strabismus completed the Dutch-AS-20, the EuroQol five-dimensional questionnaire (EQ-5D-5L) and the Amblyopia and Strabismus Questionnaire (A&SQ) (N=286). Psychometric properties were evaluated with the use of item response theory (IRT) analysis and by determining the internal consistency, test-retest reliability, targeting and measurement precision. Construct validity of the AS-20 was tested against the EQ-5D-5L and the A&SQ.

Results: Principal component analysis indicated a psychosocial and function subscale. After collapsing underutilised response options for 10 items, subsequent fit analysis showed that the function subscale benefitted from removal of two items. Internal consistency (Cronbach's alpha 0.93 psychosocial and 0.87 function subscale) and test-retest reliability (ICC 0.91 psychosocial and 0.88 function subscale) were sufficient. Targeting and measurement precision of both subscales was appropriate for patients with low to moderate levels of visual and psychosocial functioning but suboptimal for patients with high levels of visual and psychosocial functioning. Correlations were between 0.4 and 0.7 for (subscales of) the Dutch-AS-20 and the A&SQ or EQ-5D-5L, confirming expected construct validity.

Conclusions: The 18-item Dutch-AS-20 has sound psychometric properties to assess the strabismus-specific QoL among Dutch adult patients with low to moderate levels of visual and psychosocial functioning. Care must be taken when interpreting the results due to lower measurement precision at the higher end of both subscales.

The Brain Injury Visual Impairment Impact Questionnaire (BIVI-IQ): using multiple methods for development

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Visual impairment is common following brain injury. The co-developed 15-item Brain Injury-related Visual Impairment Impact Questionnaire (BIVI-IQ) is the first questionnaire available to measure vision-related quality of life in this population. Brain injury-related visual impairment often results in reduced quality of life. Capturing this impact can help personalise patient care. Our aim was to compare the outputs from three methods used to develop the BIVI-IQ.

With no ‘gold standard’ development methodology for patient reported outcome measures (PROMs), multiple methods were used to develop the BIVI-IQ. Rasch modelling of returned pilot questionnaires, provided psychometric analysis. A Delphi process incorporated stroke survivors and clinician viewpoints. These two methods were united using a nominal group process.

The final instrument would have been constructed differently if each method had been used in isolation. The three-round Delphi process would have produced the largest instrument with 34 items. Rasch modelling with minimal clinical input would have produced an instrument comprising 19 items. Combining these methods with a nominal group meeting produced the BIVI-IQ comprising 15 items. Nine items were selected by all three methods. The other six items all were selected by the nominal group process, of which five were also selected by Rasch modelling.

This multi-methods approach combined the robustness of psychometrics with experiences of stroke survivors and clinicians. It produced a 15-item questionnaire, developed for capturing vision-related quality of life of individuals with a

variety of visual impairments after brain injury, in the presence of other neurological sequelae and suitable for inpatients and outpatients.

Visual functions and executive functions in children with Down syndrome; randomized controlled trial with bifocals and unifocals with 1-year follow-up.

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Introduction: In children with Down syndrome, visual, motor and cognitive functions develop atypically. Can bifocal glasses improve their visual functions at near and additionally relieve their cognitive impairments?

Methods: In a multicentre (15) randomized controlled trial with 1-year follow-up, children with Down syndrome (2–16 years) were provided either bifocal glasses (add +2.5 Dioptres, flat top at the pupillary centre; n=50) or unifocal glasses (n=52), both with full correction of refractive error. Several visual functions and executive functions were assessed pre and post-intervention. Associations between these functions were analyzed.

Results: After one year, crowded near visual acuity had improved most in the bifocal group (improvement bifocals 0.31±0.28 LogMAR; unifocals 0.16±0.30 LogMAR, p=0.017) and more than uncrowded near visual acuity (improvement bifocals 0.23±0.29 LogMAR; unifocals 0.12±0.30 LogMAR, p=0.045).

Shortly after provision of newly prescribed glasses, strabismus was reduced in the bifocal group only (p=0.010); this result stood undiminished during follow-up.

At baseline, a larger delay in adaptive behaviour was found in children who have more visual impairment (r=−0.396, p=0.001). After one year, no effect on accommodation accuracy was found (p=0.121). Executive functions (task-based MEFS-scores) improved in the bifocal group only (p=0.002; no intergroup difference p=0.120).

Post-intervention, better MEFS scores were associated with better visual acuities (crowded near p=0.025; uncrowded near p=0.019; distant p=0.045). In questionnaires, only teachers reported improved executive functions.

Conclusions: In children with Down syndrome, bifocals improve near visual acuity (uncrowded and crowded) and reduce strabismus more effectively than unifocals. Post-intervention, better visual acuity was associated with better executive functioning.

Theme: Accommodation, Vision, & Fusion
Time: 16:20-17:10

The impact of smartphone use on accommodative functions

Louise Allen[1], Martha Waters-Farrelly[2], Laura Silver[1], Dr Jignasa Mehta[1]
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Purpose: A pilot study was undertaken to investigate accommodative measures before and after 30 minutes of smartphone use.

Methods: Participants aged 16-40yrs were invited. Accommodative facility (AF), near point of accommodation (NPA), and near point of convergence (NPC) before and after 30 mins of habitual smartphone use were assessed. NPA and accommodative facility were assessed with both eyes open (BEO), right eye (RE) and left eye (LE). Accommodative facility was assessed using +/-2D flipper lenses and measured in cycles per minute (cpm). NPA and NPC were assessed using the RAF rule and measured in centimetres. Data were analysed in SPSS using non-parametric statistical tests.

Results: 18 participants were recruited, mean age 24yrs (SD: 7.6yrs). AF measured with BEO and RE significantly improved but no significant difference was found with the LE. NPC and near NPA was significantly impaired under all conditions after smartphone use. AF significantly improved by 3cpm (p=0.015) for BEO, 2.25cpm for RE (p=0.004) and 1.5cpm for the LE (p=0.278) after smartphone use. NPA with BEO became worse by 2cms (p=0.0474), with the RE worse by 0.5cms (p=0.0474) and the LE, worse by 0.125cms (p=0.047). Convergence worsened by 0.75cms (p= 0.018).

Conclusions: AF (BEO and RE) increased following smartphone use, the difference however was 3cpm which is not clinically significant as it is less than the published normative SD deviation (5 cpd). NPA and convergence, were found to recede, by up to 2cms and 0.75cms respectively, under all conditions (BEO, RE, LE), but not considered clinically significant.

Modification of a symptom questionnaire for use with smartphones

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[1]University of Liverpool, Liverpool, United Kingdom, [2]Manchester University NHS Foundation Trust, Manchester, United Kingdom

Purpose: There are a lack of symptom questionnaires for smartphone use. This study aimed to modify a previously validated symptom questionnaire that could be used to measure symptoms caused by Smartphone use.

Methods: Cognitive interviews with participants who use smartphones took place over video conference. The participants were asked to think aloud their interpretation and responses to the questionnaire during the call. The interviews were coded independently by two authors and thematically analysed. These were further agreed by an external reviewer.

Results: 21 participants were recruited aged 11-41 (mean: 26yrs, SD: 10.9). Thematic analysis revealed a number of themes surrounding the format of the questionnaire & interpretation of symptoms. The questionnaire was modified in two ways: 1) Instructions were amended to gain the intended purpose of the questionnaire, 2) Amendment of the wording and list of symptoms. Further themes were recognised as the influence of pre-existing conditions and phone usage habits.

Conclusions: The modified questionnaire is a more appropriate tool for measuring the symptoms produced by smartphone usage. Emergent findings from the interviews included activities and habits of participants, which potentially explain the symptoms experienced by smartphone users. Further work is underway to implement this modified questionnaire as part of a larger study to determine the impact of smartphone use on accommodative measures.

An Evidence-based Psychological Approach to Accommodative Problems

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Purpose/Background: Accommodative problems have a strong psychological element and can be challenging to manage.

Methods: The accommodation and convergence of 23 patients without ocular or neurological pathology, with severe accommodative problems (spasm, “paralysis” and severe inertia) were assessed objectively in the Infant Vision Laboratory. Most had received previous orthoptic treatment or vision therapy. Treatment was rarely ocular and focused on evidence-based psychological explanations and suggestions for support. All were deliberately not offered follow up appointments but were explicitly given the option to return at any time.

Results: No patient had responses fully consistent with their diagnosis and all demonstrated normal responses at some time during testing. All admitted to significant anxiety, not only about their condition, but also about other aspects of their lives. All were reassured that their accommodation could function normally and were given a psychological explanation for their symptoms and occasionally simple orthoptic strategies to help re-establish normal functioning. Only one patient has since made contact for brief reassurance.

Conclusions: Accommodative problems are like many other anxiety-related functional health problems such as stomach-ache, heart palpitations or headache. Accommodative variability is common, and symptoms signal general anxiety. Accommodation generally occurs unconsciously, and once attention is drawn to it, it can fail or be exercised inappropriately, although rarely as a deliberate action or malingering. Once the “problem” has become medicalised there is a vicious circle of “safety behaviours” (constant checking), and “catastrophising”. Effective psychological strategies will be outlined. Binocular dynamic retinoscopy while viewing smartphones is a valuable clinical tool.

Evaluation of distance stereoacuity in children with a novel digital application

Guy Barnett-Itzhaki[1,2], Dr Zohar Barnett-Itzhaki[3], Dr Noa Ela-Dalman[1,2]
[1]Department of Ophthalmology, Meir Medical Center, Kfar Saba, Israel, [2]Sackler Faculty of Medicine, Tel Aviv University Israel, Tel Aviv, Israel, [3]School of Engineering, Research Center for Health Informatics, Ruppin Academic Center, Emek Hefer, Israel

Purpose: Stereopsis is a fundamental skill in human vision and visual actions. There are serval ways to test and quantify distance stereoacuity: traditional and new digital applications are both valid ways to test the stereoacuity. The aim of this study is to compare the results obtained using standard tests for distance stereoacuity measurement with the new StereoTAB App.

Methods: A group of 120 children (69 females), aged between 4 and 17 years old (mean age 9.16), were tested using different tests for the quantification of stereopsis at distance. These tests were Distance Randot Stereotest, M&S random dots and the new developed StereoTAB App.

Results: Stereopsis at distance was better with M&S random dots (2.09) than with Distance Randot Stereo test (2.19) or StereoTAB (2.21), but not significantly (Kruskal Wallis,P= 0.117). A strong correlation was demonstrated between: M&S random dots and Distance Randot Stereotest (0.83,P<0.0001), M&S random dots and StereoTAB App(0.84,P<0.0001), Distance Randot Stereotest and StereoTAB App(0.88, P<0.0001). The limits of agreement (Bland–Altman) between M&S random dots and Distance Randot Stereotest was 0.54, between M&S random dots and StereoTAB App was 0.55, and between Distance Randot Stereotest and StereoTAB App was 0.45.

Conclusions: The distance stereoacuity based on random dots stereopsis showed that the better values were obtained in order by M&S random dots, Distance Randot Stereo test, and StereoTAB. However, the clinical significance of their values is similar, and they can be used interchangeably. The introduction of versatile, fast, and portable stereopsis test which can be used at different distances with children is of primary importance.

Are horizontal fusional vergences comparable when measured using a prism bar and synoptophore?

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Purpose: There is limited research comparing the tests that assess fusional vergences. The aim of this study was to determine whether distance horizontal fusional vergences are comparable when measured using a prism bar and synoptophore.

Methods: Thirty-two participants (18-23 years) had their convergent and divergent blur, break and recovery points measured using a prism bar (6m) and synoptophore. The prism bar target was a 0.2 LogMAR letter. The synoptophore target was the foveal 'rabbit' fusion slides. Prism bar testing speed was two seconds per 2 prism dioptres (Δ), increasing to five seconds per 5Δ, when the increments began to increase in 5Δ. Synoptophore testing speed was 2 seconds per degree.

Results: The synoptophore (30.89 ±3.79Δ) measured significantly higher convergence break points than the prism bar (18.09 ±1.27Δ), with a wide 95% limits of agreement (LOA; -24Δ to +49.59Δ). The synoptophore (8.44 ±0.71Δ) measured a higher divergence break point than the prism bar (7.19 ±0.37Δ) but this difference was not statistically significant. There was also a wide 95% LOA (-7.70Δ to +10.19Δ). The synoptophore also measured higher convergent and divergent blur and recovery points but the differences were not statistically significant.

Conclusions: The synoptophore consistently measured higher convergence and divergence fusional values, although this was only statistically significant for the convergence break point. Both tests displayed wide LOA, not within the range of clinically acceptable, and therefore the two tests are not in agreement. The prism bar and synoptophore should not be used interchangeably in clinic to measure horizontal fusional vergences.