## INDEX

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>3</td>
</tr>
<tr>
<td>WELCOME, DELEGATES</td>
<td>4</td>
</tr>
<tr>
<td>ORGANISATION</td>
<td>5</td>
</tr>
<tr>
<td>PROGRAMME-AT-A-GLANCE</td>
<td>6</td>
</tr>
<tr>
<td>BURIAN LECTURE ABSTRACT - FOLKLORE OR EVIDENCE?</td>
<td>7</td>
</tr>
<tr>
<td>EDUCATION FORUM ABSTRACTS - ORAL PRESENTATIONS</td>
<td></td>
</tr>
<tr>
<td><strong>Monday 27 June 2016</strong></td>
<td></td>
</tr>
<tr>
<td>Education Forum PAPER A - H</td>
<td>8</td>
</tr>
<tr>
<td><strong>INTERNATIONAL ORTHOPTIC CONGRESS - ORAL PRESENTATIONS</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Tuesday 28 June 2016</strong></td>
<td></td>
</tr>
<tr>
<td>Theme block #1: Binocular Vision / Fusion</td>
<td>14</td>
</tr>
<tr>
<td>Theme block #2: Binocular Vision / Stereopsis</td>
<td>23</td>
</tr>
<tr>
<td>Theme block #3: Myopia &amp; Its Complications</td>
<td>31</td>
</tr>
<tr>
<td>Theme block #4: CVI &amp; Low Vision</td>
<td>40</td>
</tr>
<tr>
<td><strong>Wednesday June 29</strong></td>
<td></td>
</tr>
<tr>
<td>Theme block #5: Neuro-ophthalmology</td>
<td>48</td>
</tr>
<tr>
<td>Theme block #6: Genetics, Syndromes</td>
<td>56</td>
</tr>
<tr>
<td>Theme block #7: Technology in Eye Disease</td>
<td>64</td>
</tr>
<tr>
<td>Theme block #8: Expanding Orthoptic Practice</td>
<td>71</td>
</tr>
<tr>
<td><strong>Thursday 30 June 2016</strong></td>
<td></td>
</tr>
<tr>
<td>Theme block #9: Screening, Vision, Refractive Error</td>
<td>80</td>
</tr>
<tr>
<td>Theme block #10: Amblyopia</td>
<td>88</td>
</tr>
<tr>
<td>Theme block #11: Strabismus</td>
<td>96</td>
</tr>
<tr>
<td>Theme block #12: Strabismus Management</td>
<td>104</td>
</tr>
<tr>
<td><strong>EDUCATION FORUM ABSTRACTS – POSTER PRESENTATIONS</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Monday 27 June 2016</strong></td>
<td></td>
</tr>
<tr>
<td>Education Forum Poster A - H</td>
<td>113</td>
</tr>
<tr>
<td><strong>INTERNATIONAL ORTHOPTIC CONGRESS - POSTER PRESENTATIONS</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Tuesday 28 June 2016</strong></td>
<td></td>
</tr>
<tr>
<td>Theme block #1: Binocular Vision / Fusion</td>
<td>121</td>
</tr>
<tr>
<td>Theme block #2: Binocular Vision / Stereopsis</td>
<td>127</td>
</tr>
<tr>
<td>Theme block #3: Myopia &amp; Its Complications</td>
<td>130</td>
</tr>
<tr>
<td>Theme block #4: CVI &amp; Low Vision</td>
<td>135</td>
</tr>
<tr>
<td><strong>Wednesday June 29</strong></td>
<td></td>
</tr>
<tr>
<td>Theme block #5: Neuro-ophthalmology</td>
<td>140</td>
</tr>
<tr>
<td>Theme block #6: Genetics, Syndromes</td>
<td>152</td>
</tr>
<tr>
<td>Theme block #7: Technology in Eye Disease</td>
<td>155</td>
</tr>
<tr>
<td>Theme block #8: Expanding Orthoptic Practice</td>
<td>162</td>
</tr>
<tr>
<td><strong>Thursday 30 June 2016</strong></td>
<td></td>
</tr>
<tr>
<td>Theme block #9: Screening, Vision, Refractive Error</td>
<td>168</td>
</tr>
<tr>
<td>Theme block #10: Amblyopia</td>
<td>178</td>
</tr>
<tr>
<td>Theme block #11: Strabismus</td>
<td>184</td>
</tr>
<tr>
<td>Theme block #12: Strabismus Management</td>
<td>189</td>
</tr>
<tr>
<td><strong>SPEAKERS - ORAL PRESENTATIONS</strong></td>
<td>200</td>
</tr>
<tr>
<td><strong>SPEAKERS - POSTER PRESENTATIONS</strong></td>
<td>201</td>
</tr>
<tr>
<td><strong>SPONSORS</strong></td>
<td>202</td>
</tr>
</tbody>
</table>
INTRODUCTION

On behalf of the International Orthoptic Association (IOA) and myself, thank you for attending the XIIIth International Orthoptic Congress (IOC) in Rotterdam, The Netherlands. It has been 45 years since the IOA Congress was last held in Holland and it has been a pleasure for us to return to the Netherlands’ port city of Rotterdam. The IOA is an international organization representing orthoptists. It includes member associations hailing from 25 different countries representing approximately 12,000 orthoptist form all continents of the world. The IOA aspires to advance knowledge in orthoptics. The Association facilitates international cooperation and collaboration in orthoptic science, education and practice. One of the highlights of the work of the IOA is the International Orthoptic Congress that takes place every 4 years.

The site of the 2016 Congress is Rotterdam, a city known as the Manhattan on the Muesse (Mass) because of its impressive skyline and exciting architecture. The city’s iconic Erasmus Bridge swims like an elegant swan on the river Muesse connecting the northern and southern parts of the city. This architectural marvel inspired this year’s congress theme “Bridging Worlds”. The theme reflects the exciting science that connects the dynamic, culturally and linguistically diverse orthoptists from around the world who have gathered here.

Unique at this year’s congress are the symposia offered by IOA partners, the International Pediatric and Strabismus Council (IPOSC), the International Strabismological Association (ISA) and the World Society of Pediatric Ophthalmology and Strabismus. As well, this year’s Congress’s Georgievski Education Forum offers papers on Blended Learning and the first free papers session offered for orthoptic education papers. The Congress workshops discussions on “Bridging the worlds between assessment and intervention in CVI in children” and the “Changes in the personal and professional identities of orthoptists” continue our lifelong learning and build on the skills that make attendees successful. Finally, Dr. Anna Horwood’s, thought provoking Burian Lecture, “Folklore or Evidence” provides insights from one of the world’s leading researchers on how her understanding of strabismus has been changed.

Sincere thanks go to the Congress Organizing Chair, Jan Roelof Polling, the Congress Organizing Committee, the Scientific Program Chair, Kyle Arnoldi and the Scientific Program Committee, the Georgievski Education Forum Committee, the Dutch Orthoptic Association, our dedicated volunteers, exhibitors, and our inspiring presenters for making the Rotterdam meeting a truly memorable orthoptic congress. I hope you found the congress stimulating and you enjoy reading our transactions.

Karen McMain
President International Orthoptic Association
WELCOME, DELEGATES, TO THE XIII INTERNATIONAL ORTHOPTIC CONGRESS!

It is human nature to seek connection; we are a highly social species after all! From pervasive social media, to the nascent field of Translational Medicine, and even to disparate retinal images received by the visual cortex, we seek to tie together related but discrete entities. How this link may be accomplished varies, but always involves a physical or metaphorical bridge.

A bridge is a device designed to span obstacles in order to facilitate interaction and exchange. The IOA Congress is one such bridge. These singular occasions, occurring just once every four years, present the opportunity for us to bond, both intellectually and socially. These connections are mutual, balanced, and interactive. And that means the Congress delegate is every bit as integral to the bridge as the presenter! A successful Congress results when both delegates and presenters network, share ideas, challenge and question, and find common ground.

In these pages you will find abstracts for all 94 free papers, 2 workshops, 3 symposia, 95 posters, and the Burian Lecture. Take a journey across this “orthoptic bridge”, and return inspired and productive.

Kyle Arnoldi
Chairperson
On behalf of the 2016 IOA Congress Scientific Program Committee
ORGANISATION

Organizing Committee

Jan-Roelof Polling
Lecturer, University of Applied Sciences, Utrecht, Orthoptist, Erasmus MC,
University Medical Center Rotterdam, IOA Council Representative of the Netherlands

Mari Gutter
Lecturer, University of Applied Sciences, Utrecht, Orthoptist, Isala Klinieken, Zwolle

Eline de Jongh
Orthoptist, Rotterdam Eye Hospital, Rotterdam

Jacqueline Krijnen
Orthoptist, VU University Medical Center, Amsterdam

Isa Vels
Orthoptist, Erasmus MC, University Medical Center, Rotterdam

Lia Brouwer
Orthoptist, Bartiméus Institute for the Visually Impaired, Zeist

Scientific Programme Committee

Kyle Arnoldi – Jolley
Chief Orthoptist, Program Director, Ross Eye Institute Orthoptic Fellowship

Daisy Godts
Chief Orthoptist, Antwerp University Hospital, IOA Council Representative of Belgium

Hinke Marijke Jellema
Orthoptist/ PhD, Academic Medical Center, Amsterdam, The Netherlands

Connie Koklanis
Chief Orthoptist, Royal Children's Hospital, Melbourne, Lecturer and Head of Department,
Clinical Vision Sciences, La Trobe University, IOA Council Representative of Australia,
Vice President, Orthoptics Australia

Carole Panton
Senior Orthoptist, Program Supervisor/Professor, Centennial College, Toronto, Canada.

Education forum committee

Hinke Marijke Jellema
Orthoptist/ PhD, Academic Medical Center, Amsterdam, The Netherlands

Mari Gutter
Lecturer, University of Applied Sciences, Utrecht, Orthoptist, Isala Klinieken, Zwolle

Connie Koklanis
Chief Orthoptist, Royal Children's Hospital, Melbourne, Lecturer and Head of Department,
Clinical Vision Sciences, La Trobe University, IOA Council Representative of Australia,
Vice President, Orthoptics Australia

Ingrid van Wijnen
Lecturer, University of Applied Science, Utrecht, Orthoptist, OCE representative of the Netherlands

CONTACT

IOA 2016 Congress Secretariat
c/o Congress by design
P.O. Box 77
3480 DB Harmelen
The Netherlands
Tel: +31 (0)88-0898101
ioa2016@congressbydesign.com
www.ioacongress2016.org
### PROGRAMME-AT-A-GLANCE

#### Monday June 27
- **8:45 - 9:15** Registration
- **9:15 - 10:45** Education Forum I - Blended Learning
- **10:45 - 11:15** **Morning Tea**
- **11:15 - 12:25** Education Forum II - Free Papers
- **12:30 - 14:00** IOA Orthoptic Leaders Forum (upon invitation only)
- **13:30 - 14:00** Registration
- **14:00 - 15:30** Workshop I - Changes in personal and professional identities of Orthoptists
- **15:30 - 16:00** **Afternoon Tea**
- **16:00 - 17:30** Workshop II - Assessment and intervention in CVI
- **17:30 - 19:30** Registration & Welcome Reception

#### Tuesday June 28
- **7:00 - 8:15** Registration
- **8:15 - 8:25** Opening and introduction
- **8:25 - 9:45** **Theme block #1 - Binocular vision / Fusion**
- **9:45 - 9:50** Introduction - Burian lecture
- **9:50 - 10:35** Burian lecture - Anna Horwood
- **10:35 - 11:10** **Morning Break**
- **11:05 - 12:15** **Theme block #2 - Binocular vision / Stereopsis**
- **12:15 - 13:15** Lunch Break
- **13:15 - 14:15** Invited Symposium - ISA
- **14:15 - 15:35** **Theme Block #3 - Myopia & Its Complications**
- **15:35 - 16:05** **Afternoon Break**
- **16:05 - 17:15** **Theme Block #4 - CVI & Low Vision**
- **18:00 - 19:30** VIP Reception (upon invitation only)

#### Wednesday June 29
- **7:00 - 8:00** Morning Run
- **8:00 - 8:30** Registration
- **8:30 - 9:40** **Theme Block #5 - Neuro-Ophthalmology**
- **9:40 - 10:40** Invited Symposium - IPOSC
- **10:40 - 11:10** **Morning Break**
- **11:10 - 12:20** **Theme Block #6 - Genetics, Syndromes**
- **12:20 - 13:20** Lunch Break
- **13:20 - 14:30** **Theme Block #7 - Technology in Eye Disease**
- **14:30 - 15:00** **Afternoon Break**
- **15:00 - 16:20** **Theme Block #8 - Expanding Orthoptic Practice**
- **19:00 - 22:00** Congress Dinner Laurenskerk

#### Thursday June 30
- **8:00 - 8:30** Registration
- **8:30 - 9:40** **Theme Block #9 - Screening, Vision, Refractive Error**
- **9:40 - 10:00** Stephenson Honorary Fellow Award Presentation
- **10:00 - 10:30** **Morning Break**
- **10:30 - 11:40** **Theme Block #10 - Amblyopia**
- **11:40 - 12:20** IOA Annual General Meeting
- **12:20 - 13:20** Lunch Break
- **13:20 - 14:20** Invited Symposium - WSPOS
- **14:20 - 15:30** **Theme Block #11 - Strabismus**
- **15:30 - 16:00** **Afternoon Break**
- **16:00 - 17:20** **Theme Block #12 - Strabismus Management**
- **17:20 - 17:30** Closing Ceremony & Presentation of Awards
BURIAN LECTURE ABSTRACT
FOLKLORE OR EVIDENCE?

Anna Horwood PhD DBO(T)

The theme of this lecture is how my understanding of strabismus has been changed by the research we have carried out in our laboratory at the University of Reading over the years. Our laboratory has tested objective vergence and accommodation to all combinations of blur, disparity and proximal/looming cues and now has a large dataset of typical development and children and adults with a range of orthoptic diagnoses. Accommodation and convergence are fundamental to Orthoptics, but actual responses have often been very different to what I had been taught or had expected from the existing literature.

Significant findings have been
1. Neonatal ocular misalignments are common but resolve after early infancy. They appear to be a response to proximal/looming cues, and are a normal part of emerging binocular vision, but may predict infantile esotropia if increasing at two months of age.
2. Beyond early infancy, disparity cues, much more than blur or proximity, become the main drive to both vergence and accommodation, so the CA/C linkage is more significant to typical people than the AC/A linkage.
3. Vergence and accommodation appear to “hard wired” not learned responses, so are not advanced by premature birth. Longer periods of poorly controlled vergence as cortical binocularity is emerging may increase risk of strabismus in premature infants.
4. People naïve to visual experiments respond very differently to “visual experts” and there is considerable inter-individual and inter-task variability (especially for accommodation) in typical visual situations, so AC/A relationships are frequently less rigid than the literature suggests.
5. Many hypermetropic children systematically under-accommodate so may not “make up the difference” in a spectacle under-correction.
6. Differences in “visual style” of response to the different visual cues may predict specific orthoptic diagnoses.
7. All distance exotropes appear to control by disparity-driven convergence, not by using accommodative vergence.
8. The clinical near gradient AC/A ratio correlates better with the response CA/C ratio than the response AC/A ratio.
9. Accommodation can be asymmetrical or even inverse in anisometropic amblyopia.
10. Encouragement and effort in orthoptic exercises improve vergence as much or more than the exercises themselves.

Alternative ways of thinking about convergence and accommodation may help us to better understand and predict responses in our patients.
An exploratory study of orthoptic student satisfaction in a blended learning environment

Carla Lança
Orthoptic Department
Lisbon School of Health Technology
Lisbon, Portugal

Abstract: An exploratory study of orthoptic student satisfaction in a blended learning environment.

Purpose: To describe orthoptic student satisfaction in a blended learning environment.

Methods: Blended learning and teaching approaches that include a mix of sessions with e-learning are being used since 2011/2012 involving final year (4th year) students from an orthoptic program. This approach is used in the module of research in orthoptics during the 1 semester. Students experienced different teaching approaches, which include seminars, tutorial group discussions and e-learning activities using the moodle platform. The Constructivist OnLine Learning Environment Survey (COLLES) was applied at the end of the semester with 24 questions grouped in 6 dimensions with 4 items each: Relevance to professional practice, Reflection, Interactivity, Tutor support, Peer support and Interpretation. A 5-point Likert scale was used to score each individual item of the questionnaire (1 - almost never to 5 – almost always). The sum of items in each dimension ranged between 4 (negative perception) and 20 (positive perception).

Results: Twenty-four students replied to the questionnaire. Positive points were related with Relevance (16.13±2.63), Reflection (16.46±2.45), Tutor support (16.29±2.10) and Interpretation (15.38±2.16). The majority of the students (n=18; 75%) think that the on-line learning is relevant to students’ professional practice. Critical reflections about learning contents were frequent (n=19; 79.17%). The tutor was able to stimulate critical thinking (n=21; 87.50%), encouraged students to participate (n=18; 75%) and understood well the student’s contributions (n=15; 62.50%). Less positive points were related with Interactivity (14.13±2.77) and Peer support (13.29±2.60). Response from the colleagues to ideas (n=11; 45.83%) and valorization of individual contributions (n=10; 41.67%) scored lower than other items.

Conclusions: The flow back and forth between face-to-face and online learning situations helps the students to make critical reflections. The majority of the students are satisfied with a blended e-learning system environment. However, more work needs to be done to improve interactivity and peer support.
The use of blended learning to increase orthoptic students’ acceptance and success in evidence-based practice learning

Amanda French
University of Technology Sydney
Discipline of Orthoptics, Graduate School of Health
Sydney, Australia

Professor Kathryn Rose
University of Technology Sydney,
Discipline of Orthoptics, Graduate School of Health Sydney, Australia

Abstract

**Purpose:** Student acceptance of learning evidence-based practice (EBP) is notoriously poor and those who are not engaged typically have low academic success. However, supporting orthoptic students to learn these skills is essential for the continued development of evidence to support orthoptic practice. This study aimed to assess the impact of blended learning on student acceptance and success in learning EBP.

**Method:** Blended-learning strategies were introduced into the curriculum of a preparatory EBP subject to increase student engagement in the final semester research subject of the Master of Orthoptics course in Sydney, Australia. Online learning modules using the Blackboard learning management system were developed to deliver key content and student-centred classroom activities, such as, journal club, case studies and debates introduced to encourage engagement and active enquiry. Student acceptance was assessed quantitatively through formal subject evaluation scores prior to and after the introduction of blended learning and qualitatively through thematic analysis of student survey comments. The contribution of blended learning to student success was investigated by analysis of grades.

**Results:** In 2010, student acceptance of learning EBP was low with only 37% satisfied with the research subject. With the introduction of a preparatory subject incorporating blended learning in 2011, student satisfaction with the semester 2 subject increased to 56% although, student comments suggested that the relevance was not well understood “I do not at all see the relevance to my degree and how this knowledge will be used in my career as an orthoptist” (student, 2011). With further refinement of the curriculum, student satisfaction further increased to 87%, 100% and 81% in 2012, 2013 and 2014 and comments indicated a greater understanding of the relevance “[as a graduate] need to be able to look up relevant research for evidence-based medicine and in case one day I want to do research studies” (student, 2012). Student grades for the final research subject also increased, with the failure rate dropping from 8% in 2010 to 4% in 2011 and 0% in 2013 and 2014 and an upward shift in the mean grade.

**Conclusion:** The use of blended learning strategies to encourage orthoptic students’ engagement has significantly increased student acceptance and
Abstract

Purpose: Teaching the concepts of a 3D eye movement through 2D static images is a challenge and can be difficult for students to understand. Models are used within our teaching, where possible, but they do not show movement, and when assessing patients it can be difficult to relate the clinical observations to the underlying muscle abnormality. Therefore we collaborated with the elearning unit team to develop a series of eye movement animations to support student teaching.

Methods: The animations were created using a multimedia 3D graphics programme. Information regarding the eye anatomy and muscle function were provided to the graphics designer and through regular meetings they were refined to ensure accuracy. The first phase of animations consisted of normal eye movements in nine positions of gaze, followed by the inclusion of a series of eye movement disorders. The use of the animations was evaluated through the webpage activity and through student and clinical tutor evaluations.

Results: Over a six month period at the beginning of 2014 (when only the normal eye movement animations were available), the website had 1549 views, 1227 of which were unique, indicating some people were viewing multiple times. Over 55% of the views were from users outside the UK, with over 10% from Australia, Brazil, Canada and Portugal each. The students gave positive responses to the evaluation, with 32% of students using the animations a lot, and 55% saying they were useful in their learning. Some students stated:

“I think they’re brilliant, with the glowing muscles and different views for each of the 9 positions.”
“I think that they are very helpful. They are very visual and enhance learning as they bring to life what you’ve been reading about.”

Further evaluations from clinical tutors indicated that 45% found them useful in their teaching, but in some hospitals there were accessibility issues with the website being blocked. In 70% of tutors who used the animations, they were used for teaching students from professions other than orthoptics.

Conclusions: A series of 3D animations are now freely available online at http://www.liv.ac.uk/elearning/orthoptics-project/ The site has been accessed thousands of times from users around the world, with many people returning to the website. The evaluations demonstrated that they a positive impact on learning for students in orthoptics and other disciplines.
Learning from one another: a review of peer assisted learning in Orthoptic education

Nadia Northway
Life Sciences
Glasgow Caledonian University
Glasgow, Scotland

Abstract

Purpose: The purpose of this study was to review Peer Assisted Learning (PAL) and its use in Orthoptic education. Demands on practice educator time have in the past led to capacity issues for securing placement opportunities in many Allied Health Professions. Peer assisted learning where two students work together was utilised to address some of the capacity issues. However studies have shown that PAL is a useful tool to enhance learning in the clinical disciplines. PAL is about learning, not assessment and when facilitated by a practice educator student learning can be highly structured and meaningful.

Method: A range of peer assisted models are being used in Glasgow Caledonian University with practical laboratories involving 3rd and 4th year students teaching 1st and 2nd year students in investigative techniques in preparation for clinical practice. In the clinical environment 2 students are asked to see the same patients together, alternating the lead investigator. Each student observes the other examining patients and provides feedback to one another under the guidance of the practice educator.

Results: Results have shown that students feel more relaxed, less pressurised and less inhibited to ask “stupid” questions. Greater levels of reflection are observed and for those teaching the other students in peer laboratories there have been reports of deeper understanding. In addition the students clearly identify themselves also as practice educators for the future.

Conclusion: Structured practice educator peer assisted learning is a valuable learning method that enhances learning and also helps with capacity issues of placement.
Clinical reasoning at the orthoptics department of HU University of applied sciences

Marijke Luijten
Lectoraat vraaggestuurde zorg | Kenniscentrum Innovatie van Zorgverlening
Hogeschool Utrecht FG
Utrecht, Netherlands

Abstract

Purpose: Clinical reasoning has already in use for many years in medical education. It can be defined as the process of applying knowledge and expertise to a clinical situation to develop a solution. This presentation will focus on how teachers of orthoptics at HU-UAS facilitate the learning process of clinical reasoning to help students make the transition from being a rookie to becoming reflective junior orthoptists.

Method: At the orthoptics department we use hypothetic-deductive reasoning. We have this practically translated to the “think aloud” approach. This approach is a qualitative tool that is used to access cognitive processes and to describe and verbalize these processes. The students examine, during their last year internship, dozens of patients and will be judged by their supervisor at skills, diagnosis and treatment. During the internship, the students will choose sixteen cases to verbally present to their peers and teachers using evidence based arguments. They must asking questions to themselves to reflect on their own observations and interpretations linked to knowledge and literature. The patient’s care demand is starting point of the reflection. Scientific evidence, clinical expertise and patient concerns are the basic principles, together they are called evidence based practice (EBP).

Result: When the teachers first started with clinical reasoning it lacked a concrete structure. The students were used to lifelike situations being presented by the lecturer or supervisor and answer questions about them. Starting with clinical reasoning, the students had to prove that they can ask questions by themselves and reflect on a case. Students who are strong in practice and theory and have great reflective skills are the ones who perform well during the course. The ones that are less versed in theory are having problems with clinical reasoning. Students who have difficulties verbalizing the case do not pass their exam the first time. To solve these problems teachers started with clinical reasoning in the second year of Orthoptics. Starting early in education with clinical reasoning must ensure that students can verbalize and describe difficult cases by using cognitive processes during their last year internships.

Conclusion: In recent years, clinical reasoning is been adapted to a more structured course for modern-day orthoptic students. Graduates are now better prepared for their job and graduate as junior reflective practitioners.
PAPER 6

Can Google sites enhance learning experience?

Anne Bjerre
Academic Unit of Ophthalmology and Orthoptics
University of Sheffield
Sheffield, United Kingdom

Anne Bjerre MSc, BSc Orthoptics, Nav K. Hundal MSc BSc, Helen J. Griffiths PhD BSc (Hons) DBO
University of Sheffield

Abstract

Purpose: The purpose of this teaching review was to determine if creating and using a Google site as an online group discussion and presentation tool would enhance the students’ learning experience.

Method: Group discussion and presentation of a case that poses an ethical dilemma forms part of the formative assessment of the Ethics unit in year 2 for undergraduate orthoptic students at the University of Sheffield. In 2014, this task was changed where students were asked to design a Google site presenting their case, discuss the ethical dilemma including ethical principles and the clinician’s role. The students were given training on how to create a site and are encouraged to be creative. Each group was asked to present their site to the whole year 2 cohort. Following the group presentations the sites were made accessible to all students as a learning resource for use in preparation for their ethics assignment. Student feedback from 2014 and 2015 was reviewed and learning outcomes evaluated.

Results: All students accessed the Google site. In 2014, 83% found it easy to create and insert information into the Google site, in 2015 this increased to 92%. In 2014, 67% did not find they learnt more by creating and presenting their Google site. This reversed in 2015 where 62% felt they learnt more. All students, except one, planned to use the Google site as a learning resource in preparation for their ethics assignment. Many commented they liked the Google site, everyone are able to see ideas discussed at all times. Sharing of information allow students to focus on one ethical case in depth and still have access to details of the other cases. They also liked the teaching resources are located in one place. Fifteen percent did not like group work due to uneven contribution between group members. The average ethics assignment mark increased by 3 marks in 2014 following the introduction of the Google site. The average mark for the 2015 group will be reviewed once the assignments are submitted.

Conclusion: The introduction of using a Google site as a platform for group discussion, group presentation and a learning resource was well received by students. The introductory lecture was slightly altered in 2015 and the students had prior experience of viewing a Google site in year 1 which may have resulted in the 2015 cohort found it easier. The positive feedback on the learning experience and increase in assignment marks support the continued use of Google sites in teaching.
PAPER 1

The Corpus Callosum in Human Binocular Vision

Anne Cees Houtman
Brussels University Hospital
Ophthalmology
Brussels, Belgium

Anne Cees Houtman, Marcel ten Tusscher, Peter van Schuerbeek
Brussels University Hospital, Belgium

Abstract

Purpose: to examine the role of callosal connections in human binocular vision. Chiasmal hemidecussation is a prerequisite for human binocular single vision (BSV). The role of the Corpus Callosum (CC) in human BSV is unknown. Callosal connections were explored in normal volunteers and in volunteers with Infantile Esotropia (IE) by DTI, fMRI and grey matter analysis.

Methods: Diffusion tensor imaging (DTI), fMRI (during monocular viewing of central and paracentral stimuli) and grey matter analysis in a group of 13 normal volunteers and 4 volunteers with IE.

Results: DTI revealed significantly different numbers of callosal fibers connecting to the right primary visual cortex in volunteers with IE. During a monocular viewing fMRI-experiment activation of the occipital cortex, the CC and the brainstem was found. Functional connectivity between the primary visual cortex, the ipsilateral temporal retina and the CC became apparent. Grey matter analysis revealed no differences in volume or surface area of the primary and secondary visual cortices between normal and esotropic volunteers.

Conclusion: Callosal connections between the visual cortices were demonstrated by DTI and functional connectivity between the temporal retinas, V1 and CC during (para)central viewing suggesting a role for CC in BSV. Failure to develop BSV appears to affect the number of transcallosal visual fibres as found in the volunteers with IE.
Fusional Vergence Measurements for Eso vs Exo deviations: Is there a Difference?

Carla Lança
Lisbon School of Health Technology
Orthoptic Department
Lisboa, Portugal

Fiona J Rowe, PhD, DBO, Department of Health Services

Abstract

Purpose: The aims of this study were to compare angle of deviation, fusional vergence measurements and fusion reserve ratio between esophoria and exophoria.

Methods: A cross-sectional study was performed in children with best-corrected visual acuity of 0.0 LogMAR in either eye, compensated heterophoria within 10 prism dioptres (PD), full ocular rotations, presence of fusional vergence and stereopsis (60 seconds of arc or better). Fusional amplitudes were compared between angle of deviation (2, 4, 6, 8 and 10 PD) in esophoria and exophoria. The fusion reserve ratio was calculated (to assess the effect of the underlying angle of deviation) as fusional convergence divided by prism alternating cover test measurements.

Results: Two-hundred and eleven children (7.65±1.16 years) were recruited to this study. Exophoria was most common for near (n=181; 85.8%) and distance (n=20; 9.5%). Esophoria was present in 22 children for near (10.4%) and in 1 child for distance (0.5%). No significant differences were found between fusional amplitudes and angle of deviation for near (p>0.05). Children with exophoria of 10PD had a slight, but not, significant (p=0.264) increase in fusional convergence from 2PD (19.95±5.09) to 10PD (26.67±5.77). In esophoric children the variation of fusional convergence was smaller from 2P (25.00±0.00) to 10PD (22.50±3.54) and non significant (p=0.185). The fusion reserve ratio was significantly smaller in children with higher deviations (i.e. 10PD) for both esophoria (p=0.003) and exophoria (p>0.001). The fusion reserve ratio ranged between 12.50 (2PD) and 2.25±0.35 (10PD) for esophoria and between 9.98±2.55 (2PD) and 2.67±0.58 (10PD) for exophoria.

Conclusions: Angle of deviation is not an efficient measure to predict fusional amplitudes. The fusion reserve ratio appears to be a better measurement to assess the effect of the underlying angle of deviation on fusional convergence. More studies are necessary to understand better the relationship between fusion amplitudes and angle of deviation.
PAPER 3

How Progressive or Stable is Age-Related Distance Esotropia? Does Fusional Divergence Amplitude Decrease Over Time?

Daisy Godts
Antwerp University Hospital
Ophthalmology
Edegem, Belgium

Daisy Godts1, Isabel Deboutte2, Danny G.P. Mathysen1,2
1Antwerp University Hospital Antwerp, Dept. of Ophthalmology
2University of Antwerp, Faculty of Medicine and Health Sciences

Abstract

Purpose: To evaluate the evolution of the horizontal deviation and fusional amplitudes at distance and near in patients with age-related distance esotropia.

Material and Methods: Twenty-seven elderly patients, aged between 64 and 86, presenting permanent or intermittent distance esotropia, with a follow-up of at least 60 months (60 months to 161 months; median 69 months), were included in this study. The horizontal deviation, fusional convergence amplitude and fusional divergence amplitude were measured at both distance and at near. Measurements were compared over time.

Results: The distance esodeviation ranged between 2 prism dioptres (PD) esotropia (ET) and 14 PD ET (median angle of 6 PD ET) at the initial examination, and ranged between 2 PD ET and 25 PD ET (median angle of 8 PD ET) at the final examination.

The near deviation varied from 10 PD exophoria (X') to 8 PD esophoria (E'), with a median deviation of 0 PD at the initial examination, and ranged between 4 PD X' and 14 PD ET', with a median angle of 1 PD E' at the final examination.

The fusional divergence amplitude at distance ranged between 0 and 10 PD (median: 3.5 PD) at the initial examination, and ranged between 0 and 8 PD (median: 4 PD) at the final examination. At near, the fusional divergence amplitude ranged between 4 and 12 PD (median: 8 PD) at the initial examination, and ranged between 6 and 16 PD (median: 8 PD) at the final examination.

The fusional convergence amplitude at distance ranged between 4 to 22 PD (median: 13 PD) at the initial examination, and ranged between 6 and 22 PD (median: 12.5 PD) at the final examination. At near, the fusional convergence amplitude ranged between 10 and 44 PD (median: 26 PD) at the initial examination, and ranged between 8 and 42 PD (median: 25.5 PD) at the final examination.

Conclusion: This study indicates that patients with age-related distance esotropia have a slight increase in distance esodeviation (p<0.005), while no significant change in fusional divergence or fusional convergence amplitude was observed over time.
Fixation Disparity by Ogle’s Apparatus: Different Methods, Different Results

Marieke Telleman
University of Applied Sciences
Utrecht, The Netherlands

L. de Meij, M.A.J. Telleman, J.R. Polling, M. Gutter
University of Applied Sciences Utrecht, Faculty Eyecare, Utrecht, The Netherlands

Abstract

Purpose: Fixation disparity exists in a small misalignment of the eyes within the normal alignment when viewing under binocular condition. Ogle’s apparatus is a recognized device to measure this condition for clinical purposes. Unfortunately, methods of use could influence the outcome of the fixation disparity curve. This could lead to different diagnoses and treatment for a patient.

Methods: Students of the University of Applied Science with straight ocular alignment and visual acuity <0.1 logMAR were included in this prospective comparative study. Ogle’s apparatus (classical version) was used to obtain fixation disparity. Refractive error of the participants was recorded. Participants had to achieve stereopsis of at least 60° of arc. Four methods of measurements were performed. Method 1(M1): prisms of ascending strength and aberrant placing of the nonius line. Method 2(M2): prisms of ascending strength and nonius line moving from subjective zero. Method 3(M3): prisms of alternating base in to base out and aberrant placing of the nonius line. Method 4(M4): prisms of alternating base in to base out and nonius line moving from subjective zero. Differences between the curves were determined looking at point zero, motor fusion amplitude and the degree of fixation disparity.

Results: Twenty-four participants with a median age of 22.5 (range 18-27) years were examined by these four methods. Point zero was a significant difference between M1-M2 (p=0.002) and M3-M4 (p=0.001). M3 indicates the highest point zero with a median of 3 arcminutes exodisparity. Motor fusion amplitude shows a significant difference between M1-M2 (p=0.028), M1-M3(p=0.006) and M2-M4 (p=0.007). M1 revealed the highest motor fusion amplitude with a median of 33Δ and the lowest amplitude was found in M4 with a median of 28Δ. There is no significant difference in esodisparity between the four methods. Between the medians in exodisparity there was a significant difference when comparing M1-M2 (p=0.000), M3-M4 (p=0.001) and M1-M3 (p=0.027).M1 gave the highest exodisparity (median 22 arcminutes) and M4 the lowest (median 10 arcminutes).

Conclusion: The only clinically relevant difference is found in exodisparity, mainly caused by the difference in line shifting. When moving the line from subjective zero, the exodisparity is significantly lower. This could lead to misdiagnosis. These findings might lead to standardizing measuring the fixation disparity curve for clinical use.
Abstract

**Purpose:** The stability of binocular vision depends on good fusional amplitudes, but the clinical assessment of fusional amplitudes varies around the world. The purpose of this study was to determine whether or not there is variation in the assessment of fusional amplitudes in normal subjects. The author looked at the testing distance, the order of testing, the role of examiner encouragement and the subject's level of alertness.

**Methods:** In a prospective study using a modified crossover design, the author assessed fusional amplitudes in 99 participants with normal eye exams. The measurements were obtained in two separate sessions with each participant being randomized as to the order of fusional vergence testing. All participants were assessed without and with encouragement in the first session. In the second session, all were assessed at different testing distances.

**Results:** The author previously presented data on 50 subjects. In this expanded cohort, the author has found that convergence is significantly affected by encouragement and divergence is significantly reduced if assessed after convergence. Finally, fatigue can affect a subject's performance when measuring fusional amplitudes.

**Conclusion:** We need to develop a standard of testing fusional amplitudes so that there is consistency in the clinical assessment. By doing this, any examiner will know if a change in amplitudes is due to treatment effect or due to a deterioration in control.
PAPER 6

Incidence and Management of Intractable Diplopia

David Newsham
University of Liverpool
Orthoptics and Vision Science
Liverpool, United Kingdom

Dr David Newsham¹, Dr Anna O’Connor¹ and Mr Richard Harrad²
¹Directorate of Orthoptics and Vision Science, University of Liverpool
²Bristol Eye Hospital

Abstract

Purpose: Intractable diplopia has important quality of life implications for those affected. It is reported to be rare, but little is known regarding its incidence or presentation. Previous studies have either used case reports or retrospectively provided estimates of intractable diplopia resulting from individual ocular treatments. Objectives were to:
• Determine the annual incidence and causes of intractable diplopia occurring in the UK.
• Gain greater understanding of the risk factors that lead to intractable diplopia.
• Determine how cases are managed and if the treatment is successful.

Methods: A prospective observational study of new cases of intractable diplopia in the UK was undertaken. Incident cases of intractable diplopia, cause and risk factors were identified via the British Ophthalmological Surveillance Unit reporting system/subsequent incident questionnaire. A follow up questionnaire determined if/how the intractable diplopia was treated and if the treatment was successful.

Results: Mean (±sd; range) age at diagnosis was 41 years (±19.8; 12 to 79). The incidence of intractable diplopia was 65 cases per year. A pre-existing manifest strabismus was present in 61% of cases. Events preceding the intractable diplopia were strabismus surgery (31%), cataract surgery (4%), Botox (2%), severe head trauma (8%) not known (16%), other (35%), Botox/strabismus surgery (1%) and cataract surgery/laser (1%). Follow up revealed that treatment to eliminate the diplopia was successful in 52%, failed in 26% and 22% still had diplopia but could now ignore the image.

Conclusions: Intractable diplopia is mostly commonly related to previous strabismus/surgery. Whilst there were no cases directly attributable to amblyopia treatment, there were a number of spontaneous cases with no immediate cause, but a history of pre-existing strabismus. Intractable diplopia can be difficult to eradicate satisfactorily and may take multiple procedures before the patient is satisfied.
PAPER 7

Cyclotropia Associated with Macular Disease

Jonathan M. Holmes
Mayo Clinic
Rochester
Rochester, USA

Lindsay D. Klaehn, Raymond Iezzi
Mayo Clinic, Rochester MN, USA

Abstract

Purpose: To illustrate the potential barriers to fusion associated with epiretinal membranes and macular holes and to describe two cases where specifically addressing the excyclotropia was critical for improving the patient’s diplopia.

Methods: Patients, with diplopia, referred from the retina service underwent an expanded orthoptic examination including assessment of central peripheral rivalry (retinal misregistration), assessment of metamorphopsia, and assessment of aniseikonia. Torsion was assessed subjectively in free space, with double maddox rods and using fusible synoptophore targets with square edges and suppression controls (house targets).

Results: Two patients, one post-epiretinal membrane surgery and one post-macular hole surgery, both had residual metamorphopsia and aniseikonia (15% and 10%). The patient with the epiretinal membrane also had evidence of central peripheral rivalry. Both patients had a small vertical misalignment (2pd and 6 pd) but were unable to comfortably fuse with a trial of prism. Both patients had excyclotropia (8 degrees and 11 degrees) and, despite coexistent metamorphopsia and aniseikonia, had much improved single vision when the torsion was corrected on the synoptophore using fusible house targets. Surgery to address the excyclotropia was then performed using the adjustable Harada-Ito procedure. Both patients had dramatic improvement in their symptoms following successful surgical correction of the excyclotropia.

Conclusions: Patients with diplopia associated with macular disease may have multiple barriers to fusion including metamorphopsia, aniseikonia, central peripheral rivalry, and ocular misalignment. In some patients, cyclotropia is the primary barrier to fusion and surgically addressing significant cyclotropia can dramatically improve symptoms. Careful synoptophore examination, with attention to torsion, is critical in evaluating such retina patients and may allow successful strabismus surgery without resorting to monocular occlusion.
RAPID FIRE POSTER PRESENTATION 1 (1)

Correlation between Symptomatic Heterophoria and Asthenopic Syndrome

Federica Ristoldo
University of Milan
School of Medicine
Milan, Italy

Co-Author:
Sara Bettega, Nicolo’ Daniele Ceccarelli, Hospital “A.O. Luigi Sacco”, University of Milan

Abstract

Purpose: the aim of the study is to find a possible correlation between the symptomatic heterophoria and the asthenopic syndrome. The main features, of the heterophoria related asthenopia will be analyzed. In addition the prevalence of pure and mixed symptomatic heterophoria and the related symptoms will be described. Possible visuomotorial and visuosensorial indexes that could help in improving the classification of these forms, identifying their causative agents and the eventual treatment will be searched.

Material and methods: 115 subject between 20 and 35 years of age were enrolled in the study. Among them 15 were excluded after preliminary examination because they did not entirely match the inclusion criteria. The remaining 100 subjects were divided into two groups: symptomatic (Cases) and asymptomatic (Controls). Each subject underwent a single examination including: an accurate anamnestic interview mainly focused on the typical asthenopic symptoms, a best correct visual acuity test and a complete orthoptic exam. The following indexes were evaluated: near and far heterophoria measurements, negative and positive fusional amplitudes (near and far), near point of convergence and amplitude of accommodation.

Results: Mean age was 25.70 SD 4.36 in cases group and 24.60 SD 3.62. Amplitude of accommodation was significantly lower in symptomatic subjects as compared to controls (p<0.001). A statistically significant difference was found in near and far fusional amplitude (both p<0.001) between cases and control with cases showing the lowest values. Similarly the far relative convergence, near relative positive vergences were significantly lower in symptomatic subjects (both p<0.001). Finally near point of convergence resulted significantly lower in symptomatic population (p<0.001).

Conclusions: According to our datas, asthenopia is a complex condition with multiple etiopathogenetics factors. In symptomatic heterophoria related asthenopia a single analysis of fusional amplitude values or heterophoria measurements is not enough to explain the symptoms. Only a joined analysis of the fusional amplitude and the heterophoria can explain the subject symptomatic condition. The more significant indexes for the identification of the asthenopia causative agent resulted: the near point of convergence and the symptomatic heterophoria in particular, focusing on the near positive relative convergence value.
RAPID FIRE POSTER PRESENTATION 2 (2)

Binocular Function in Multiplayer Online Battle Arena Players vs. Non-Video Game Players

Marianne E.F. Piano
Glasgow Caledonian University
Department of Vision Sciences
Glasgow, United Kingdom
Anita J. Simmers

Abstract

Purpose: To establish whether there is a difference in strength of binocular function between regular players of a multiplayer online battle arena (MOBA) game, and those who infrequently play video games. If a relationship did exist between frequent videogame play and strength of binocular single vision, it would have important implications for any research evaluating dichoptic viewing modalities for perceptual learning training in amblyopia.

Methods: Players of a MOBA game (League of Legends) aged 18-30, who played >5 hours a week were recruited from a local social media community for the game. Individuals who played video games <5 hours a week (non-video game players, NVGPs) were recruited from the staff and student population of Glasgow Caledonian University. Inclusion criteria for both groups were corrected monocular visual acuity ≤0.200 logMAR in each eye, interocular acuity difference < 0.200 logMAR Frisby stereoacuity ≤ 20” arc and fusional amplitudes ≥20BO and ≥10BI. All participants underwent measurement of uniconular visual acuity (VA) with Thompson 2000 logMAR test chart at 5m, prism fusion amplitudes at 33cm and 5m, and Frisby and TNO stereoacuity. Frisby stereoacuity values were manually calculated by recording threshold test distance, plate thickness and interpupillary distance. Participants were also tested using a computerised random dot stereogram program written in MATLAB, which tested dichoptic stereoacuity thresholds using an adaptive staircase method.

Results: 10 MOBA players (mean age = 22.2 ± 3.4 years) and 16 visually normal individuals (mean age = 25.4 ± 3.0 years) were recruited. MOBA players had better near positive (base out) fusional amplitudes than NVGPs (p = 0.01, Z = -2.58; MOBA players median = 45Δ, IQR = 18.75Δ; NVGPs median = 37.5Δ, IQR = 12.5Δ). However, NVGPs had better near negative fusional amplitudes (p = 0.003, Z = -3.01; MOBA players median = 13Δ, IQR = 4Δ; NVGPs median = 18Δ, IQR = 2Δ). There were no significant differences between the groups in uniconular VA, distance fusional amplitudes or stereoacuity.

Conclusions: There are differences between regular MOBA players and NVGPs in fusional amplitudes. Studies evaluating dichoptic perceptual learning modalities for improving binocular function in amblyopia should consider this potential source of elevated fusional amplitudes. Future research could focus on changes in binocular function when introducing a group of NVGPs to a MOBA.
Tuesday 28 June 2016
11:05 – 12:05 hr

Theme block #2: Binocular Vision / Stereopsis

PAPER 1
Factors influencing Regaining of Stereopsis after Strabismus Surgery for Acute Acquired Comitant Esotropia

Helena Hesgaard
CFR Hospitals
Eye and Strabismus Clinic
Gentofte, Denmark

Helena Buch Hesgaard, MD, PHD, FEBO, Inger Holst DBO, Troels Vinding, MD, DMSci
Copenhagen Eye & Strabismus Clinic, CFR Hospitals, 2800 Lyngby, Copenhagen, Denmark
Eye Clinic, Strabismus Unit, Roskilde Hospital, Denmark.

Abstract

Purpose: To study factors influencing regaining stereopsis after strabismus surgery for acute acquired comitant esotropia (AACE) in childhood.

Material and Methods: Retrospective analysis of children referred with AACE from May 2000 to March 2013. All children underwent complete pre- and postoperative ophthalmological and orthoptic examinations.

Results: We included all 24 children with AACE who underwent strabismus surgery within the 13 year study period. All children were aligned within 8Δ or less of orthotropia at near (1/3 m) post-operatively. At the 6 week post-operative examination 4 of the 24 children (16.7%) had regained normal stereopsis (TNO 60°). At the long-term follow-up, an additional 7 children (29.2%) had regained normal stereopsis. Of the 24 children, 11 (45.8%) regained normal stereopsis, 4 (17.0%) regained a moderate degree of stereopsis (TNO 120° – 1980°), 6 (25.0%) had simultaneous perception with Bagolini glasses, while 3 children (12.5%) demonstrated suppression. Accordingly 62.5% (15/24) of the children who underwent surgery regained some degree of stereopsis postoperatively. These children were older at AACE onset (P=0.05 Fishers exact; P=0.01 t-test). Additionally, there was an insignificant trend towards shorter delay of surgery (P=0.08) and presence of fusion preoperatively (P=0.1) among those who regained normal stereopsis compared with those who did not regain stereopsis postoperatively.

Conclusion: The potential for regaining stereopsis was large among children with AACE. The re-emergence of stereopsis may take several months, and depends on age at onset. Delay of surgery among children younger than 6 years may worsen the prognosis for regaining stereopsis.
PAPER 2

Bifocals Fail to Improve Stereopsis Outcomes in High AC/A Accommodative Esotropia

Katelyn MacNeill
The Hospital for Sick Children
Ophthalmology and Vision Sciences
Toronto, Canada

Mary C. Whitman, MD/PhD¹, David G. Hunter, MD/PhD²
¹Department of Ophthalmology, Boston Children’s Hospital and Harvard Medical School, Boston, MA, USA
²Department of Ophthalmology, Harvard Medical School, Boston, MA, USA

Abstract

Purpose: To assess whether stereopsis outcomes of patients with high AC/A accommodative esotropia were improved after treatment with bifocal glasses compared with single vision lenses.

Methods: The study design was a retrospective cohort study. Participants included patients seen in the Department of Ophthalmology at Boston Children’s Hospital between 2006 and 2014 with high AC/A accommodative esotropia (esotropia eliminated or decreased to within 10pd at distance with full correction); near angle (in full correction) >10pd more than distance angle); evidence of stereopsis, binocularity (on Worth 4 Dot testing), or improvement in near angle with +3.00 lenses; at least 4 years of records available for review; use of bifocal or single vision glasses. Charts were reviewed retrospectively. Linear and logistic regression was used to control for confounders. The main outcome measures included stereopsis at final follow-up, difference in stereopsis between final and initial visits, and progression to strabismus surgery. Secondary outcomes include final near and distance deviations. The research protocol was reviewed and approved by the Institutional Review Board at Boston Children's Hospital.

Results: Of the 180 patients who met inclusion criteria, 77 used bifocals and 103 used single vision lenses. Bifocals did not improve stereopsis outcomes compared with single vision lenses. In both groups, stereopsis was similar at initial and final visits, with similar improvement in both groups. Children in the bifocal group had a 3.6-fold higher rate of strabismus surgery than children in the single-lens group (p=0.04.) Additionally, children in the bifocal group had near deviations 4pd greater than those with single lenses at final follow-up, even after controlling for age and initial deviations (p=0.02.) These results did not change if surgical patients were eliminated, or in the subgroup with initial distance deviation of 0pd in full correction.

Conclusions: Despite their widespread use, there is no evidence that bifocals improve outcomes in children with accommodative esotropia with high AC/A. In our retrospective review, children in bifocals had higher surgical rates and a smaller improvement in the near deviation over time. While our results suggest that eliminating bifocals could reduce the cost and complexity of care, while potentially improving quality, prospective, randomized, controlled trials are needed to determine whether a change in practice is warranted.
PAPER 3

Stereodeficient Patients have Normal Non-disparity Based 3-D Depth Perception

Linda Colpa
The Hospital for Sick Children
Eye Movement and Vision Neuroscience Lab
Toronto, Canada

Linda Colpa O.C.(C)1, Inna Tsirlin PhD1, Herb Goltz PhD1,3, Agnes Wong MD, PhD, FRCS(S)1,2,3
1Program in Neuroscience and Mental Health
2Department of Ophthalmology and Vision Sciences
3The Hospital for Sick Children; Department of Ophthalmology and Vision Sciences

Abstract

Purpose: In binocular vision, occlusion of one object by another in space results in monocular occlusions – areas visible only in one eye. Although binocular disparity is not available in these regions, monocular occlusions can still be localized precisely in depth. The neural mechanisms coding this type of depth perception are not well understood. Some suggest that depth from occlusion is computed primarily by the same neurons coding binocular disparity; others propose separate neurons dedicated solely to computing depth from occlusion. The aim of our study is to assess depth from monocular occlusions in a cohort of stereo-blind/deficient subjects. If the same neurons are indeed used for both types of depth perception, then these subjects should not see depth from monocular occlusions.

Methods: 12 visually normal and 11 stereo-deficient (amblyopia/strabismus) subjects participated. Binocular vision was tested by standard clinical tests (Randot stereotest, Worth4Dot) and a Random Dot Stereogram (RDS) task on a mirror stereoscope. Those with no demonstrable binocularity on clinical tests had their fusion/stereopsis potential assessed by synoptophore. The experimental “Two Objects Task” presented by stereoscope, comprised a binocular rectangle and a vertical bar. In the disparity task the bar was seen by both eyes. In the monocular occlusion task it was seen by only the left or right eye. Subjects indicated whether the bar was in front, behind or co-planar to the rectangle for 80 trials. Percent correct responses for stereo-deficient and control participants were compared by t-test.

Results: 9/11 stereo-deficient subjects could see depth from monocular occlusions as well as controls (77±32% vs. 88 ±25%; t(21) = 0.97, p = 0.34). Of these 9 subjects, only 2 perceived depth on the disparity task. All had fusion, but 3/9 had no measurable stereopsis on the RDS task, Randot or synoptophore. The 2 subjects unable to perceive depth by monocular occlusion had no demonstrable fusion, even on the synoptophore.

Conclusions: Subjects unable to resolve depth from conventional binocular disparity (either on the disparity-based Two Objects Task or on stereo tests) performed as well as controls with stimuli where depth was perceived solely on monocular occlusion. All these subjects had intact fusion. This suggests that there may be separate neural substrates for 3D perception of depth derived from binocular disparity to that from monocular occlusions.
PAPER 4

ASTERIOD: Development of Fun and Accurate Stereotest on a 3-D Tablet

Kathleen Vancleef
Newcastle University
Institute of Neuroscience
Newcastle-upon-Tyne, United Kingdom

Kathleen Vancleef, PhD1, Prof Ignacio Serrano-Pedraza, PhD2, Dr Graham Morgan, PhD1,
Dr Craig Sharp, PhD1, Dr Michael Clarke3
1Newcastle University, UK
2University of Madrid, Spain
3Newcastle Eye Centre, Royal Victor, UK

Abstract

Purpose: Measuring stereoacuity in children can be challenging. First, the current tests are not very engaging for young children. Also, children may not be comfortable wearing 3D glasses. Furthermore, tests give inaccurate results with low reliability. Together with the difficulty of keeping viewing distance constant, this results in rather imprecise stereothresholds. We aim to develop an engaging and accurate STEREotest On a mobile Device (ASTERIOD).

Methods: Service evaluation informed decision-making in ASTEROID development. We used a multi-method step approach. First, a survey identified orthoptist’s needs for stereotests. Second, orthoptists were consulted at all development stages. They gave opinions on topics as game design, user-interface, instructions, giving feedback, displaying results, etc. by questionnaire responses. Third, we tested different game versions in healthy children in the community, and in children with visual impairments at Newcastle Eye Centre. We evaluated the duration of the test, the instructions, the viewing distance measure, and any technical or developmental problems that influenced test results. In addition, we compared stereoacuity measured with ASTEROID to stereoacuity measured with Randot, Frisby or TNO.

Results: Following service evaluation, we have designed a dynamic random dot stereotest that runs on a glasses-free 3D tablet. Viewing distance is automatically controlled by the front camera. A computer algorithm makes a precise estimate of the individual’s stereothreshold based on their answers on previous trials. The difficulty level is individually adjusted to reduce test duration and limit the number of trials needed for an accurate result. The test is embedded in a game to increase motivation. Following children’s feedback, different game themes are designed and animated characters give standardized instructions. Including different game missions and animations during the game keeps children engaged. Stereoacuity on ASTEROID correlates with stereoacuity on other clinical tests.

Conclusions: By building on input from orthoptists and children, we think ASTEROID is a promising engaging tool for measuring stereoacuity in children and is adjusted to orthoptists’ needs.

Keywords: amblyopia, stereoacuity, stereotest, strabismus, vision screening

Comments: This abstract presents independent research commissioned by the Health Innovation Challenge Fund (HICF-R8-442), a parallel funding partnership between the Wellcome Trust and the Department of Health. The views expressed in this abstract are those of the authors and not necessarily those of the Wellcome Trust or the Department of Health.
PAPER 5

Are Stereoscopic Anaglyphic Red-Green Tests Sensitive to Dissociation?

Benoît Rousseau
Institut Mutualiste Montsouris
Ophthalmology
Paris, France

Benoît Rousseau; Clémence Athéna Lalouette

Abstract

Purpose: The TNO stereotest is known to be dissociating for the reason that it is based on an anaglyphic red-green technique. The EKW is also a red-green stereotest, however, it includes a frame of multiple choice shape, perceived by both eyes. A multiple choice frame (MCF) is a shape/form that can be seen as simple using binocular vision despite a visual deviation. It is the base-line/basis and originality of Hess-Weiss’s coordimeter for instance.

In order to verify that the TNO is that dissociating, we have presented it to 17 adults with normal retinal correspondence, properly corrected, with visual iso-acuity and carrier of an intermittent divergent strabismus at near vision.

Methods: This presentation has been made systematically and in the following order:
1/ TNO before any dissociating manipulation
2/ EKW before any dissociating manipulation
3/ Dissociation using a cover test, then 30min monocular occlusion
4/ Re-examination using the TNO
5/ Re-examination using the EKW

Results:
1/ The average stereoscopic acuity using the TNO before dissociation was 120”
2/ The average stere-acuity using the EKW before dissociation was 60”
3/ The average stereo-acuity using the TNO after dissociation was 120”
4/ The average stereo-acuity using the EKW after dissociation was 60”

Conclusion: Contrary to popular belief, the results obtained through the TNO examination showed no evident sensibility to dissociation, however, the EKW seems to be more accurate, providing better results, because this test nevertheless, solicits more fusion than the TNO due to the presence of a multiple choice frame.
Abstract

**Purpose:** to measure the visual acuity stereoacuity and contrast sensitivity of young soccer players.

**Methods:** 205 boys from 10 to 12 years old, 115 young soccer players and 90 boys who did not practice sports. They underwent several tests of visual function including visual acuity. Stereoacuity was evaluated at near and distance. Distance stereoacuity was also tested under timed and untimed conditions.

**Results:** Visual acuity was measured with boys' regular distance correction in 410 eyes. Near stereoacuity ranged from 23 to 37 seconds of arc. Results for untimed distance stereoacuity under timed conditions were 98 to 83 seconds of arc. We found differences between young soccer players and non players on tests of untimed distance stereopsis.

**Conclusions:** Young soccer players have better visual skills. Mean visual acuity and distance stereoacuity are better than those of children who do not play soccer. Our results are in congruence with previous studies and literature.
Rapid Fire Poster Presentations

Tuesday 28 June 2016 12:05 – 12:15 hr

Theme block #2: Binocular Vision / Stereopsis

RAPID FIRE POSTER PRESENTATION 1 (9)
Comparative Study of Stereopsis with 3 Different Tests: TNO®, Stereo Acuity Test Fly® and StereoTAB® in Students in Higher School

Ilda Maria Poças
Escola Superior de Tecnologia da Saúde de Lisboa De Ciências e Tecnologias de Reabilitação lote Lisboa, Portugal

Rúben Morais; Ilda Maria Poças; Ana Miguel; Denise Monteiro; Cleide Cassandra

Abstract

Purpose: Stereopsis is the perception of depth based on retinal disparity. Global stereopsis depends on the process of random dot stimuli and local stereopsis depends on contour perception. The aim of this study was to correlate 3 stereopsis tests: TNO®, StereoTAB®, and Fly Stereo Acuity Test® and to study the sensitivity and correlation between them, using TNO® as the gold standard. Other variables as near convergence point, vergences, symptoms and optical correction were correlated with the 3 tests.

Materials and Methods: Forty-nine students from Escola Superior de Tecnologia da Saúde de Lisboa (ESTeSL), aged 18-26 years old were included.

Results: The stereopsis mean (standard-deviation-SD) values in each test were: TNO® = 87.04” ±84.09”; FlyTest® = 38.18” ±34.59”; StereoTAB® = 124.89” ±137.38”. About the coefficient of determination: TNO® and StereoTAB® with R² = 0.6 and TNO® and FlyTest® with R² =0.2. Pearson correlation coefficient shows a positive correlation between TNO® and StereoTAB® (r = 0.784 with α = 0.01). Phi coefficient shows a strong and positive association between TNO® and StereoTAB® (Φ = 0.848 with α = 0.01). In the ROC Curve, the StereoTAB® has an area under the curve bigger than the FlyTest® with a sensivity of 92.3% for 94.4% of specificity, so it means that the test is sensitive with a good discriminative power.

Conclusion: We conclude that the use of Stereopsis tests to study global Stereopsis are an asset for clinical use. This type of test is more sensitive, revealing changes in Stereopsis when it is actually changed, unlike the test Stereopsis, which often indicates normal Stereopsis, camouflaging a Stereopsis change. We noted also that the StereoTAB® is very sensitive and despite being a digital application, possessed good correlation with the TNO®.
Stereopsis and Professional Football Players

Anna Barducco
Orthoptic and Ophthalmologic Assistance Course, University of Ferrara, St. Anna Hospital
Department of Biomedical and Specialty Surgical Sciences
Ferrara, Italy

Perri Piera, Borghi Federica, Mancioppi Silvia
Orthoptics and Ophthalmologic Assistance Course, Department of Biomedical and Specialty Surgical Sciences, University of Ferrara, Italy.

Abstract

Purpose: Stereopsis is the most important visual skill in sport activities because the perception of depth is the unique condition for the evaluation of the surrounding temporal-space relations. The Orthoptist/assistant in Ophthalmology can support the Sport’s Doctor in the evaluation of visual skills in professional athletes. Stereopsis (static and dynamic) is fundamental in sports such as football. For this reason we decided to compare the near static stereopsis between two groups belonging to the same cross-section (118 subjects). The clinical trial started in March 2013 and finished in September 2013.

Methods: Cross-section choice (118 subjects):
Group A: 59 professional football players who played in the Italian football championship for the year 2013/2014;
Group B: 59 students of the University of Ferrara who did not play any sports and were chosen randomly.
Cross-section inclusion/exclusion standard: age ≤ 36 years old, refractive error ≤ -2D sphere or ≤ +1.50D sphere with max +1/-1D cylinder and without any evident strabismus forms.
The whole cross-section has been provided with TNO stereopsis Test.
Before the real test, a simulation-test on 5 volunteers, to choose the execution time, was performed. In the end all the information was collected and analyzed by the Chi-square test.

Results: The static stereopsis value of the cross-section and the Chi-square test analysis have given significant results. The lowest difference disparity, which means a range of 30-15 arcsecs at TNO test was perceived by 78% in Group A (46 subjects) instead of 27% in Group B (16 subjects); the Chi-square test results were statistically and clinically significant (p-value < 0.001).

Conclusion: The results have shown a better perception of depth in professional football players (Group A) versus non athletic young men (Group B), in the future an analysis of dynamic stereopsis, as the literature suggests, could be interesting. Unfortunately in Italy the Orthoptist/assistant in Ophthalmology is not involved in the sporting-medical team, but in light of what the clinical trial has shown we hope that this assessment can be included and help to improve the sport performance with the evaluation and visual training technique.
PAPER 1
Prediction of Axial Elongation and Early Onset Myopia

Willem Tideman
Erasmus MC
Ophthalmology/Epidemiology
Rotterdam, the Netherlands

J.W.L. Tideman1,2, J.R. Polling1,2,3, V.W. Jaddoe1,2, C.C.W. Klaver1,2
1 Dept. Ophthalmology, 2 Dept. Epidemiology, Erasmus MC, Rotterdam, the Netherlands
3 Department of Orthoptics & Optometry, University of Applied Sciences, Faculty of Health, Utrecht, the Netherlands

Abstract

Purpose: High myopia is characterized by a disproportional axial elongation in childhood and teenage years. To help identify high risk groups, we developed a model based on non-invasive measures to predict early onset myopia.

Methods: In the population-based birth-cohort study Generation R, 4,636 children underwent ophthalmic examination at 6 and 10 years of age, including measurement of axial length and corneal curvature. Variables related to nearwork and outdoor exposure, SES, demographic characteristics were assessed by questionnaire. 2,360 children underwent cycloplegic refractive error measurements, and myopia was defined as an average spherical equivalent of ≤-0.5D in ODS. A risk score was created using beta’s from linear regression models of associated variables. The accuracy of the risk score (area under the curve) of the discrimination between myopes and non myopes was estimated using receiver operation curves.

Results: Average axial elongation was 0.21 mm/year. Seven parameters were independently associated with axial elongation: myopic parents, books read per week, time spent reading, time spent outdoors, sports, ethnicity, and AL/CR ratio at baseline. Prevalence of myopia increased from 2.3% at 6 years to 11.3% (n=267) at 10. The risk score ranged from 3 – 30. Children with a score of ≤8 had a risk of 1.2% to develop myopia; children with a risk score of ≥15.5 had a risk of 55%. The discriminative accuracy of the model was 0.76.

Conclusion: This model, based on easy to obtain variables, is an accurate tool to identify children at risk for high myopia. It can be used to recommend early life style changes and intervention in high risk groups to prevent high myopia.
Controversies in Myopia: Association with Low Socio-Economic Status in Urban Children of the Netherlands

Caroline Klaver
Erasmus MC
Epidemiology
Rotterdam, The Netherlands

C.C.W. Klaver1,2, J.R. Polling1,2,3, V.W. Jaddoe1,2, A. Hofman1,2, J.W.L. Tideman1,2
1 Dept. Ophthalmology, 2 Dept. Epidemiology, Erasmus MC, Rotterdam, the Netherlands
3 Department of Orthoptics & Optometry, University of Applied Sciences, Faculty of Health, Utrecht, the Netherlands

Abstract

Purpose: In most studies, myopia is related to higher education and higher socioeconomic class. We examined the relationship between factors of social economic status (SES) and risk of myopia in young children in the multi-ethnic, urban city of Rotterdam, the Netherlands.

Methods: This study was part of the population-based birth-cohort study Generation R, in which 4,903 children with mean age 6.13 (SD ±0.46) participated in an extensive ophthalmologic examination. Presenting visual acuity was measured using LEA charts. Children with a monocular LogMAR visual acuity of >0.1 were referred to an ophthalmologist for automated cycloplegic refraction and a complete eye exam; medical records of these children and of those who were already receiving ophthalmological care were evaluated. Myopia was defined as spherical equivalent (SE) of ≤-0.5D in at least one eye. Risk of myopia was calculated using logistic regression analysis for ethnicity, monthly income, educational level of the mother, and city district. Associations were: 1) adjusted only for age, gender and anthropometry, and 2) additionally for lifestyle factors including indoor- and outdoor activity and serum vitamin D levels, and for birth parameters.

Results: The prevalence of myopia was 2.4% (n=116). Children of African (OR 3.43, 95% CI 2.68 – 4.39), South- and East Mediterranean (OR 2.34, 95% CI 1.79 – 3.07), or Asian (OR 2.81, 95% CI 2.07 – 3.83) descent had a higher risk of myopia than children with a Northern European background. Children from low income families (OR 2.70 95% CI 2.22 – 3.29), with a mother who had only lower or secondary education (OR 2.21, 95% CI 1.81 – 2.71), and living in densely populated city districts had a higher risk of myopia (OR 1.88 95% CI 1.13 – 3.13). The associations lost statistical significance after adjustment for lifestyle factors.

Conclusion: In contrast to many other studies, this study from Rotterdam found that that children with a lower socio-economic class and African ethnicity were more likely to develop myopia. Lifestyle factors appear to be an important explanation for these relationships, and may be more important than education or ethnicity per se.
Abstract

**Purpose:** Evidence that there is an epidemic of myopia in East Asian is now coupled with data indicating an increase in prevalence of myopia in America and Europe. These rapid rises in the prevalence of myopia, including the prevalence of high myopia, implicate environmental changes as underlying factors. A public health approach requires that causative factors are clearly identified and interventions are rigorously examined to determine the most effective approaches.

**Methods:** This paper presents recent evidence from intervention trials using increasing time outdoors for the prevention of the development of myopia in primary school aged children; the Guangzhou Outdoor Activity Longitudinal (GOALS) and the Recess Outside Classroom (ROC) studies from China and Taiwan respectively. The primary outcome for these studies was the cumulative incidence of myopia (SE ≤-0.50D). Lessons learned from these intervention studies are analysed in the context of outcomes and feasibility.

**Results:** In the GOALS study, the 952 children enrolled in the intervention spent an extra 40 minutes per school-day outdoors over 3 years, compared to the age-matched 951 children in the control arm. The cumulative incidence of myopia in the intervention group was 30.4% compared to 39.5% in the control group. In the ROC study, which increased time spent outdoors by 80 minutes per school-day over a year for 333 students, the incidence of myopia was 8.41% compared to 17.65% in the 238 students in the control arm. In GOALS parent education campaigns had little impact on altering time spent outdoors by the children outside school time. While there is evidence of a possible dose-response effect between the two studies, the time spent outdoors by the children in the both studies didn’t reach the levels of time spent outdoors (10-14 hours per week) suggested by cross-sectional and longitudinal studies as necessary to prevent the development of myopia and the ROC study has commenced an investigation of an increase to 120 minutes per day spent outdoors.

**Conclusions:** These studies provide proof of principle that school-based interventions to increase the amount of time children spend outdoors may be successful in reducing the incidence and/or delaying the onset of myopia, which has important implications for the prevalence of high myopia and associated levels of visual impairment in populations. Other interventions are required to slow the progression of myopia for those already myopic.
Effectiveness Study of Atropine for Progressive Myopia in Europeans: Two Year Follow-up

Jan Roelof Polling
Erasmus MC
Ophthalmology
Rotterdam, the Netherlands

Jan Roelof Polling1,2, Gentiana Martinaj1, Astrid van der Schans1, R.G.W. Kok1, J. Willem L. Tideman1,3, Caroline C.W. Klaver1,3
1Department of Ophthalmology, Erasmus MC, University Medical Center Rotterdam, the Netherlands;

Abstract

Purpose: Randomized controlled trials have shown the efficacy of atropine for progressive myopia, and this treatment has become the preferred practice pattern for this condition in many Asian countries. This study explores the three year effectiveness of atropine 0.5% treatment for progressive high myopia and adherence to therapy in a non-Asian country.

Methods: We performed an effectiveness study of atropine eye drops for progressive myopia in Rotterdam, the Netherlands. We included 205 children (mean age 9.8 yrs±3.3) of European (n=138; 67.3%), Asian (n=51; 24.9%) and African (n=16; 7.8%) descent, performed a standardized eye examination including cycloplegic refraction and axial length at baseline, prescribed atropine eye drops 0.5% daily, and examined the children every 6 months at follow up. Children were prescribed photochromic multifocal glasses at the initiation of therapy.

Results: Mean spherical equivalent (SE) at baseline was -6.15D (±3.59); mean annual progression before treatment -1.0D/yr; and the proportion of high myopes (≤-6.0D) was 40,5%. Median follow up was 23,6 months. Of the 205 children, 35 (17,1%) who ceased therapy, there were 24 within the first year of treatment. The mean progression of SE diminished substantially during the first year -0.24D ± 1.1 and the second year -0.51D ±0.64. Most significant factor for successful prolongation of therapy was age ≤10 years at initiation of therapy (P=0.002).

Conclusion: Despite photophobia and lack of accommodation, our study shows that atropine can be an effective and sustainable treatment for progressive myopia also in the Western world. Younger children had the highest chance of successful implementation of this therapy.
PAPER 5

A Systematic Review on Myopia Progression; Can we really Prevent or Reduce the Progression of Myopia in the Long Term?

Madina Kaamil-Sayedi
Reinier de Graaf Gasthuis Delft
Orthoptics
Delft, the Netherlands

Abstract

Purpose: Myopia causes blurry vision when looking at distant objects. The prevalence of myopia in Western countries is about 30-40% and it can increase to 73% in the Asian countries. The high and growing prevalence of myopia and its progression in children has contributed to a current surge in interest for the available preventive interventions to control the progression of myopia.

Objectives: To analyse the long-term results (≥two years of follow-up) of therapeutic interventions to prevent or reduce the progression of myopia.

Methods: We searched in CENTRAL, MEDLINE and EMBASE. The electronic databases were last searched on 01 May 2014. We analysed the studies done in the period between January 1994 and January 2014.

Selection criteria: We included studies on patients between the ages of 5 to 18 years.

Data collection and analysis: Two review authors independently extracted data and assessed the risk of bias for each included study. Risk of bias is assessed regarding randomisation, allocation sequence concealment, blinding, incomplete outcome data, selective outcome reporting and other biases.

Results: We included nine studies, four observational studies and five randomised controlled trials (RCTs). Atropine was reported in three studies, one pirenzepine, three orthokeratology contact lens, one soft contact lens and one spectacle. The meta-analysis on the anti-muscarinic pharmaceutical agents, atropine and pirenzepine shows that the participants who received the intervention had slower progression in myopia compared with controls. Change in refractive error from baseline was -0.51 (95% CI -1.00, -0.01) dioptries, that is less myopia progression in favour of the intervention group after two years of follow-up. The other studies showed small significant intervention effects.

Conclusions: Long-term results (≥2 years follow-up) indicate that stopping myopia progression is not fully achievable, although it is possible to slow the myopia progression in some clinically meaningful manner. Anti-muscarinic pharmaceutical agents had a meaningful effect on myopia progression. However, anti-muscarinic pharmaceutical agents have significant side effects. We found some consistent evidence favouring orthokeratology lenses. The study with Defocus Incorporated Soft Contact (DISC) lenses had the least effect.
PAPER 6

Strabismus Surgery in High Myopia

Stéphanie van de Ven
VU medical centre
Ophthalmology
Amsterdam, the Netherlands

S.J.N. van de Ven, J.S.M.Krijnen, A.E.L. Langenhorst, S.M. Jansen, D. Molenaar, L.J. van Rijn

Abstract

Purpose: To evaluate the effect of surgical techniques used in our clinic for strabismus due to high myopia with no evident dislocation of the globe and no displacement of the superior and lateral rectus muscle. Conventional recession-resection procedure has a limited effect. The literature states that the most commonly chosen is a recession combined with a modified hang back suture. We would like to present an alternative. Recession of a rectus muscle using Tutopatch® as an interponate combined with a resection.

Methods: 11 patients with unilateral or bilateral high myopia and strabismus who had undergone surgery. In 3 patients with an esotropia and no vertical deviation we performed a resection of the lateral rectus and a weakening procedure of the medial rectus using Tutopatch® as an interponate. 8 Patients with high myopia and an esotropia or exotropia were treated with a conventional resect-recess procedure with an adjusted amount, calculated for axial length.

Results: The effect of strabismus surgery with a corrected dose for axial length is more predictable. Two of the patients operated on with Tutopatch® had a good outcome, one patient had a residual esotropia and imaging confirmed a dislocation of the globe.

Conclusion: In patients with strabismus due to high myopia and no vertical deviation a recession-resection combined with Tutopatch® as interponate is a good option to improve alignment and the motility of the eyes. The use of Tutopatch® to weaken the muscle has advantages; the arc of contact remains the same, no scleral sutures need to be made in a thin sclera, which is very common in high myopic eyes. The dose response in patients with a high axial length needs to be taken into consideration and quantity of surgery will need to be adjusted accordingly.
PAPER 7

Myopexy for Acquired Distance Esotropia

Yair Morad
Assaf Harofeh Medical Center, Tel Aviv University
Ophthalmology
Rosh Hayin, Israel

Yair Morad, Achia Nemet

Abstract

Purpose: To evaluate the results of bilateral lateral rectus to superior rectus myopexy for the treatment of acquired adult distance esotropia.

Methods: The charts of all adult patients who were operated for esotropia by the first author at the Department of Ophthalmology, Assaf Harofeh Medical Center, Tel Aviv University, Zrifin, Israel between the years 2010-2015 were analyzed. Patients with the following inclusion criteria were included: Acquired esotropia (not present during childhood); deviation greater for distance than near by at least 5 diopters; slight abduction deficit in one or both eyes and/or displacement of the lateral rectus downwards as evident by CT/MRI with or without superior rectus nasal shift and no neurologic abnormalities such as cranial nerve palsies or other.

Results: Eighteen patients were identified (age 31-80 years, mean 52 years), 83% females). Preoperative esodeviation averaged 23 PD (range 14–35 PD) for distance and 17 PD (range 8–30 PD) for near. Thirteen patients (72%) had diplopia. All patients were myopic (average -7.2 diopters, range -2.00 to -18.00). All patients underwent bilateral superior rectus – lateral rectus myopexy. Seven patients needed additional single medial rectus recession of between 2-6mm, and two had additional inferior rectus recession. After a follow up period of 3-52 months (average 16 months) 15/18 patients (83%) had a deviation less than 6 PD. No overcorrections were noted.

Conclusion: lateral to superior rectus myopexy, is a safe and effective treatment for patients with distance esotropia in which displacement of these muscles is identified. Additional single medial rectus and/or inferior rectus recession may be needed in some patients.
Rapid Fire Poster Presentations

Tuesday 28 June 2016 15:25 – 15:35 hr

Theme block #3: Myopia & it’s Complications

RAPID FIRE POSTER PRESENTATION 1 (11)

Unilateral High Myopia

Yvette Braaksma-Besselink
AMC (Academic Medical Centre)
Ophthalmology/ orthoptics
Amsterdam, the Netherlands

Abstract

Purpose: To clarify and present possible mechanisms of unilateral high myopia illustrated on the basis of a series of patients in light of existing literature with emphasis on the clinical relevance of these conclusions.

Methods: Patient records between 2007 and 2015 were reviewed retrospectively. Orthoptic patients of all ages with unilateral high myopia and anisometropia of at least 3dpt were included. A literature review was performed to examine existing theories regarding the cause of unilateral high myopia.

Results: 24 patient records were identified (aged 3 years to 18 years; mean age 11.4 years) The mean anisometropia was 8.25dpt (SD±3.2) Visual acuity of the most affected (myopic) eye ranged from LP+ to 0.5(Snellen) and refractive error from -4.0 to -20.0. In 7/24 (29%) ocular pathology was identified. 9/24(38%) showed strabismus and 10(42%) were anisometropic.

Conclusion: Four possible mechanisms are identified as a potential cause of high unilateral myopia in the patient group. At a time in which myopia is a frequently visited topic, one can conclude that the collected knowledge with regard to cause, treatment and prognosis can be applied to the more uncommon condition of patients with unilateral high myopia where, unfortunately, the visual prognosis remains very variable.
RAPID FIRE POSTER PRESENTATION 2

12 Post Operative Hypertropia after Esotropia Surgery in High Myopia

Vanessa Sebag
Ophtalmological clinic
Orthoptie
Paris, France

Vanessa Sebag, Aline Kostas, Mitra Goberville, Michele Leite

Abstract

Purpose: Over the last fifteen years, the understanding of the pathophysiology of esotropia in high myopia has allowed the adaptation of surgical techniques plus a clear improvement of results with increased stability and few undesirables effects. However, the occurrence of postoperative marked hypertropia may, in rare cases, hinder the result of this surgery. The mechanisms for the appearance of this hypertropia are not yet well known and its management is not defined.

Methods: A retrospective study of the records of 35 patients, operated on for esotropia associated with high myopia, between 2003 and 2011 was conducted. The horizontal and vertical deviation pre-and postoperatively were evaluated. The cases with hypertropia after surgery were analyzed.

Results: There were 7 men and 28 women. The average age was 56 years. In 27 cases a raising of the lateral rectus surgery was performed according to the Kaufmann technique. In 8 cases the technique to unite the lateral rectus and superior rectus, or “looping” according Yokoyama, was used. High myopia was unilateral in 10 cases and bilateral in 25 cases. The operated eye had amblyopia in 28 cases. The average follow-up was 1 year and 10 months. The average preoperative horizontal deviation was 52 Dioptres. The average preoperative hypotropia was 19 diopters. Postoperatively the average horizontal deviation was 16 diopters. The average post operative hypotropia was 8 diopters but in 4 cases a major hypertropia appeared (2 cases following surgery of “looping” and 2 cases after raising lateral rectus). In 4 cases moderate hypertropia was noted. In all cases with a hypertropia, myopia was bilateral and/or preoperative hypotropia was minimal.

Conclusion: The new surgical techniques used to treat esotropia in high myopia give excellent results and have improved the prognosis of the hypertropia, which previously recurred almost always. However, we must be vigilant as to how we quantify our technique that is not yet well established, especially when bilateral high myopia is at risk of developing a functionally disabling and sometimes aesthetically unsightly postoperatively. A second surgery after these interventions, particularly after fixing the lateral rectus and superior rectus, can be very complicated.
Longitudinal Changes in Visual Processing Performance Depend on Visual Pathology in Children

Marlou Kooiker
Erasmus MC
Neuroscience
Rotterdam, the Netherlands

Kooiker M.J.G.¹, Verbunt H.², van der Steen J.¹,², Pel J.J.M.¹,²
¹Vestibular and Oculomotor Research Group, Erasmus MC, Rotterdam, the Netherlands
²Royal Dutch Visio, Center of Expertise for Blind and Partially Sighted People, the Netherlands

Abstract

Purpose: Reflexive eye movement responses to specific visual input are known to provide information on the capacity of processing that input. In children with visual pathology, such responses can yield a quantification of visual processing abnormalities. We examined how this visual processing performance changed over time, compared with age-based normative changes and with changes in oculomotor- and visual function.

Methods: We included 77 children aged 1-13 years with different types of visual pathology: ocular cerebral, or nonspecific. At baseline and after two years follow-up, reflexive eye movement responses to a strong visual stimulus (i.e. cartoons) were recorded with a remote eye tracker. These responses were quantified by calculating response time, fixation duration, and fixation accuracy. Results were compared with age-based normative eye movement responses recorded in 337 typically developing children. On the same two occasions, orthoptic exams were performed to test oculomotor and visual functions (e.g. visual acuity, visual field, stereovision, nystagmus, motility). Spontaneous changes in all types of visual performance were compared between the three pathology groups, over two years.

Results: During normal age-related development, eye movement response times decreased and fixation durations increased. Children with ocular visual pathology had reduced but stable fixation accuracy, while fixation duration was reduced at baseline and increased at a higher rate than normal. 95% of children with cerebral visual pathology showed prolonged responses that increased at a higher rate than normal in 40%. Performance patterns in children with nonspecific pathology resembled those of the central group. Children with higher degradation rates of eye movement performance, less than normal for their age, showed, on orthoptic exams, more oculomotor- and visual abnormalities than children with stable performance patterns.

Conclusions: Visually-guided eye movement responses were shown useful to characterize changes in temporal and spatial properties of visual performance over time in children. Despite the abnormal eye movement responses in children that depended on visual pathology, 80% showed stable visual processing performance over time. The 20% of children with higher change rates in performance than normal may benefit from additional support. The presented norm-based visual processing performance may be used to follow uniformly visual development in children.
Cerebral Visual Impairment: Considerations in Practice

Hélène Verbunt-Brattinga
Royal Dutch Visio
Regional Centre Nijmegen
Nijmegen, the Netherlands

Ms. Henriette Lijnders MSc, Ms. Marloes van oort MSc, child psychologists

Abstract

**Purpose:** At present, cerebral visual impairment (CVI) is among the principal causes of visual impairment in children in developed countries. More and more children, suspected of CVI, are referred to Royal Dutch Visio, centre of expertise for blind and partially sighted people. CVI can manifest itself in many different ways, from severe visual deficits to subtle visual dysfunctions. Visual functions can be affected without verifiable cerebral abnormalities. CVI often occurs with other neurodevelopmental problems and can be accompanied by ocular pathology. Both the presence of CVI and the impact of CVI on daily functioning is sometimes hard to establish. We present our multidisciplinary way of working. By means of two cases, some of the dilemmas we are facing in daily practice are illustrated.

**Methods:** Assessment consists of: 1. gathering information of the child; history-taking, including the Glasgow CVI Inventory, 2. a multidisciplinary examination: ophthalmic examination, examination of visual sensory, oculomotor and visual perceptive functions, visual attention and visual-motor integration, 3. formulating an integral conclusion and recommendations, 4. explaining the results to the parents and professionals involved.

**Results:** G.: a 10-year old boy; born prematurely; cerebral palsy; special education; VIQ 91, PIQ 68. Referral by rehabilitation specialist. Orthoptic follow-up, subnormal visual acuity, esotropia and amblyopia OS. Visual complaints: skipping lines, difficulties in finding things, insecure on steps and stairs, doubt about visual field. He often says “I can’t see well”. Dilemma after assessment: complex co-morbidity. To what extent results are defined by attention, motivation, impaired executive functioning and motor skills?

**Conclusion:** the problems in daily life are not primarily caused by visual disorders; visual perceptive function is higher than PIQ.

**Recommendations:** training systematic viewing; compensation by verbalisation.

N.: an 8-year old girl; cerebellar hypoplasia; regular education; VIQ 80, PIQ 78. Referral by orthoptist; subnormal visual acuity, high hypermetropia and astigmatism, crowding. Visual complaints: variability in visual functioning, problems in judging distances, route finding and overlooking things. Dilemma: different results between neuropsychological examination elsewhere and assessment at Visio. How to interpret this as part of variability in visual functioning?

**Conclusion:** results are not clear and conclusive.

**Recommendations about (visual) adaptations in school.**

**Conclusion:** The most important question to be answered is what needs to be done for the child to support his/her development, not whether CVI can be confirmed. Therefore, the main goal of the assessment is to get insight into which visual functions are impaired, how this is related to the experienced visual problems in daily life and what other factors are of influence.
A Proposed Model for Determining the Severity of Vision Impairment

Sue Silveira
Royal Institute for Deaf and Blind Children Renwick Centre
North Rocks New South Wales, Australia

Abstract

Institution: The Renwick Centre, Royal Institute for Deaf and Blind Children
Australia has recently adopted an innovative system of supporting people with disability known as the National Disability Insurance Scheme (NDIS). Adoption of the NDIS by Australia has seen a major paradigm shift from a traditional disability funding scheme based entirely on the presence of a health condition, to one focussed on the functional impact of the person’s health condition. However, despite this new approach, the capacity of a person with vision impairment to meet NDIS eligibility criteria for funding will not be judged by measures that indicate the functional impact of their vision impairment. Rather, the person’s clinical measurements such as visual acuity and visual field results will be applied to predetermined categories drawn from the WHO International Classification of Disease Version 10 (ICD-10), to conclude if the person has mild, moderate or severe vision impairment, or if they are blind.

This paper will present an alternative methodology that could be applied when determining a person’s eligibility for disability support funding. This methodology estimates a person’s vision impairment by aggregating clinical measurements such as visual acuity and visual fields, with the presence of additional factors that are known to impact on a person’s visual function, such as glare and visual fatigue. The results of applying the methodology to a cohort of children with Oculocutaneous Albinism (OCA), who are registered with the Australian Childhood Vision Impairment Register, will be reported.

It is anticipated that this methodology could form a quick tool for clinicians to calculate the severity of a person’s vision impairment better. The intention is not to use the methodology to replace the wealth of information that becomes apparent from a low vision functional assessment. Rather it begins to bridge the gap between the conclusions that can be drawn from clinical measurements and the person’s true visual function.
PAPER 4

Verse: Vertical Reading Strategy Efficacy for Homonymous Hemianopia after Stroke: A Feasibility Study

Lauren Hepworth
University of Liverpool
Health Services Research
Liverpool, UK

Lauren Hepworth, Fiona Rowe
University of Liverpool, UK Heather Waterman, University of Cardiff, UK

Abstract

Purpose: To conduct a feasibility study using vertical reading with stroke survivors with homonymous hemianopia. Vertical reading has been suggested in the literature, but as yet has no empirical evidence of use in homonymous hemianopia.

Method: The study used a cross-over design with cross-sectional analysis. Stroke survivors underwent a routine orthoptic assessment including a visual field test. Control participants had no visual or neurological pathology. Visual and cognitive functioning were assessed. The three reading directions (horizontal; 90° clockwise rotation; 90° anti-clockwise rotation) were assessed in a randomised order. Control participants only performed the reading assessment in the three reading directions.

Results: Seven participants (71% male, mean age 73 years) with stroke-induced homonymous hemianopia and eight (37.5% male, mean age 66 years) control participants were recruited, each acting as their own control. The mean horizontal reading speed for stroke survivors was 120.29 (SD 33.91) words per minute and for controls was 143.92 (SD 44.77) words per minute (p=0.139). When reading vertically (downwards) at 90° clockwise rotation the mean reading speed of stroke survivors was 62.66 (SD 43.44) words per minute and for controls was 59.37 (SD 18.94) words per minute. When reading vertically (upwards) at 90° anti-clockwise rotation the mean reading speed of stroke survivors was 74.56 (SD 53.46) words per minute and for controls was 67.63 (SD 30.81) words per minute.

Conclusions: With minimal practice time, both directions of vertical reading reduced reading speed in both stroke survivors and controls. Controls had a larger decrease in reading speed than those with homonymous hemianopia possibly indicating the added impact of atypical text position to their normal reading function. Stroke survivors were already slower at reading in the normal horizontal position due to their hemianopia but had similar reading speeds to controls in tilted conditions. This potentially indicates that tilted text negates the effects of hemianopia on reading. Due to the small sample size, the findings should be interpreted with caution. A home practice element should be incorporated into future studies.
**PAPER 5**

**Clinical vs Evidence-Based Rehabilitation Options for Post-stroke Visual Impairment**

**Kerry Hanna**  
University of Liverpool  
Health Services Research  
Liverpool, UK

**Fiona Rowe**, Reader and PhD supervisor at University of Liverpool, UK,  
**Lauren Hepworth**, research assistant at University of Liverpool, UK

**Abstract**

**Purpose:** To review the orthoptic treatment options used within a clinical stroke cohort compared with options identified in a systematic literature review of stroke populations.

**Methods:** A systematic review of the literature was conducted including randomised controlled trials, controlled trials, cohort studies, observational studies and retrospective reviews. Subjects included adult participants (aged 18 years or over) diagnosed with a visual impairment as a direct cause of a stroke. Studies which included mixed populations were included if over 50% of the participants had a diagnosis of stroke and were discussed separately. We searched scholarly online resources and hand searched articles and registers of published, unpublished and ongoing trials. Quality of evidence and risk of bias was assessed using the appropriate tools dependant on the type of article. The Vision In Stroke (VIS) study was a prospective multi-centre cohort study. Standardised referral and investigation protocol included assessment of visual acuity, ocular alignment and motility, visual field and visual perception, with capture of treatment options.

**Results:** Forty-five articles were included in the review. Treatment options identified included visual search training, Peli prisms and restitution therapy for visual field loss; hemifield eye patching and scanning treatment for visual neglect; prisms, occlusion and surgery for ocular motility defects; and advice for visual perceptual defects. VIS recruited 915 patients with a mean age of 69 years (SD 14). Ninety-two percent (n=840) of the cohort had visual impairment and all received treatment or advice for this. Interventions consisted of verbal or written advice (99%), refraction (39.3%), prisms (12%), typoscopes (8.9%), occlusion (7.8%) and low vision aids (3.8%).

**Conclusions:** The orthoptic treatment options offered to stroke survivors with visual impairment matched those identified through the systematic literature review. Many have an established evidence base for effectiveness. A number, however, such as typoscope and advice options, have limited detail of their effectiveness and require further research to address this gap and provide an evidence base for orthoptists treating visual impairment in stroke survivors.
PAPER 6

Posterior Cortical Atrophy

Ms Greetje Koevoets
Bartiméus
Services
Zeist, the Netherlands

Abstract

People with Alzheimer’s Dementia often have visual processing problems such as impaired visual attention and the inability to find objects in a busy area. In people with posterior cortical atrophy, a form of early onset Alzheimer’s Dementia, visuospatial dysfunctions are often the first symptoms. For example, patients may have trouble recognizing objects, with depth perception and color vision, they may have symptoms such as double vision and eye focusing problems. Quite often these clients visit an orthoptic clinic and find that their problems are not well interpreted and treated. This disease is only relatively recently described and unknown, therefore it is not easy for orthoptists to recognize when they should refer a patient to a specialist for further diagnostics. Bartiméus works together with the Alzheimer’s Center of the VU University Medical Center, Amsterdam with the aim of the promotion of early diagnosis and to improve the support of people with PCA, their family and caregivers.
**Abstract**

**Purpose:** The lack of specific tests for Cerebral Visual Impairment (CVI) makes diagnosis complex. Test results are sometimes confounded by comorbid cognitive or motor difficulties, and available tests are often too complex for young children. To address these problems, we developed the Cerebral Visual Impairment Test for 3 to 6 year olds (CVIT 3-6) focussing on object recognition, degraded object recognition, motion perception and local-global processing.

**Methods:** Normative data were collected from 348 children without visual and developmental disorders. Validity and reliability was evaluated in children with CVI, intellectual impairment, or with a typical development. We determined test-retest reliability and Cronbach’s alpha. Confirmatory factor analysis was performed to assess internal validity. Convergent and discriminant validity was assessed by correlating CVIT 3-6 performance with other measures of visual functions, visual acuity, intelligence (IQ) and autism. In addition, we compared performance between validation groups.

**Results:** Cut-off scores for normal visual perception for the total score on CVIT 3-6 and for the 4 sub-scale scores were determined based on our normative data sample. Multiple regression indicated CVIT 3-6 scores increased with age for children born at 35 weeks gestational age or later. Cronbach’s alpha in our normative data sample was .65 and test-retest reliability in our validation groups was .80. The confirmatory factor analysis confirmed the hypothesized internal structure of CVIT 3-6. We found a non-significant correlation between CVIT 3-6 performance and performance on a visual-motor integration task, probably related to the motor component of the second task. A high correlation was observed between CVIT 3-6 and scores on L94, a visual perception battery. Autistic traits were not correlated to CVIT 3-6 performance. Significant correlations were found between CVIT 3-6 scores and visual acuity or IQ. The correlation with IQ is probably mediated by the visual nature of test materials, because we observed a significantly better score on CVIT 3-6 for children with an intellectual impairment compared with CVI children.

**Conclusions:** We developed a screening test for mid- and high level visual functions in CVI. Factor analysis confirmed the test measures four domains of visual functions. Age-dependent normative data are available for 348 children. We observed good reliability of CVIT 3-6 and validity research showed satisfying results.
RAPID FIRE POSTER PRESENTATION 2 (17)
A 10 Year Review of Patient Outcomes from a Neurorehabilitation Orthoptic Assessment Service

Jennifer Earl
Newcastle Eye Centre, Royal Victoria Infirmary Orthoptics Orthoptics Department, Level 2 Claremont Wing, Royal Victoria Infirmary Newcastle Upon Tyne, UK

Jennifer Earl, Kate Taylor, Tina Sharma, Margaret Dayan

Abstract

Purpose: A 10 year review to look at outcomes of patients referred to the Newcastle Eye Centre at Royal Victoria Infirmary (RVI) from Walkergate Park Hospital from 01/04/2005- 31/03/2015. Walkergate Park Centre for Neurorehabilitation is a service for patients with a disability caused by injury or disease affecting the brain, spinal cord or muscles. All new patients are offered an orthoptic vision and ocular motility assessment upon admittance to the centre. length of treatment/follow-up, attendance rate and type of treatment issued.

Methods: We undertook a retrospective case notes review using the hospital database to review patient’s appointments, treatment given and outcomes.

Results: 521 patients were seen by the Orthoptic screening programme at Walkergate Park Hospital over this 10 year period. 326 (62.57%) were referred to Newcastle eye centre at RVI for further assessment and treatment. (Figures may change due to ongoing data collection). We report the diagnoses, treatments and outcomes for these complex patients.

Conclusion: The incidence of visual disability in patients with brain injuries is high and many of these patients are unable to communicate their visual disability. Orthoptic screening of these patients on admission allows identification and management of their visual disability. Close communication with the rehabilitation team allows this information to be used in their rehabilitation planning.
Wednesday June 29

Wednesday 29 June 2016 8:30 – 9:30 hr

Theme block #5: Neuro-ophthalmology

PAPER 1

Neurological imaging in acquired cranial nerve palsy: Ophthalmologists vs. Neurologists

Tessa Klein Hesselink
Hogeschool Utrecht
Orthoptics
Utrecht, The Netherlands

T. Klein Hesselink, M. Gutter, J.R. Polling
University of Applied Science Utrecht, Faculty of Optometry and Orthoptics, Utrecht, the Netherlands

Abstract

Purpose: Cranial nerve palsies often require neurological imaging by MRI, guidelines whether or not to perform MRI scanning have been absent or lack clarity. In daily practice, both neurologists and ophthalmologists treat patients with cranial nerve palsy and determine whether neuro-imaging is indicated. There appear to be differences in policy with respect to neuro-imaging. The question that will be answered in this study is the following: to what extent do differences in policy exist between ophthalmologists and neurologists regarding patients with acquired ocular cranial nerve palsy?

Method: Pubmed database was searched for literature on acquired cranial nerve palsy and MRI scanning performed by ophthalmologists and neurologists. Case series published between 2000 and 2015 were included. The first author screened the literature on eligibility, profession of the authors and conducted data abstraction.

Results: Ten case series were found eligible for analysis. A total of 889 cranial nerve palsies were described, 770 by ophthalmologists and 119 by neurologists. The age range of patients in all case series was 2 yrs of age to 96 yrs of age. The oculomotor nerve was investigated in 162 patients, the trochlear nerve in 131 patients and the sixth nerve in 486 patients. All neurologists (n=3) and 2 out of 7 investigated ophthalmologists advise to perform MRI scanning in every patient presenting with an ocular cranial nerve palsy, five out of seven ophthalmologists do not perform MRI scanning in every single patient but determine risk factors for cranial nerve palsies first. When different groups of patients are viewed separately it becomes apparent that almost all specialists agree that every patient with a third nerve palsy and patients under 50 years of age should undergo MRI scanning. In patients with fourth nerve palsy MRI scanning is not indicated. The biggest differences in management occur in patients with sixth nerve palsy and patients over 50.

Conclusion: The neurologists in this study are more likely to perform MRI scanning in every patient presenting with ocular cranial nerve palsy. Ophthalmologists are more likely to determine risk factors for cranial nerve palsy first before performing neurological imaging in patients over 50 year or presenting with abducens nerve palsy.
The role of MRI in infants with strabismus and central nervous system disorders

Sjoukje Loudon
ErasmusMC University Medical Center
Ophthalmology
Rotterdam, The Netherlands

S.E. Loudon¹, J. Dudink², L.S. Smit³, J.R. Polling¹, H.J. Simonsz¹
¹Departments of Ophthalmology; "Neonatology; ³Pediatric Neurology Erasmus MC Rotterdam,
The Netherlands

Abstract

Purpose: The proportion of Infantile Esotropia (IE) associated with Central Nervous System Disorders (CNSD) is increasing. In this observational study we investigated the role of MRI in infants with CNSD and IE.

Methods: Since March 2012 all infants with perinatal incidents resulting in damage to the central nervous system who visited the out-patient clinic of pediatric neurology and presented with a strabismus (Bruckner test), are being referred to the department of Ophthalmology. They received full orthoptic and ophthalmological examination. The neurological documentation included classification of cerebral palsy: spastic (unilateral or bilateral), dyskinetic or atactic. In addition, the GMFCS (Gross Motor Function Classification System) scale ranging from 1 (mild impairment in functional abilities) to 5 (impaired in all levels of motor function) was recorded. All children had a post-natal MRI brain scan. All scans were performed using a 1.5-T GE Echo Speed scanner (General Electronics Medical Systems, Milwaukee, Wisconsin, USA) according to a standard imaging protocol. MRI’s were assessed (JD) using a simplified scoring system: 1. Unilateral or bilateral brain injury 2.Presence of white matter injury (0=none, 1=mild-moderate, 3= severe) and 3. Presence of (cortical or deep) grey matter injury (0=none, 1=mild-moderate, 3= severe).

Results: So far, 35 children with a CNSD and strabismus have been referred by the pediatric neurologist, mean age at examination was 9.5 months (range 4-18 months). Thirteen (37%) of the referred children were diagnosed with IE. All of them had severe bilateral white matter lesions periventricular; which had resulted in spastic cerebral palsy bilateral or unilateral, and their GMFCS ranged from 1-5. The remaining 22 children had various types of strabismus ranging from exotropia, to microstrabismus. Their MRI scans showed various types of lesions, but the periventricular white matter area was spared. They had cerebral palsy spastic or dyskinetic. Their GMFCS ranged from 1-5.

Conclusion: Remarkably all infants with CNSD resulting in spastic cerebral palsy and IE showed similar bilateral periventricular white matter injury, which included posterior fibers of the optic radiation. A subsequent study will be done to determine if, based on the MRI lesion, a more extensive scoring system (assessing all substructures of the brain: including basal ganglia, thalami, mesencephalon, cerebellum and all white matter tracts) can accurately predict the risk of IE.
Ocular motility dysfunction in patients with meningiomas

Gill Roper-Hall
Saint Louis University, Ophthalmology
St. Louis, Missouri, USA

Abstract

Introduction: Meningiomas are slow-growing, usually benign tumors that account for twenty-seven percent of all primary brain tumors. They arise from the meninges and can occur anywhere in the brain or spinal cord, a common location (20 percent) being the sphenoid wing. In many cases the presence of the lesion is unknown or is asymptomatic.

Purpose: To conduct a retrospective chart review to evaluate the ocular signs and symptoms of patients seen in the Department of Ophthalmology at [institution] between 2002 and 2015 with a diagnosis of meningioma.

Methods: Exclusion criteria were previous strabismus, strabismus surgery or unilateral loss of vision. Evaluation included visual acuity and visual field testing, ocular motility, exophthalmometry and a dilated fundus examination. A subset of patients with meningioma and diplopia was studied further to determine the type of ocular deviation present and the mechanism causing the diplopia. The study was conducted with HIPAA compliance and in accordance with the Institutional Review Board requirements for our institution.

Results: One hundred and seventeen patients with meningioma seen at our institution between 2002 and 2015 were identified. There were 99 females and 18 males with an age range of 30 to 82 (mean 55) Thirty-three patients were found to have normal neuro-ophthalmologic examinations, and one had functional vision loss. Forty-eight patients had decreased vision or visual field loss and the remaining 35 patients had ocular motility dysfunction, including diplopia.

The patients with motility disorders were further studied. The age range and gender distribution was similar to the total group (age 37 to 79; 30 females and 5 males.) Four patients with meningioma had eye movement findings without diplopia including nystagmus, abnormal pursuit, and square-wave jerks. Four further cases were excluded due to insufficient information.

Data for the remaining 27 cases showed that cranial nerve involvement was the most common cause for diplopia (22 of 27.) Ten patients had VI nerve palsy; 5 patients had III nerve palsy; only one patient had IV nerve palsy. Four patients had combined III and VI nerve palsies; two had involvement of the III, IV and VI nerves. A few patients had additional involvement of other nerves (II, V, VII, VIII), two had ocular neuromyotonia and one had an associated Horner syndrome. The remaining five patients had sensory exotropia from visual field defects (2), convergence insufficiency (1), proptosis (1) and recurrent cranial neuropathies from unrelated polyneuritis (1).

Conclusions: Although 90 percent of meningiomas are benign they can have damaging effects on the ocular structures affecting vision and eye movements. Patients develop visual field defects or vision loss from optic nerve or chiasmal involvement and ocular motility limitations from associated cranial neuropathies. Meningiomas cause most neurological deficits due to mass effect.
PAPER 4

Management and long-term follow-up of divergence paralysis in spino cerebellar ataxia type 3

Jan Willem Pott
UMCG
Ophthalmology
Groningen, the Netherlands

Abstract

**Purpose:** Spino Cerebellar Ataxia (SCA) type 3 is an inherited neurodegenerative disease and the most common type of Autosomal Dominant Cerebellar Ataxia (ACDA). SCA type 3 is often accompanied by diplopia caused by divergence paralysis. We report on the long term follow-up and treatment of these patients.

**Methods:** Medical records of 55 patients with SCA type 3 were reviewed retrospectively. This is a selection of 94 patients with SCA known on the department of Neurology of our hospital.

**Results:** 45 patients complained of diplopia. The mean age at presentation was 43 years (range 25 - 58 years); 44 patients had a divergence paralysis, characterised by an esotropia at distance and ortho-/or heterophoria nearby. Mean follow up is 7 years (range 1-18 years); 36 patients were initially treated with prisms to restore binocular single vision. No patients were initially treated by surgery. In 13 patients prisms eventually were not sufficient and surgery was performed. First surgery could be postponed for a mean duration of 6.5 years (range 3-13 years) by prescribing increasing power of prism glasses. Of this group, 5 patients were operated once, 6 patients twice and 2 patients needed a third operation. Eventually, 8 patients lost fusional capacity due to other ocular motility dysfunction, like nystagmus, saccadic intrusions andduction deficits, disturbed fusional ability. The mean time between the first visit and the decision that no further treatment was possible was 11.4 years (range 4.5-16 y).

**Conclusion:** Diplopia caused by divergence paralysis is very common in patients with SCA type 3. It is a progressive disease. The diplopia at distance can initially successfully be treated with prisms. Thereafter strabismus surgery is needed. As the progression of divergence paralysis is not stopped, some patients need multiple procedures. Eventually, after more than 10 years of follow-up some patients will lose their fusional capacity by other motility disorders.
Oculomotor findings in bilateral thalamic strokes

Amandine Guinard
University Hospital Pasteur 2 (Nice, France)
Ophtalmology, service orthoptie
Nice, France

A. Guinard, S. Iachaud, C. Leal, B. Schneider

Abstract

Purpose: Bilateral thalamic infarct is a rare type of stroke which involves an acute diplopia. We describe oculomotor findings of two patients who presented a bilateral thalamic infarcts. We aim to provide a better understanding for orthoptists of this kind of stroke and particularly the existence of one anatomic variant: the Pecheron artery. Ophthalmologic outcomes are often present for most of patients like a vertical gaze palsy, vertical deviation, nystagmus and oscillopsia.

Method: We studied the clinical and radiological findings of two men (55 and 62 year old) who were admitted in emergency in 2014 for an acute diplopia. The MRI (Magnetic Resonance Imaging) revealed an ischemic stroke resulting in a bilateral thalamic injury. We reviewed the literature for these cases.

Results: At the first examination, both of the men had a diplopia with a vertical ocular deviation due to the vertical gaze palsy. Also, the examination revealed a marked upbeat nystagmus and oscillopsia in upgaze. Difficulties to initiate saccades for both of them were also noticed. Both men showed good ocular improvement after one year except a residual vertical deviation did not resolve one year after the stroke. Consequently, both had distructive diplopia which lead to a challenging management for the orthoptist and the strabismus surgeon.

Conclusions: The proximity of the thalami with the upper midbrain leads to involvement of the upgaze center, and the oculomotor nerve (CN III) just above. Oculomotor findings confirm damages at the upper midbrain. This explains why the bithalamic stroke by the occlusion of Pecheron artery often induces Parinaud’s syndrome, nystagmus with oscillopsia and vertical strabismus. Despite of the good improvement of supranuclear oculomotor signs, we observed a persistent vertical deviation for those patients. The analysis of this deviation for orthoptist is sometimes difficult and involves complicated surgical protocol for the ophthalmologist.
PAPER 6

Visual field outcomes in children with Neurofibromatosis type 1 associated optic pathway gliomas

Sarah Whitecross
Boston Children’s Hospital
Ophthalmology
Boston, USA

Abstract

**Purpose:** The majority of studies of neurofibromatosis type 1 (NF-1) associated optic pathway gliomas (OPGs) have focused on visual acuity (VA) outcomes. In contrast, visual field (VF) outcomes data are limited, as VF testing is more difficult to perform in young children. Despite the potential challenge of VF testing, VF loss may occur concurrently with VA loss, and rarely, VF loss may even be the only sign of visual dysfunction. The purpose of this study is to examine the impact of OPGs on VFs in a large cohort of children with NF-1.

**Methods:** Eleven year retrospective chart review of all patients with a diagnosis of NF-1 (ICD-9 237.7) and optic nerve glioma (ICD-9 192.0, 377.51, 377.52, 237.9) at a single, tertiary care center. Data regarding demographic characteristics, VF data, radiographic data, and treatment were collected.

**Results:** A total of 140 patients with NF-1 associated OPGs were identified of whom 113 (53% female) have performed Goldmann perimetry. Median age of first VF test by Goldmann perimetry was 5 years (range 3-18 years) and mean follow up was 75 months. VF dysfunction was noted in 49/113 (43%) of patients. Types of VF deficits present included generalized constriction (25%), temporal hemianopia (61%), homonymous hemianopia (11%), and nasal deficit (2%). Treatment occurred in 42% of patients, and of those, 68% had persistent visual field deficits present on most recent VF testing compared to 17% of patients who did not undergo any treatment.

**Discussion:** VF loss occurs at a high frequency in children with NF-1 associated OPGs. We found that formal VF assessment by Goldmann perimetry is a feasible method to monitor disease progress in young children.

**Conclusion:** Evaluation of VF dysfunction in children with NF-1 associated OPGs is important as it is a significant source of morbidity in these patients.
Rapid Fire Poster Presentations

Wednesday 29 June 2016 9:30 – 9:40 hr

Theme block #5: Neuro-ophthalmology

RAPID FIRE POSTER PRESENTATION 1 (21)

Ocular motor function in children with unilateral spastic hemiplegia evaluated by the ocular motor score

Agneta Rydberg
Karolinska Institutet
Department of Clinical Neuroscience
Stockholm, Sweden

A. Rydberg, J Ygge, M. Olsson,
Karolinska Institute, Department of Clinical Neuroscience, Section of Ophthalmology and Vision, and St. Erik Eye Hospital, Stockholm, Sweden

Abstract

Purpose: To assess the ocular motor functions in children with spastic hemiplegia by using the Ocular Motor Score (OMS).

Methods: 34 children (20 boys and 14 girls, age range 7-17 years, median age 11 y) were included in the study. The children were divided into 3 groups according to the underlying brain lesion: 1) malformations (polymicrogyria, schizencephaly and grey matter heterotopia; n=7), 2) white matter damage of prematurity (WMD; n=15) and 3) cortical/subcortical lesions (middle cerebral artery or anterior cerebral artery infarct; n=12). The OMS protocol consists of 15 different subtests evaluating ocular motor functions. The OMS is divided into 2 parts, a static and a dynamic. The static tests include examination of head posture, eyelid position, stereo acuity, pupil response and strabismus. The dynamic tests include examination of ductions/versions, fixation in primary position, fixation in 8 gaze directions, saccades, smooth pursuits, convergence, fusional vergence, VOR and OKN. The results from each subtest is scored 0, 0.3, 0.5 or 1, according to the level of disturbance, where 0 corresponds to normal function and 1 represents pathological function. A total score between 0 and 15 can be obtained.

Results: The median OMS score in the whole group was 2.7 (range 0.3-9). In group 1 the median score was 3.7 (range 0.3-9), in group 2 the median score was 2.1 (range 0.3-8.1) and in group 3 the median score was 2.9 (range 1-5.7). Strabismus was found in 45% (15/34) of the children, with an equal percentage in all 3 groups.

Conclusions: The children with spastic hemiplegia caused by different brain pathologies had a total median OMS of 2.7 and the highest median score was seen in children with malformations. This is in accordance with another study by Olsson and coworkers in children with various neurological problems. The score is, however, higher than the OMS in a reference group of children, without any known ocular problems and with normal psychomotor development, which was 0.3 in children age 7-10 and 0 in children 11-19 years. The OMS score is easy to use clinically and gives a quick overview of the patient’s ocular motor functions. Some modifications of the protocol will be needed for better comparison between the static and dynamic part of the protocol.
Rapid Fire Poster Presentation 2 (22)

Oscillopsia due to malabsorption secondary to Wernicke encephalopathy

Angela Dillon
Houston Eye Associates
Pediatric Ophthalmology and Adult Strabismus
The Woodlands, USA

Abstract

Purpose: To describe the cause and treatment of oscillopsia induced by Wernicke Encephalopathy secondary to gastric bypass surgery.

Methods: Case presentation of a 40-year-old female who presented to our clinic with complaints of diplopia and oscillopsia after undergoing gastric bypass surgery. Based on the presentation and exam findings, a surgical plan was formulated and executed.

Results: The cause of the oscillopsia was found to be due to Wernicke Encephalopathy secondary to gastric bypass surgery. After bilateral guarded superior oblique tenotomies, surgical results yielded resolution of oscillopsia and improvement of diplopia.

Conclusions: A clinician should add malabsorption syndrome secondary to Wernicke Encephalopathy on their differential for sudden-onset oscillopsia. Guarded superior oblique tenotomies can be a successful treatment for oscillopsia secondary to Wernicke Encephalopathy.
PAPER 1

A prospective observational study of ocular comorbidities in children with NAS: Study design and one-year outcomes

Jennifer Lambert
Boston University School of Medicine
Department of Ophthalmology
Boston, USA

J. Lambert, K.H. McConnell, H.P. Park, S.P. Christiansen

Abstract

Purpose: Previous studies suggest that children diagnosed with neonatal abstinence syndrome (NAS) have a higher than expected prevalence of congenital ocular and visual abnormalities. This study prospectively assesses the risk of ocular and visual co-morbidities in NAS babies.

Methods: All infants exposed to maternal drugs of abuse are referred at discharge for complete ophthalmological examination as part of the NAS screening protocol at our institution. Visual and ocular abnormalities are tabulated and interim statistical analyses explore the incidence of ocular anomalies in NAS babies.

Results: 17 babies diagnosed with NAS have been examined. 53% were male; 71% were white. The mean gestational age was 37.1 months; mean birth weight was 2.7 kg. Mean age at examination was 4.8 months. One child (6%) has developmental delay. All 17 children were exposed to at least one opiate substance in utero. The most common opiate of maternal use was buprenorphine (53%), followed closely by methadone (47%), and then by heroin (24%). In addition, 24% of mothers abused cocaine and 12% abused benzodiazepines. All but one child (94%) required pharmacologic treatment for symptoms of withdrawal. Of 17 children examined, 4 (24%) had abnormal ocular findings. Three (18%) had a significant refractive error, which was the most common abnormal ocular finding. Esotropia was detected in one patient (6%). Optic nerve pigmentation and hypoplasia were detected in one child (6%).

Conclusions: Early data show a significantly higher than normal rate of ocular co-morbidities in NAS babies in this prospective data collection study. Further study is warranted to identify infants at highest risk of poor visual outcomes.
14 year follow-up study of orthoptic findings in Fetal Alcohol Spectrum Disorders (FASD)

Eva Aring
Neuroscience and Physiology
Ophthalmology
Göteborg, Sweden

E. Aring¹, M. Landgren², L. Svensson², M. Andersson Grönlund¹
¹Institute of Neuroscience and Physiology/Ophthalmology, The Sahlgrenska Academy at University of Gothenburg, Gothenburg, Sweden; ²Department of Pediatrics, Skaraborg Hospital, Skövde

Abstract

Purpose: To follow up orthoptic findings as a part of a multidisciplinary study in individuals adopted from eastern Europe diagnosed with FASD.

Methods: A prospective study was performed in 1993 - 1997 in children adopted from eastern Europe (n=72, mean age 7.5 years). In this cohort 15 children were diagnosed with FASD according to the 4-digit diagnostic code based on growth deficiency, facial features, central nervous system (CNS) structural and functional abnormalities, and prenatal alcohol exposure. Fourteen years later twelve of these individuals with FASD were eligible for follow-up at mean age of 20.7 years.

Results: At baseline 8/15 (53 %) had best corrected visual acuity (BCVA) ≥0.5 (≤0.3 logMAR) at distance of the better eye and 7/15 (46%) had binocular BCVA ≥0.5 (≤0.3 logMAR) at near. 2/15 (0.13%) were hyperopic (≥2.0 D SE), two (0.13%) were myopic (≥0.5 D SE) and 6/15 (40%) had astigmatism (≥1.0 D). Anisometropia ≥1D was found in 3/15 (25%) and 10/15 (66%) had defect or impaired binocular vision.

At follow-up 9/12 (75%) had BCVA ≥0.5 (≤0.3 logMAR) of the better eye (n.s) and 12/12 (100%) had binocular BCVA ≥0.5 (≤0.3 logMAR) at near (p=0.03). 1/12 (0.8%) were hyperopic (n.s), 9/12 (75%) were myopic (p=0.006) and 9/12 (75%) had astigmatism (n.s). Anisometropia was found in 5/12 (42%) (n.s) and 8/12 (66%) had defect/impaired binocular vision (n.s).

The numbers of individuals with heterotopias were the same both at baseline and follow up. However, one was consecutive exotropia at follow up and one esotropia at baseline had a small hypotropia at follow up.

Conclusion: This group of young adults with FASD had a positive change in BCVA with the most positive change in near vision and a significant increase towards myopia from age 7 to 20 years. However, binocular vision showed no significant changes over time.
PAPER 3

Visual field deficits in albinism

Viral Sheth
The University of Leicester
Ophthalmology
Leicester, United Kingdom

V. Sheth, I. Gottlob, S. Mohammad, R.J. Mclean, F.A. Proudlock

Abstract

**Purpose:** Albinism is associated with known retinal deficits such as foveal hypoplasia, a midline shift in the line of decussation and optic nerve head abnormalities. Visual field results in albinism are difficult to interpret because of nystagmus. We have compared visual fields in albinism to a nystagmus cohort without obvious retinal deficits (idiopathic infantile nystagmus or IIN). Results were compared to structural retinal deficits measured using optical coherence tomography (OCT).

**Methods:** Visual field testing was completed monocularly using a Humphrey Field Analyzer on 61 participants with albinism and 32 with IIN. In all participants monocular light spot detection threshold were assessed using automated white on white perimetry with a SITA 24-2 algorithm to compare the detection threshold for up to 24” around the fixation point. We analyzed each quadrant (upper nasal, upper temporal, lower nasal and lower temporal) of the visual field excluding the blind-spot. We also compared central detection thresholds to the layer thicknesses at the fovea and across the parafoveal region in 99 eyes with albinism and 54 eyes with IIN assessed using OCT.

**Results:** The detection threshold in albinism was significantly worse compared to the IIN group for all quadrants compared to IIN (p<0.001). Detection thresholds were also significantly worse in the left eye compared to the right (p=0.008) for albinism. In albinism the upper nasal visual field was significantly worse than the upper temporal (p=0.004), lower temporal (p=0.013) and lower nasal (p=0.02) fields. There were no significant differences between the quadrants or eyes in the IIN group. We found significant correlations between central detection threshold and retinal thickness across the parafoveal region (p=0.016), retinal nerve fiber layer (p=0.002 at fovea, p=0.001 across parafovea), inner nuclear layer (p=0.005 at fovea), outer nuclear layer (p=0.001 at fovea, p=0.003 across parafovea), outer segment (p=0.005 at fovea). No significant correlations were found for the IIN group.

**Conclusion:** Light spot detection thresholds provide further insight into the cortical re-organization occurring in albinism. They also demonstrate that upper / lower visual pathway asymmetries as well as nasal / temporal asymmetries exist in albinism. OCT findings indicate that detection thresholds relate to structural abnormalities of the retina showing that there is clinical value in performing visual fields in albinism.
PAPER 4

Phenotype modification after genetic analysis – another look at Moebius syndrome

Darren Oystreck
IWK Health Centre / Dalhousie University Eye clinic
5850 University Avenue
Halifax, Canada


Abstract

**Purpose:** To improve the phenotypic description of Moebius syndrome (MBS) through genetic analysis.

**Methods:** Careful evaluation of ocular motility, ocular alignment, facial muscle function, as well as assessment of additional anomalies often reported with MBS were conducted in a larger group of individuals previously given a diagnosis of MBS by their local health care providers. Research participants were recruited from 3 consecutive international Moebius Syndrome Conferences organized by the Moebius Syndrome Foundation.

**Results:** 112 participants were enrolled. The vast majority of participants were found to have characteristic strabismic patterns. Nineteen percent (21/112) had atypical patterns. Seven of these were later confirmed to have one of three genetically distinct syndromes.

**Conclusions:** MBS can easily be misdiagnosed due to variable diagnostic criteria used by health care professionals. Assessing individuals for presence of specific criteria improves making the correct diagnosis. This project supports the importance of accurate phenotyping particularly when research subjects are being selected for genetic testing. Recognition of outliers led to the identification of three genetically distinct conditions that may have otherwise still been referred to as MBS. Conversely, having a genetic diagnosis helps confirm a clinical diagnosis however the negative genetic results in these MBS patients further supports this as a distinct entity from other overlapping conditions.
**PAPER 5**

**Strabismus and binocular functions in children with Autistic Spectrum Disorder**

Pamela Anketell  
Belfast Health & Social Care Trust  
Orthoptic Department  
Belfast, Northern Ireland

P. Anketell¹, K.J. Saunders², S.M. Gallagher², J.A. Little²  
¹Belfast Health & Social Care Trust; ²Ulster University, Coleraine

**Abstract**

**Purpose:** Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder. Extensive research has described atypical visual findings in ASD such as anomalous facial recognition and motion perception. By comparison only a few studies have described basic clinical measures in children with ASD. These studies have indicated there may be an increased prevalence of strabismus and impaired convergence in children with ASD. The aim of this study was to investigate the prevalence of strabismus and the accuracy of binocular functions in a large population of children with ASD.

**Methods:** Children with ASD (n=128, mean age 10.9±3.3years) were recruited from a population-based register using the ICD-10 diagnostic codes F84.0 & F84.5. Typically developing children (TD) were recruited as controls from mainstream schools (n=206, mean age 11.5±3.1years). Assessment included cover test to determine the presence of heterotropia/phoria, observation of saccades, stereoacuity and near point of convergence (NPC). Additional measures included VA, refractive error and accuracy of accommodation.

**Results:** Children with ASD were noted to have an increased prevalence of strabismus compared to typically developing children (ASD 8.6%; TD 1.5%; $\chi^2=10.0$, p=0.002). Significantly more participants with ASD were noted to have inaccurate saccades (33%) compared to the TD group (4%) ($\chi^2=62.6$, p<0.0001). After exclusion of individuals with heterotropia stereoacuity scores were significantly better in the TD group ($z=-2.9$, p=0.004; median scores; ASD group median=20", interquartile range (IQR) 10 to 55"; TD group median=20", IQR 10 to 40"). NPC was significantly reduced in ASD compared to the TD group ($z=-4.6$, p<0.0001; ASD median=5.7cm, IQR 5.0 to 8.0cm; TD group median=5.0cm, IQR 5.0 to 6.0cm).

**Conclusions:** The present study has established, through a representative sample of individuals with ASD, that there is an increased prevalence of strabismus in this population. However, this prevalence is substantially lower than previously reported in the literature. Stereoacuity and NPC were reduced in participants with ASD. While the differences noted may be of minimal clinical impact it may be indicative of subtle visuo-motor deficits.
PAPER 6

Strabismus, Prevalence and Influences in a UK Multi-ethnic Birth Cohort

Alison Bruce
Bradford Teaching Hospitals NHS Trust
Bradford Institute for Health research
Bradford, United Kingdom

A. Bruce, G. Santorelli

Abstract

Purpose: To determine the prevalence, types and early-life risk factors associated with strabismus in a birth cohort of 4-5 year old children in the first year of school.

Methods: Data was collected prospectively over a three year period (2012-2015) from children participating in the universal vision screening programme provided by orthoptists and carried out in schools located in the city of Bradford, UK. Prevalence of strabismus was determined for 17018 children aged four to five years. Data linkage was undertaken for 4563 children participating in both the Born in Bradford birth cohort study and the vision screening programme. 4067 children had complete data and were included in the multivariable regression analyses to determine associated factors.

Results: 401/17018 (2.4%) children were found to have either a constant or an intermittent strabismus; 180/401 (45%) had an eso deviation and 214 (53%) an exo deviation.

No significant difference in the overall prevalence of strabismus was found between the White British, Pakistani or children of other ethnic origin (p=0.41). Multivariate analysis showed that children of White British ethnicity had increased odds of having esotropia (2.4 95% CI 1.1 to 5.3). The odds of having esotropia doubled for every +1DS mean spherical equivalent (2.0 95% CI 1.7 to 2.6). Some interaction was found between ethnicity and mean spherical equivalent in children with esotropia (p=0.058).

Conclusions: Prevalence of strabismus is consistent with other population based studies in this cohort of 4-5 year old children. Prevalence of esotropia (constant or intermittent) is greater in the White British population. White British ethnicity is shown to be associated with the presence of esotropia. The presence of a hyperopic refractive error is highly associated with the likelihood of esotropia in both the white British and the Pakistani population. Exotropia (constant or intermittent) was not found to be associated with refractive error, ethnicity or other early life factors.
Rapid Fire Poster Presentations

Wednesday 29 June 2016  12:10 – 12:20 hr

Theme block #6: Genetics, Syndromes

RAPID FIRE POSTER PRESENTATION 1 (33)

Orbital xanthogranulomatous disease and eye motility disorders

Eline De Jongh
The Rotterdam Eye Hospital
Orthoptic department
Rotterdam, The Netherlands

E. De Jongh, A.D.A. Paridaens

Abstract

Purpose: Adult orbital xanthogranulomatous disease (AOXGD) is a rare acquired condition classified in 4 subtypes. This poster presents a patient with adult onset asthma and periocular xanthogranuloma (AAPOX). The clinical presentation of AAPOX consists of uni/bilateral periocular yellow-brown infiltrates that may mimic xanthelasmata or orbital mass lesions. There is a trend to progressions of these abnormalities causing eyelid disfigurement, dislocation of the bulbus/exophthalmus, eye motility restrictions, diplopia, and rarely optic neuropathy. Treatment can be conservative (immunosuppression /radiotherapy) or surgical (debulking/orbital decompression). The clinical features look like Graves orbitopathy and the aim of this poster is to make orthoptists and ophthalmologists aware of this rare and misdiagnosed condition associated with eye motility disorders.

Methods: A 52-year old man was referred to the Rotterdam Eye Hospital for treatment of the eyelids and proptosis. Swelling of the under eyelids existed for at least 10 years. He was diagnosed with Graves orbitopathy based on the enlarged extraocular muscles on CT. Lab investigation showed that he was euthyroid and had a vitamin-D deficiency. Full ophthalmologic and orthoptic examination was performed including a biopsy and CT scan of the orbits.

Results: Complaints: watery eyes and social discomfort due to his changed appearance. No diplopia. Clinical appearance shows large periocular swelling, especially of the undereyelids. Furthermore, xanthomatous changes were found of the deep dermis. Bilateral proptosis (Hertel 26.5 – 26.5 – 94). Motility showed a small restriction of the elevation of the right eye (more than left). Biopsy of skin, septum and prolapsing fat revealed inflammation due to xanthogranulomas. CT revealed infiltration of xanthogranulomas in the extraocular muscles. Both inferior rectus muscles were enlarged including the right infraorbital nerve. Orbital decompression and debulking will be considered.

Conclusion: AAPOX is a rare condition which may be associated with eye motility changes. Our case showed a small mechanical restriction of elevation due to an enlarged inferior rectus of the left eye. A CT confirmed the diagnostic suspicion of infiltration of xanthogranuloma in the extraocular muscles. Diplopia occurs when the eye muscles are involved and this condition should be added to the orthoptic diagnostics due to the motility restrictions.
RAPID FIRE POSTER PRESENTATION 2 (34)

An eye diagnostic code for evaluation of ophthalmological abnormalities in fetal alcohol syndrome disorders (FASD)

Eva Aring
Neuroscience and Physiology
Ophthalmology
Göteborg, Sweden

Abstract

Purpose: Fetal Alcohol Syndrome Disorders (FASD) are divided into Fetal Alcohol Syndrome (FAS), Partial FAS (PFAS), Static Encephalopathy Alcohol Exposed (SE/AE) and Neurobehavioral Disorder Alcohol Exposed (ND/AE) according to a 4-Digit Diagnostic Code used worldwide. There are no guidelines for ophthalmological examination in individuals with prenatal alcohol exposure. Our purpose was to develop and evaluate an ophthalmological tool (4-Digit Eye Diagnostic Code) serving as a complement to the method described above.

Methods: Twenty-five children with FAS, mean 7.6 years (4.9-10.4), and 25 age and sex matched controls were evaluated. Four ophthalmological digits were used: Visual acuity (VA), refraction, strabismus/binocular functions, and structural abnormalities. The magnitude of expression of each feature was ranked independently on a 4-point scale with 1 reflecting normal ophthalmological finding and 4 reflecting a strong presence of the most common ophthalmological abnormality found in children with FASD. We also tested the 4-digit code on three other groups of children; 42 children with Attention Deficit Hyperactivity Disorders (ADHD), 78 children born Moderate to Late Preterm (MLP) (gestational age 32-36w) and 18 children with Silver Russell Syndrome (SRS).

Results: Children with FAS (n=9) showed a total median score of 10: VA (2); Refraction (2); Strabismus/Binocular function (3); Structural abnormalities (3). The total median score for children with PFAS (n=6) and ND/AE (n=7) was 9, for SE/AE (n=3) 5, ADHD 5, MLP 4, SRS 7.5 and controls 4.

Conclusion: Our results are in consistence with our hypothesis that children with fully developed FAS have the highest score of ophthalmological abnormalities. This tool, which is based on the most common ophthalmological abnormalities previously found in these children, may serve as diagnostic help in combination with the 4-digit diagnostic code based on growth deficiency, facial features, central nervous system (CNS) structural and functional abnormalities, and prenatal alcohol exposure.
Theme block #7: Technology in Eye Disease

Wednesday 29 June 2016 13:20 – 14:20 hr

PAPER 1

Binocular eye movement perimetry in children with visual problems

Johan J.M. Pel
Erasmus MC, Neuroscience
Rotterdam, The Netherlands

J.J.M Pel1,2, M.J.G Kooiker1, J. van der Steen1,2
1Vestibular and Oculomotor research group, Erasmus MC, Rotterdam, the Netherlands
2Royal Dutch Visio, Center of Expertise for Blind and Partially Sighted People, the Netherlands

Abstract

Purpose: Orthoptic testing involves, amongst others, the examination of the total area that a patient is able to see, i.e. the visual field. Especially in young or neurologically impaired children such examinations can be a challenge. Significant advances in remote eyetracking have opened up new possibilities to test visual capabilities of children without verbal interaction. The aim of the present study was to develop and evaluate a paradigm for measuring children’s binocular visual field based on eye movement responses.

Methods: We recruited 32 children (age 10.6 (2.8) years; mean (SD)) with visual problems at Royal Dutch Visio, The Netherlands. Each child underwent an orthoptic exam to obtain oculomotor functions and visual field properties, the latter tested by confrontational methods or Goldman perimetry. The measurement setup was based on a commercially available remote eye tracker (T60XL, Tobii, Sweden) sampling at 60 Hz. It was suitable for measuring a child’s gaze and for compensating small head movements made during the test. After a standard 5 point calibration, the test was shown to each child on the eyetracker’s monitor with a duration of 3min 30s. At the start of the test, a white smiley [RGB] = 1.0 appeared in the center of the monitor against a homogeneous grey background [RGB] =0.6. This central smiley was constantly visible during the test. Next, smileys randomly appeared one by one in predefined peripheral locations for 1.2s, covering a visual field of ~60 degrees horizontally- and 40 degrees vertically. The child was instructed to look at visible changes on the monitor. An independent examiner did a first classification of the visual field by observing the recorded eye movement responses.

Results: Orthoptic exams showed that 21 cases (66%) had nystagmus, 19 cases (59%) had stereopsis and 18 cases (56%) had strabismus. None of the cases had oculomotor apraxia. A first observation of the eye movement patterns confirmed nystagmus in 16 cases. In 23 cases (72%), we were able to evaluate the visual field based on eye movement responses. In 15 of these cases, we confirmed the intact visual field obtained by an orthoptic exam on the basis of eye movement responses. In 3 cases, intact visual fields on the basis of eye movement responses were found, while the orthoptic exams showed visual field defects. In 3 of the 5 remaining cases, in which a visual field defect was obtained by an orthoptic exam, defects were also found on the basis of eye movement responses.

Conclusions: The proposed system seems suitable for measuring and evaluating a visual field in children with visual problems and provides quantitative data to support clinical evaluation.
Use of the Saccadometer to detect saccadic peak velocity in Myasthenia Gravis and visually normal subjects

Craig Murray
University of Liverpool
Orthoptics, Thompson Yates Building
Liverpool, UK

C. Murray1, D. Newsham1, F. Rowe1, I. Marsh2, C. Noonan2
1University of Liverpool; 2Aintree Hospitals NHS Foundation Trust

Abstract

Purpose: This is a pilot study to ascertain whether the Saccadometer is able to identify characteristic increased peak velocity of saccades in Myasthenia Gravis (MG) patients and compare this to the peak velocities of healthy subjects.

Methods: Saccadic parameters were measured in a group of healthy volunteers using a Saccadometer. The Saccadometer is a head mounted device that projects laser targets as the participant faces a blank surface at a distance of between one and three meters. Measurements of saccadic velocity, amplitude and duration were obtained during 10 degree saccades via infra-red oculography. Data are transferred to a laptop containing specialist software and analysed to produce mean values for saccadic parameters as well as individual trial results. Participants were recruited from the staff population of the University of Liverpool and were assessed by an orthoptist to ensure that they met the inclusion criteria. Patients with myasthenia gravis (MG) were identified and recruited from the patient database of two Ophthalmologists based at Aintree Hospitals NHS Foundation Trust. All had a confirmed MG diagnosis by either acetyl choline antibodies serum test or single fibre electromyography (sFEMG).

Results: Mean saccadic peak velocity for healthy participants (n=4) was 553.5 deg/s (±24.0). Data of patients with MG is currently being collected.

Conclusions: The mean peak velocity of healthy subjects tested using the Saccadometer is comparable with previously published reports in healthy subjects. This will enable the Saccadometer to potentially detect saccadic characteristics found only in MG patients. This could therefore provide a valuable diagnostic tool in a condition that can be difficult to diagnose.
Clinical and electro-retinogram assessment of an orthoptic and optometry led hearing loss clinic

Vijay Tailor
Biomedical Research Centre at Moorfields Eye Hospital and UCL Institute of Ophthalmology Moorfields Eye Hospital London, UK

Abstract

Purpose: Children diagnosed with Sensorineural Hearing Loss (SNHL) can have associated ophthalmological problems; and a higher risk of developing Usher syndrome. Guidelines from the National Deaf Children's Society recommend that all children diagnosed with SNHL should have a full ophthalmological examination and an electro-retinography (ERG) to exclude retinal abnormalities. In response to an increase in referrals on children with SNHL we developed a new specialist service for these children. We present clinical findings for 1 year.

Methods: Prospective data collection of all children attending a new SNHL Children’s Vision Clinic at Moorfields Eye hospital (November 2014-October 2015), 63 patients were examined (41 new and 22 follow up) age range 1 to 16 years old, median age 4.

Results: Thirty eight new referrals were made from audio vestibular medicine, 3 from other medical sources. Seven children presented with refractive errors and 4 new refractive errors were found. Two patients had intermittent exotropia. Forty patients with mild to mild/severe SNHL were reviewed and 22 Severe to profound SNHL, the type of SNHL was unknown in 1 patient. Fifty-eight patients had normal fundus checks, 3 could not be examined, 1 was found to have a coloboma and 1 had scattered pigment in the peripheral retina and subsequently diagnosed with Ushers syndrome. Nine patients were referred for a consultant opinion routinely. Electro-diagnostic testing was ordered on 14 patients of these 5 had profound SNHL and 9 had Mild to Severe SNHL. ERG abnormalities were detected in 2 children, 4 were normal, 7 are awaiting EDT examination and one missed the EDT appointment.

Conclusions: The use of a specialist Orthoptic and Optometry led clinic to examine children with SNHL is a safe and economical way of examining and reviewing children with a small incidence of ophthalmological problems. Children needing further management can be examined by consultants at any stage.
PAPER 5

Exploring retinal development of strabismic infants using handheld optical coherence tomography

Gail Maconachie
University of Leicester
Ulverscroft Eye Unit, Department of Neuroscience, Psychology and Behaviour,
Leicester, UK

G.D.E. Maconachie, V. Sheth, R. Purohit, F. Proudlock, I. Gottlob

Abstract

Purpose: The effect of strabismus on retinal development has been explored in young children and adults with conflicting results. Recent reports suggest delayed development of the retina in strabismic and anisometropic amblyopes when layers in the retina are reviewed individually. Hand-Held optical coherence tomography (HH-OCT) now provides assessment of the retinal structure in infants and young children. We report the first findings of retinal layers in strabismic infants under the age of 5yrs using the HH-OCT.

Methods: 42 strabismic infants (range 3-60mos), and 51 controls (range 3-60mos), were recruited to the study. Each patient underwent an orthoptic assessment and HH-OCT scans of both eyes. A foveal scan was analysed for both eyes of the strabismic infants and one eye of the control subjects. During analysis scans were randomised and the examiner (GM) masked to the condition. ImageJ was used to identify each retinal layer at the fovea and 1000µm nasally and temporally. Age-adjusted comparisons were made between the non-fixing and fixing eye and between the normal and the non-fixing / fixing eye, comparing interactions between age and group.

Results: Comparisons between the non-fixing and fixing eyes revealed no significant difference in any of the layers. Retinal thickness and RNFL were found not to be significantly different between controls and the fixing and non-fixing eye of strabismic infants. A highly significant difference in the rate of RPE development at the fovea and 1000µm nasally and temporally was observed between the controls and the non-fixing eye (interaction between age and group: p=0.001, p<0.0005, p<0.0005, respectively) and the fixing eyes of strabismic infants (p<0.0005, p<0.0005, p=0.005, respectively). A small but significant age effect was also found in in the IS and OS layers of non-fixing eyes (p=0.029 and 0.043) but not with the controls or the fixing eyes.

Conclusion: We observed in our cohort significant differences in the rate of development within the RPE layer between fixing and non-fixing eyes of strabismic infants in comparison to controls. We also reveal an age effect within photoreceptor layers of non-fixing eyes but not in the controls or fixing eyes which may relate to reduce visual deficit if the eye remains the non-fixing eye. Further investigation of retinal development in strabismic and amblyopic infants may be key to understanding the development of strabismus.
Abstract

Purpose: An increasing and considerable number of patients with unexplained visual disorders is referred to the Bartiméus Diagnostic Centre. A majority of these patients (both children and adults) prove to have functional visual loss (FVL), i.e visual disorders without organic cause. Patients can present themselves with different symptoms, most commonly with decreased visual acuity, visual field loss, strong photophobia, or a combination of these symptoms. FVL requires a different diagnostic and rehabilitation approach compared to organic visual loss. Over the years professionals from the Bartiméus Diagnostic Centre have acquired significant experience with this group. Diagnostics and treatment of FVL are performed by a multidisciplinary team, consisting of ophthalmologists, medical physicists, orthoptists, behavioral scientists, and social workers. Their approach of the patients and their complaints is always non judgmental. Sophisticated ophthalmological methods are used on the one hand to exclude organic pathology, and on the other hand to prove that visual functions are potentially better than a patient claims.

Methods: The investigation consists of structural ocular examination including fundus examination and OCT, sweep Visual Evoked Potentials (VEP) for acuity measurement, eye-tracker techniques for visual field loss, and methods to quantify photophobia. Treatment consists of a two-track approach: therapy from behavioral scientists and social workers, in combination with an adapted rehabilitation program including aids, visual training with apps, and relaxation exercises. The visual training is still under development. The primary goal of the treatment is to get the patients to normalize their daily activities, and to resume going to school or work.

Conclusions: In order to demonstrate the non organic cause of FVL, objective diagnostics like acuity sweep VEP and eye-tracking are paramount. A multidisciplinary team for diagnostics and treatment and a non judgmental approach of the patients are of special value in the management of functional visual loss.
Rapid Fire Poster Presentations

Wednesday 29 June 2016 14:20 – 14:30 hr

Theme block #7: Technology in Eye Disease

RAPID FIRE POSTER PRESENTATION 1 (36)
Feasibility of the saccadometer to detect saccadic performance across different age groups in a normal population

Jignasa Mehta
University of Liverpool
Directorate of Orthoptics and Vision Science Thompson Yates building
Liverpool, UK

J. Mehta, D. Newsham

Abstract

Purpose: Saccades are fast eye movements allowing us to accurately alter our fixation from one object to another, for example we execute small saccadic movements whilst reading and large saccades when altering our gaze in an open environment. Saccadic characteristics such as latency, velocity and accuracy has been shown to be affected by age using lab based video oculography. The aim of the study is to collect normative data for different age groups using the portable saccadometer which can be used clinically to obtain quantifiable saccadic measurements.

Methods: Horizontal visually reflexive saccades of an amplitude of 5°, 10°, 15° and 20° were tested using the Saccadometer in adults aged 20-75 years with no known ocular motility defect. Data was collected in 4 age categories; age 20-30 years (n=20) for the baseline measurement before the ageing process begins, then to quantify the increasing effect of age on saccadic performance in the following age groups: ages 55-60 yrs (n=20), 65-70 yrs (n=20), 75-80 yrs (n=20). Subjects were asked questions regarding their general health (past and present) and medication to rule out any underlying neurological condition. Visual acuity was measured in either eye for near and distance using the gold standard letter logmar charts with refractive correction if worn. Ocular motility was tested to rule out any extraocular muscle defect.

Results: Data collection is ongoing and early results suggest that there is an increase in saccadic latency and a decrease in velocity with age.

Conclusions: To date, saccadic parameters measured with the saccadometer are in agreement with measurements made using video-oculography. Therefore, this will allow identification of abnormal saccadic behaviour in individuals with pathological conditions, relative to their age, using a portable device that can be used clinically.
RAPID FIRE POSTER PRESENTATION 1 (37)
Perimetry in pediatric age: reliability and limits

Gloria Badin
University of Ferrara,
Department of Biomedical and Specialty Surgical Sciences School of Medicine
Italy

G. Badin, G. Verzola, P. Perri, A. Barducco, F. Borghi, S. Mancioppi

Abstract

Purpose: The possibility of execution and the evaluation of the automated perimetry exam in pediatric patients is still an object of open discussion. Considering that the tool database is built on a model made for adults (Zeiss report), we investigated if it can also be used for children by evaluating whether pediatric patients could execute the task, the reliability of the results and their usefulness for diagnosis.

Methods: We recruited children aged 8 to 18 years. The clinical trial lasted from November 2010 to November 2015. We analyzed and compared the visual fields of two groups of the same sample (136 study eyes): Group 1: 70 tests (eyes) performed by healthy pediatric subjects with normal physical and mental development, in absence of systemic and ocular disorders, with a visual acuity of 10/10 nat or 10/10 obtained with correction between +2.00/-2.00 sf. Group 2: 66 tests (eyes) from the Ferrara Ophthalmologic clinic: 28 of these tests requested for migraine, 20 for visual decline, 18 for family history of glaucoma or suspected glaucoma. We used the “30-II SITA Fast” strategy with Humphrey perimeter Iii 750-740. We considered the following parameters: patient age, time of testing, foveal threshold, fixation losses, GHT, false positives, false negatives, MD and PSD indices, maps of total deviation and pattern deviation.

Results: In this study we demonstrate that young patients are able to perform this psychophysical test reliably, considering losses of fixation, FP and FN tolerated by the database. The analysis of the Group 1 of healthy subjects is not devoid of alterations, but shows significant deterioration of MD index and relative map of total deviation, classifying the healthy subjects as false positives. In Group 2 of suspected pathological subjects, a few tests did not present a pathological picture, but the majority of this group presents similar alterations of the Group 1.

Conclusions: In conclusion we can say that, considering that children’s exams are incorrectly compared with a database made for adults, in case of diagnostic doubt it is important to discern which defects indicated in the visual field exam are due to real visual damage and which are due to processing errors. The exam has high sensitivity and low specificity: it can identify a suspected disease but produces a high number of false positives, and is therefore useful just for the exclusion of serious functional topographical injuries such as functional neurological defects.
Wednesday 29 June 2016

Theme block #8: Expanding Orthoptic Practice

PAPER 1

The psychosocial impact of repeated intravitreal injections on patients with neovascular age-related macular degeneration

Jessica Boyle
La Trobe University, Discipline of Orthoptics, School of Allied Health, Melbourne, Australia

J. Boyle¹², M. Vukicevic¹², K. Koklanis¹, C. Itsiopoulos¹, G. Reece³
¹School of Allied Health, La Trobe University, Melbourne, Australia; ²Eye Surgery Associates, Melbourne Australia; ³Centre for Eye Research Australia, Melbourne, Australia

Abstract

Purpose: Orthoptists in Australia have increasingly become involved in the care of patients with age-related macular degeneration (AMD) and specifically of patients undergoing anti-vascular endothelial growth factor (VEGF) treatment for the condition. Whilst current therapy to slow disease progression in patients with neovascular AMD entails regular and often indefinite intravitreal injections, little is known about the burden imposed on patients by this repetitive treatment schedule and how this can be best managed. In order for orthoptists and the ophthalmic team to provide optimal care and support to patients with neovascular AMD, it is important to understand the psychosocial consequences of repeated intravitreal injections. To date, few studies have investigated the perceptions of patients regarding treatment tolerability and satisfaction in this population. The aim of this study was to explore the subjective experiences of patients undergoing anti-VEGF therapy.

Methods: Forty patients (16 males, 24 females) with neovascular AMD undergoing anti-VEGF treatment were recruited using purposive sampling from a private ophthalmology practice and public eye hospital in Melbourne, Australia. Patients underwent semi-structured, one-on-one interviews and were also surveyed using the Macular Disease Treatment Satisfaction Questionnaire (MacTSQ; Health Psychology Research Ltd, England). Interview topics discussed included: treatment burden and satisfaction; tolerability; barriers to treatment adherence; and issues surrounding patient education and the provision of information relating to patient support groups and low vision services. Interviews were audio recorded and thematic analysis performed using NVivo 10 (QSR International, Australia).

Results: Patients recognised the importance of treatment to preserve eyesight, yet experienced significant emotional and practical burden from the treatment schedule. Important issues included treatment-related anxiety, financial considerations and transport burden placed on relatives and carers. Many patients were restricted to sedentary activities post-injection owing to treatment side effects. Patients prioritised treatment above other commitments, sacrificing family, travel and social life. At times, some patients felt reluctant to continue treatment owing to the burden of therapy but did so out of fear of losing eyesight if treatment was discontinued.

Conclusion: Whilst anti-VEGF injections represent the treatment method of choice for neovascular AMD, the ongoing treatment protocol imposes significant burden on patients. An understanding of the factors that contribute to the burden of treatment may help inform the eye care team, including orthoptists increasingly involved in AMD management, about how to lessen the impact and assist patients to better manage the challenges of treatment.
PAPER 2

Should orthoptic input be compulsory for all patients undergoing refractive surgery?

Tanzeeba Rabbani
Oxford university hospitals nhs foundation trust Orthoptics West wing,
LG1, John Radcliffe Hospital, Headley way, Headington,
Oxford, United Kingdom


Abstract

Purpose: To report the extent of orthoptic input practiced in patients undergoing refractive surgery. To determine the occurrence of orthoptic related complications post refractive surgery; proposing minimal orthoptic screening guidelines.

Methods: A literature search was conducted. PubMed, Medscape, Elsevier and Science Direct were utilised. Keywords used included: refractive surgery ± strabismus, diplopia, orthoptics, esotropia, exotropia and complications.

Results: Of all 11 studies analysed, 4 ensured patients underwent a full orthoptic assessment prior to refractive surgery. As a result, the majority did not experience significant change to their orthoptic status post operatively. The remaining studies either performed limited orthoptic tests or none at all, prior to refractive surgery. This highlighted the manifestation of post-operative orthoptic complications. Diplopia, reduced visual acuity and accommodative anomalies were amongst the most frequently reported. All the authors recommend some degree of orthoptic input prior to refractive surgery.

Conclusion: There is strong evidence to suggest that orthoptic input is invaluable in this patient group. To highlight patients most at risk, we recommend that all patients undergo a minimal orthoptic assessment pre-operatively. Our proposed minimum standards comprise of a previous ocular history, cover test and ocular movements. For those identified as high risk patients, a thorough orthoptic assessment including fundoscopy and a trial of contact lenses, to simulate post refractive surgery results, would be considered as gold standard. A risk stratification approach and recommended screening criteria would reduce the incidence of post refractive surgery, orthoptic complications. A large multi-centre study would facilitate to determine the extent of orthoptic input. These would include current UK centres or clinics, providing refractive surgery services.
Abstract

Purpose: This study sought to explore the practice of orthoptists internationally in care provision for post stroke visual impairment.

Methods: Survey questions were developed and piloted with clinicians, academics and users. Questions addressed types of visual problems, how these were identified, treated and followed up, care pathways in use, links with other professions and referral options. The survey was approved by the Institutional ethical committee. The survey was accessed via a web-link which was circulated through the International Orthoptic Association member professional organisations to orthoptists.

Results: 299 completed electronic surveys were obtained. About one third (35.5%) of respondents saw patients within two weeks of stroke onset and over half (55.5%) by one month post stroke. 87% routinely assessed stroke survivors; over three quarters in eye clinics. 11% used screening tools. Validated tests were used for assessment of visual acuity (76.5%), visual field (68.2%), eye movement (80.9%), binocular vision (77.9%) and visual function (55.8%). Visual problems suspected by family or professionals were high (86.6%). Typical overall follow-up period of vision care was less than 3 months. 56.9% of respondents used designated care pathways for stroke survivors with visual problems. 85.9% of respondents provided information on visual impairment.

Conclusions: In international orthoptic practice, there is general agreement on assessment and management of visual impairment in stroke populations. More than half of orthoptists reported seeing stroke survivors within one month of the stroke onset, typically in eye clinics. There was a high use of validated tests of visual acuity, visual fields, ocular motility and binocular vision. Similarly there was high use of established treatment options including prisms, occlusion, compensatory strategies and oculomotor training, appropriately targeted at specific types of visual conditions/symptoms. This information can be used to inform choice of core outcome orthoptic measures in stroke practice.
Gaze behaviour among orthoptists during optic disc examination

Jane Scheetz
La Trobe University
Discipline of Orthoptics, School of Allied Health
Melbourne, Australia

J. Sheetz, K.Koklanis, M. Long, M. Morris
School of Allied Health, La Trobe University, Melbourne, Australia

Abstract

**Purpose:** In Australia the role of orthoptists in glaucoma care has expanded with the introduction of new service delivery models utilising the skills of orthoptists in monitoring and co-managing patients with stable or suspected glaucoma. Essential to orthoptists safely screening and monitoring glaucoma, is the accurate assessment of the optic nerve head and retinal nerve fibre layer (RNFL). The purpose of this study was to utilise eye movements to assess clinical skill acquisition and to specifically examine the eye movements and gaze behaviour patterns among orthoptists with varying levels of experience when assessing the optic disc and RNFL for glaucoma likelihood.

**Methods:** Participants were divided into experts or novices in glaucoma care according to their level of experience. Each participant was required to assess 20 optic disc images displayed on the Tobii T120 eye tracker which recorded the orthoptists’ eye movements, the number of fixations made during the assessment and the time spent on each image including the proportion of time spent on areas of interest. The images were selected by two glaucoma sub-specialist ophthalmologists and were validated and graded according to a four point glaucoma likelihood scale: unlikely, possible, probable, or certain. Participant responses for glaucoma likelihood were recorded on a paper pro-forma after each image was assessed.

**Results:** 41 participants were included in the study; 5 experts and 36 novices. Qualitative analysis of eye movement behaviour showed experts have a more systematic pattern of viewing compared to novices who either fixated predominantly on the disc alone or demonstrated random clusters of fixations on and around the optic disc. The total time spent on each image was found to be 14% longer for experts than for novice orthoptists but was not statistically significant. Experts spent a significantly longer total time on those images which were graded as possible (p = 0.003) and probable (p = 0.004). Fixation count was found to be 19% greater for experts than novice orthoptists but not statistically significant. Fixation count was significantly higher for possible (p = <0.001) and probable (p = <0.001) images. On average, expert orthoptists had a higher mean level of agreement (κ = 0.51) with the sub-specialist ophthalmologists compared to novice orthoptists (κ = 0.32).

**Conclusion:** Overall, expert orthoptists showed a more systematic and consistent approach to examining the disc, spent longer examining each image, had a greater number of fixations and were more often accurate in their assessment of glaucoma likelihood. This is potentially due to experts having a better understanding of glaucomatous signs and expertise in monitoring changes of the disc and RNFL. The effect of teaching viewing behaviour when assessing glaucoma likelihood warrants further investigation.
The first UK orthoptist-delivered intravitreal anti-VEGF injections

Lorraine North
Frimley Park Hospital
Frimley Health Foundation Trust
Frimley, UK

Abstract

Purpose: One of the major developments within the medical retinal service over the last few years has been the introduction of intravitreal injections of Anti-VEGF’s for patients with AMD and other macular disease. As a consequence of the development of these treatments, outpatient attendances within the medical retina service have increased significantly causing tremendous burden on the service and medical staff. Traditional Orthoptic work has already changed considerably in recent years with the introduction of extended roles in Ophthalmology. There is increasing awareness of the positive impact of extended roles both for health professionals and for patients. The use of nurse-delivered intravitreal injections has already proven highly successful in this area. To explore the utilisation of Orthoptists to give intravitreal injections as a new initiative in the UK.

Methods: Careful planning was undertaken alongside the ophthalmic nurses to ensure a formalized training framework, in preparation for an independent orthoptist-led injection service. Approval was given by the British and Irish Orthoptic Society (BIOS) professional development committee (PDC). Approval from the Trust’s clinical audit, clinical governance, and management executive committees were obtained. Appropriate Trust indemnity cover and standard operating procedures were implemented before commencing any training. The Orthoptist performed 100 intravitreal injections under direct supervision by a doctor before independent practice was approved. We then carried out a retrospective case series of the first 250 intravitreal injections performed independently by an Orthoptist.

Results: Detailed training was carried out which included lectures, wet lab training and a supervised rigorous competency-assessed training program based on the Moorfields IVT policy (MEH) and locally recognized protocols were written. The primary outcome measure was the safety profile and secondary outcome measure was patient experience. No serious vision-threatening complications were recorded in a consecutive series of 250 Orthoptist-delivered intravitreal injections. Fifty patients were surveyed for satisfaction levels following injection by an orthoptist. Forty of these patients rated the orthoptist led service as excellent.

Conclusion: Orthoptist-delivered intravitreal injections appear safe and are acceptable to patients. The orthoptist followed the robust training programme adapted from MEH with high levels of supervision. Regular audits and competency reviews are carried out to ensure patient safety. To our knowledge this was the first unit in the UK to utilise Orthoptists in this role and other units are now using the FPH model of training.
Abstract

Purpose: How can we improve our procedure from a child’s perspective at Bartiméus? To achieve better Child-centered care we started a Children’s Participation Project. The purpose of this project was to understand how children experience the different aspects of ophthalmological examinations in order to achieve better quality and so that children are more at ease during examinations. With the outcomes of the project we developed several tools that can be used by orthoptists in general orthoptic practice.

Methods: We measured distress in 77 Children visiting our institute and interviewed 48 Children (4-17) about their extensive experiences. We used a wish wall, a statement box, interviews, round table discussions and a funny eye game. We developed an Eye Drop Booklet, imitation of the materials used during electrophysiological examinations to play with in advance, tips to distract children and to relax them during stressful parts of the examinations, funny pictures to watch on the ceilings when children receive eye drops and education of medical staff to improve child centered communication. We also developed information leaflets with photo’s of the examinations.

Results: Children shared many of their feelings, gave many do’s and don’ts plus other feedback. The different aspects that were mentioned, include experience of pain, fear, lack of control, lack of information and a boring environment. The children also want to be better informed before and during their visit to the eye care centre. Giving children a certain amount of control reduces fear and distress. Getting eye drops and having electrophysiological examinations are by far the most feared experiences. The use of imitation materials during medical play at home results in children who are more at ease. By using the eye drop booklet, the eye drops are given in a way that is preferred by the child.

Conclusion: In 2016, we will evaluate the influence of the eye drop booklet on feelings of wellbeing during ophthalmological examinations. There are booklets available for participants of the congress in English and German.
PAPER 7

Building capacity of child eye health services in Botswana

Claire Studley Scott
Addenbrooke’s Abroad
Cambridge University Hospitals
Herts, United Kingdom

Abstract

**Purpose:** Botswana is located in southern Africa and is a middle income country. There are many health challenges and the health system is still developing to build in-country capacity, including within ophthalmology. Eye health strongly depends on ophthalmic nurses for the delivery of eye care services at a primary to tertiary level. Increasing the knowledge and capacity of ophthalmic nurses and training them as trainers to expand service delivery, through case finders, provides the opportunity to develop services at all levels through early detection and management of sight threatening conditions in children.

**Methods:** The development of children’s eye health services has been achieved by advocacy at all levels; primary, secondary and tertiary healthcare, ministry level and through training institutions.

**Results:** The training of ophthalmic nurses in child eye development, and equipping them with the skills to be trainers, established 500 case finders among health and education workers. These case finders have referred children to all levels of ophthalmic services.

**Conclusions:** Improving Botswana’s child eye health resources will impact on the child, their family and their community lifelong – economically, socially and developmentally. The development of this service is ongoing, input is being provided at all levels and being integrated into health and education to promote sustainability of services. Capacity building among ophthalmic nurses, optometrists and ophthalmologists, as well as other health and education workers, assists in the development of this service.
**Rapid Fire Poster Presentations**

**Wednesday 29 June 2016 16:10 – 16:20 hr**

**Theme block #8: Expanding Orthoptic Practice**

**RAPID FIRE POSTER PRESENTATION 1 (45)**

**Listing for strabismus surgery by an orthoptist**

**Janice Hoole**

Leeds Teaching Hospitals
Orthoptic and Children’s Eye Clinic
Leeds, UK

**Abstract**

**Purpose:** There is increasing pressure on capacity in NHS ophthalmology clinics. It was felt that an experienced orthoptist, who has worked closely with a consultant ophthalmologist in complex strabismus clinics and who advises trainee ophthalmologists on listing in the absence of the consultant, could under take listing and consenting for strabismus surgery.

**Methods:** An independent reviewer compared the decisions of an experienced orthoptist and consultant ophthalmologist of 10 patients requesting strabismus surgery. The reviewer examined if the orthoptist and consultant agreed that the patient should be listed for strabismus surgery, and then reviewed the surgical plan of each practitioner to see if they concurred.

**Results:** No patient was listed by the orthoptist for strabismus surgery that would not have been listed by the consultant. The surgical plan was in agreement in all cases and the consultant would have listed the patient for the same procedure with the same surgical aim.

**Conclusion:** Where there is a history of a good working relationship and trust between the consultant ophthalmologist and experienced orthoptist it is safe for an orthoptist to list and consent for strabismus surgery without protocol and without reference to the ophthalmologist.
Abstract

Purpose: Patient centered care is known to be a key element of high-quality care. However, patient-centered care differs from child-centered care. The importance of child-centered care is, amongst others, acknowledged in the Conventions on the Rights of the Child and by the European Association for Children in Hospital (EACH). We want to share our knowledge about the ability of children as individuals able to make important decisions regarding their health.

Methods: Health care is patient-centered when patients are involved in their care, being informed, listened to and when the care suits the needs of the patient. Child-centered care refers to care in which the needs of children are respected and taken into account by the medical processes. By the right treatment of children, each on his or her own developmental level, a safe environment for your ophthalmologic examination is achieved. By starting a project on children’s participation, we involved the children by interviewing them about their perspectives and opinions as users of the care.

Results: Child-centered care is shown to reduce anxiety for both the child and the parents and it is associated with faster recovery of the child. By informing the children and giving them control and choices where possible, children are more at ease and experience less distress and fear during ophthalmological examinations.

Conclusions: Listening to children and taking them seriously, is one of the most important lessons we learned. The project really opened our eyes to the needs of the children. We participated in the development of a quality mark for child centered care in polyclinics in the Netherlands, called “the polyclinic smiley”.
Disinvestment of population-wide eye screening at age 6-24 months in the Netherlands

Frea Sloot
Erasmus MC
Ophthalmology
Rotterdam, the Netherlands

Karaman H, Sami A, Loudon S.E., Benjamins J, Simonsz H.J.

Abstract

Purpose: Dutch children are eye-screened 7 times at Child Health Care Centers that screen 97% of all children for general health disorders. We assessed the screening examinations at age 6-9, 14 and 24 months.

Methods: Preverbal screening (cover test, Hirschberg test, eye movements, cornea and pupillary reflexes) was omitted in the second of two sequential birth cohorts. All children were screened at 1-2 and 3-4 months, but at 6-9, 14 and 24 months only children in the screened group (born July-December 2011) were eye screened. Children in the unscreened group (born January-June 2012) did attend consultations for all other basic screening and vaccinations, but eye screening was performed only in case of positive family history, recommendation of the screening physician, or concerns by the parents. Data was collected from screening records, anonymous questionnaires and on-site observations.

Results: 177 out of 6064 children (2.9%) in the screened group and 129 out of 5492 children (2.3%) in the unscreened group were referred. Screening results were the reason for referral in 47 versus 15 children respectively. All other children were referred because of visually apparent eye disorders or conspicuous strabismus. Amblyopia was found in 42 (0.7%) versus 22 (0.4%) cases. In the questionnaires, screening physicians indicated that they found examination of children at age 6-24 months difficult, especially the cover test. During the observations, cover test, motility and pupillary reflexes were performed correctly in 37%, 7% and 14% respectively. Hirschberg test was performed correctly in 87%.

Conclusions: Referral was based mostly on conspicuous strabismus or other visually apparent disorders noted by parents or screening physicians. Although still a minority, specific eye screening led to more referrals at the age of 14-24 months than at 6-9 months. It seems that omission of specific eye screening tests at age 6-24 months does not reduce detection of amblyopia cases significantly.
PAPER 2

The comparability of computerised and non computerised visual acuity tests.

Marianne Burgess
Royal Berkshire Hospital
Orthoptics
Reading, United Kingdom

Marianne Burgess, BMedSci(Hons), Anne Bjerre, MSc, BSc(Hons)
University of Sheffield

Abstract

Purpose: To compare the computerised crowded Kay Pictures and crowded LogMAR tests using COMPlog software against the non-computerised printed versions in a normal adult population.

Methods: This was a prospective, repeated measures study. Student volunteers at the University of Sheffield were invited to participate. Eligibility criteria included no manifest strabismus, decompensating heterophoria and/or ocular pathology. Right and left visual acuity (VA) were assessed using the printed Crowded Kay Pictures and Crowded logMAR tests and the computerised Crowded Kay Pictures and Crowded Sloan Letter test using the COMPlog software in a randomised order. VA were tested without participant’s refractive correction to obtain a range of VA. Agreement between tests were evaluated using Bland Altman analysis.

Results: Twenty-four volunteers (7 males; 17 females) with a mean age of 22±3 years (age range 18-30, Standard Deviation 3 years) participated. Mean right and left VA were -0.01± 0.45 and -0.01±0.54 logMAR with the printed, and 0.05±0.47 and 0.06±0.55 logMAR with the computerised Crowded Kay Pictures, 0.18±0.43 and 0.21±0.50 logMAR with the printed, and 0.22±0.51 and 0.26±0.58 logMAR with the computerised Crowded logMAR tests. There was no significant difference between right and left VA (p>0.05) but a significant difference between the optotype (picture versus letters) (p<0.0001) and test (computerised versus non-computerised) used (p<0.01). Pictures overestimated mean VA by up to 2 lines. Using computerised tests resulted in slightly worse mean VA <1 line. Bland Altman showed 95% limits of agreement within 0.20 logMAR for the printed vs computerised Crowded Kay Pictures and within 0.27 logMAR for the printed vs computerised crowded logMAR. Excluding one outlier assessing the two letter based tests reduced the 95% limits of agreement to ±0.22 logMAR.

Conclusion: This study found that picture optotypes tended to overestimate VA by up to two logMAR lines compared to letter optotypes on both computerised and non-computerised tests in a normal adult population. Good agreement, just over two logMAR lines, were found between the computerised and non-computerised versions of the picture and letter based tests. Computerised tests are a suitable alternative and comparable to the traditional printed versions.
Validation of the new Kay pictures visual acuity test

Anna O’Connor
University of Liverpool
Directorate of Orthoptics and Vision Science Thompson Yates Building, Brownlow Hill
Liverpool, UK

Anna R. O’Connor1, Hazel Kay2, Ashli Milling1, Laurence P. Tidbury1, David Newsham1
1University of Liverpool; 2Kay Pictures

Abstract

Purpose: The Kay pictures test is used extensively within paediatric ophthalmology, with many management decisions made on the basis of the test results. Since the creation of the test 30 years ago, modifications have been made but no further comprehensive validation has been published regarding the picture recognition or legibility. Also, many clinicians have reported that the choice of pictures may not be optimal. Therefore, the test was redesigned to ensure the pictures were of equal legibility and that they were recognisable by children. This final phase of the redevelopment compared the new test to current VA tests, and evaluated test-retest variability.

Methods: All VA optotypes were presented on a computer screen in logMAR format, with VA scored per letter. The Kay pics were presented individually in a crowding box. In the comparison phase, subjects were tested using the Early Treatment for Diabetic Retinopathy Study (ETDRS) chart and Lea Symbols. In the test-retest phase the ETDRS test was used for comparison. For each test the optotypes were randomised. All subjects were aged 18 years or older, to ensure that concentration or behavioural factors did not influence the results. VA scores were compared using Bland Altman plots and test-retest variability was analysed using a paired t-test.

Results: 113 subjects were tested in the comparison phase and 89 in the test-retest phase. The mean bias indicated very similar results between the tests, ETDRS vs Lea, -0.112, ETDRS vs Kay pics -0.138, and Lea vs Kay pics -0.154. However, the limits of agreement for ETDRS vs Lea symbols are -0.117 to 0.183, with a narrower range for ETDRS vs Kay pics, -0.055 to 0.22. Test retest variability demonstrated no significant differences between test one and two for Kay pics (p=0.5) or ETDRS (p=0.2) with an equal amount of variability (mean bias for both tests=0.01) with very similar limits of agreement, Kay pics -0.104 to 0.124, ETDRS -0.0708 to 0.0908.

Conclusions: These data demonstrate that the new Kay pictures test is a valid test of VA, and is suitable for clinical use. The test-retest variability is equal to that found in the current gold standard test ETDRS. Compared with ETDRS, Kay pictures VA scores are on average one line better, with less variability when compared to ETDRS than when comparing ETDRS with Lea symbols.
**PAPER 4**

*Children's accommodation to a variety of targets*

**Siobhan Ludden**

University of Reading  
Psychology and Clinical Language Sciences Earley Gate  
Reading, UK

**Dr Anna Horwood, Prof Patricia Riddell**

Department of Psychology and Clinical Language Sciences at the University of Reading

---

**Abstract**

**Purpose:** Previous research has found that a significant proportion of children underaccommodate at 1/3m. Accommodation may vary with task demand, so children may accommodate appropriately if required, for example, only when reading small print. This study explores the range of accommodative responses elicited in typical children, under naturalistic conditions, to a range of different targets.

**Method:** 24 typically developing children were identified from the University of Reading Child Database. Children aged 6 years and 10 years with minimum distance visual acuity of 0.200 LogMAR and near visual acuity of 0.100 LogMAR were recruited for participation. A remote haploscopic photorefractor was used to assess naturalistic, binocular accommodative responses to a variety of targets at different distances. At 33cm, accommodative targets included individual letters and age appropriate text in large print equivalent to early primary school-books, small N5 equivalent print, a visual search task (“Where's Wally?”), a clown picture containing a range of spatial frequencies, and a children's cartoon. Participants were given minimal instructions for task completion and asked to read aloud when presented with text, locate “Wally”, and simply watch the cartoon. Targets were presented in a counterbalanced order. The results reported in this study were obtained during a longer testing session involving different target types and fixation distances.

**Results:** The accommodative response observed with each target varied across participants. To both the clown target and single letters of a size used in school reading books the accommodative responses were 2.39±0.48D (range 1.8 - 2.96D) and 2.47±0.37D (range 1.47 - 3.06D) respectively. Accommodation to age-appropriate text size was 2.89±0.57D (range 1.5 - 4.12D). The accommodative response to N5 print (3.06±0.52) was statistically better than all other targets other than the visual search and large print tasks (p<0.05).

**Conclusions:** Even to demanding N5 text, accommodation is variable between participants. Tasks commonly experienced by children in everyday or clinical situations will stimulate an unknown amount of accommodation for near fixation.
Abstract

Purpose: Stereogram cards are given as treatment to exercise positive and negative relative vergence. This study investigates the amount of accommodation that actually occurs when using the near position.

Method: Twenty participants with normal binocular single vision, with emmetropia or their refractive error corrected by contact lenses, were recruited. Stereogram cards require physiological diplopia to achieve a fused third image. All participants were tested to ensure they could achieve and maintain the third image. A repeated measure design was employed. Each participant viewed a control stimulus which was a picture of the stereogram cat viewed without utilising physiological diplopia, and two stereogram cards one without depth (cats) and one with (buckets) which did require physiological diplopia to achieve a fused image. The amount of accommodation exerted was measured using a Shin-Nippon SRW-5000 (Shin-Nippon Commerce Inc., Tokyo, Japan), autorefractor. The distance from the eyes to the fixation target when fusion was achieved was measured in centimetres, as was the distance the fused target was perceived to be.

Results: The amount of accommodation, when the third image was achieved, was significantly different than the accommodation elicited to the card viewed at the same distance without a near stimulus (p=<0.001). This was the case whether or not the stereogram card contained depth. The degree of accommodation was found to be related to the perceived distance of the fused image.

Conclusion: There is incomplete uncoupling of accommodation from convergence. The accommodation response is driven partly by the perceived distance of the image.
High-order aberrations in children

Aya Saito
Kitasato University Hospital
Ophthalmology
Sagamihara, Kanagawa, Japan

Aya Saito, Misae Ito, Takushi Kawamorita, Kimiya Shimizu

Abstract

**Purpose:** Previous studies have reported that both corneal and ocular higher-order wavefront aberrations (HOAs) showed positive correlations with age in elderly patients. However, the relationship between corneal and ocular HOAs and age is not yet fully understood in children, in whom we have to consider various organic development periods (e.g., axial length and corneal curvature). The present study evaluates the relationship between corneal and ocular HOAs and age in children aged 19 years or younger.

**Methods:** Corneal and ocular HOAs in the central 6-mm-diameter region were measured with videokeratography and the Hartmann-Shack wavefront aberrometer (KR-9000PW; Topcon Corp., Tokyo, Japan) in the right eyes of 87 normal subjects (male: 46, female: 41), with a mean age of 11 ± 5 years (range: 4–20 years). The subjects had no history of ocular abnormalities. They had the best-corrected visual acuity of 20/20 or better and corneal astigmatism within 1.50 diopters (D). Corneal and ocular HOAs were calculated with Zernike polynomials up to the sixth order. From the Zernike coefficients analysis was achieved for the mean of each three times, we calculated root mean square (RMS) of coma and spherical aberration. A p value of <0.05 was considered statistically significant. All subjects or their guardians gave informed consent before participation.

**Results:** The spherical equivalent refraction ranged from +7.00 D to −6.75 D (mean ± SD: −0.68 ± 2.70 D). Corneal astigmatism was not significantly correlated with age. Corneal spherical-like aberrations were significantly correlated (r = 0.420, p < 0.001), but coma-like aberrations and total HOAs were not significantly correlated with age. In addition, a comparison was made of the collected data according to gender, which showed that the corneal and ocular HOAs were not significantly correlated.

**Conclusion:** In children, corneal and ocular total HOAs did not change with age. Compared with previous reports in the adult, we found a small quantity of corneal and ocular HOAs in children. These results suggest that the preservation of the visual quality in children aged 19 years or younger is explained by the balance between the corneal and ocular HOAs, regardless of gender.
Rapid Fire Poster Presentations

Thursday 30 June 2016 9:30 – 9:40 hr

Theme block #9: Screening, Vision, Refractive Error

RAPID FIRE POSTER PRESENTATION 1 (53)

Adverse reactions following routine anticholinergic eye drops in a paediatric population: an observational cohort study

Helena Maria van Minderhout
Medical Centre Haaglanden
Ophthalmology
The Hague, the Netherlands

Helena M. van Minderhout, Maurits V. Joosse, Diana C. Grootendorst, Nicoline E. Schalij-Delfos

Abstract

Objectives: To investigate the presence, nature, and relationship to age, sex, ethnicity and body mass index (BMI) of adverse reactions following routine cycloplegic eye drops in children.

Methods: Prospective observational cohort study. Participants were 3 to 14 year old children receiving two drops of cyclopentolate 1% (C+C) or one drop of cyclopentolate 1% and one drop of tropicamide 1% (C+T). Patients were categorised by age (3 to 6, 7 to 10, and 11 to 14 years), sex, ethnicity and BMI (low, normal or high). Outcome measure was rate and nature of adverse reactions reported at 45 minutes following treatment. Crude and adjusted odds ratios (OR) for reporting an adverse reaction using stepwise regression analysis with BMI, age, ethnicity and sex were calculated.

Results: 912 of 915 eligible patients participated (99.7%). Adverse reactions were reported for C+C in 10.3% and in C+T in 4.8% (42/408 and 24/504, p=0.002). Compared to C+T, an increased risk was present in C+C (crude OR 2.3 [1.4 to 3.9], p=0.002). Central effects were present in 95% (C+C) and 92% (C+T) respectively. Severe to moderate drowsiness was the most frequently reported adverse reaction (5.4%) following C+C administration. This adverse reaction was most often present in children aged 3 to 6 years and predominantly present in children with low BMI. Hyperactivity and/or behavioural problems were reported in 1.5%. Reports of severe to moderate drowsiness and excitation, hyperactivity and/or behavioural problems were significantly less often present following C+T administration (1.6% and 0.6% respectively). Regression analysis showed BMI to be a highly significant influencing factor (forward adjustment; OR 3.1 [1.7 to 5.6], p<0.001). In a multivariate model, dose of cyclopentolate remained associated with adverse reactions. Analysis per BMI, age category, and regime indicated associations with low BMI in both interventions (OR C+C 21.4 [6.7 to 67.96], p<0.001; C+T 5.2 [2.1 to 12.8], p<0.001) and young age in C+C (OR 8.1 [2.7 to 24.8], p<0.001).

Conclusions: Adverse reactions were common and almost exclusively involved the central nervous system. Both presence and severity were associated with repeated installation of cyclopentolate 1%, low BMI and young age. In specific paediatric populations a single dose of cyclopentolate must be considered. We recommend a general adjustment of product documentation.
RAPID FIRE POSTER PRESENTATION 2 (54)

Are lea numbers and symbols comparable to the ETDRS using a computerised chart?

Anne Bjerre
University of Sheffield
Academic Unit of Ophthalmology and Orthoptics Faculty of Medicine, Dentistry and Health, Beech Hill Road Sheffield, UK

Anne Bjerre BSc (Orthoptics) MSc, David Robertson
Academic Unit of Ophthalmology and Orthoptics, University of Sheffield, England

Abstract

Purpose: To validate Lea Symbols and Numbers against ETDRS visual acuity (VA) using the computerised Thomson Test Chart 2000 software in a normative adult sample.

Methods: This prospective study employed a laboratory-based, repeated measures design led by a single experimenter. Twenty adult volunteers without ocular history and manifest strabismus were recruited. Right and left VA was measured using three different logMAR charts: Lea Symbols, Lea Numbers and ETDRS. The optotypes were presented at 4 metres on a computer screen using the Thomson Test Chart 2000 software. Test charts and eye tested were performed in a randomised and counterbalanced order. Participants were assessed unaided to gather a wide range of VAs. Assessment took place over 2 separate visits to evaluate test-retest variability (TRV). Agreement between tests, expressed as 95% limits of agreement was determined.

Results: There was no significant difference between right and left VA for all three tests (F(1,19)=0.35, p=0.56). Therefore only right eye data is discussed. Right mean VA scores at visit 1 and 2 were -0.01±0.40 and -0.07±0.32 logMAR for Lea Symbols, 0.10±0.33 and 0.05±0.31 logMAR for Lea Numbers and -0.02±0.33 and -0.03±0.35 logMAR for ETDRS. There was no significant difference between ETDRS and Lea Symbols (p=0.16), however Lea Symbols had a tendency to overestimate VAs up to 0.04 logMAR. Lea Numbers significantly underestimated VA compared to ETDRS (p<0.00001) and Lea Symbols (p<0.001) up to 0.12 logMAR. TRV of +0.13 logMAR was found with ETDRS and +0.18 logMAR for both Lea Symbols and Numbers. The ETDRS showed agreement of +0.16 and +0.22 logMAR with Lea Numbers and Symbols, respectively. Agreement between Lea Numbers and Symbols were ±0.26 logMAR. Majority (80%) ranked Lea Numbers the hardest and ETDRS the easiest chart to perform.

Conclusions: Lea Numbers significantly underestimated VA compared to both ETDRS and Lea Symbols by just over 1 line. Lea Symbols tended to overestimate by up to 2 optotypes compared to ETDRS. Similar TRV was found for all test charts, although the ETDRS was the most repeatable. Good agreement was found between test charts, with Lea Numbers producing stronger agreement with the ETDRS than Lea Symbols. Clinicians should be aware that VA obtained with the three tests varies and Lea Numbers are likely to underestimate VA in literate adults.
Thursday 30 June 2016 10:30 – 11:30 hr

Theme block #10: Amblyopia

PAPER 1
Is Microtropia a reliable predictor of the presence of Amblyopia in Anisometropic patients?

Deborah Lysons
Royal Berkshire Hospital, Reading, UK
Orthoptic Department
Reading, UK

Jane Tapley

Abstract

Purpose: In ‘straight-eyed anisometropes’ the nature of refractive error and degree of anisometropia do not provide indicators for the presence or severity of amblyopia, nor the need for occlusion therapy. Patients of similar age, with identical refractive errors, may have very different visual outcomes. A previous unpublished study by the authors suggested that amblyopia only occurs in anisometropic children when microtropia is present. A further study was carried out involving a larger number of cases to determine if this could be substantiated.

Method: A retrospective case note review was carried out of all children referred from Orthoptic school vision screening between Sept 2005 – July 2015. Children who had unequal visual acuity, no manifest squint and who were prescribed glasses to correct anisometropia (interocular difference 1 DS or more in any meridian) were included. Children were grouped according to visual outcome.

- Group 1: Equal vision after a maximum refractive adaptation of 2 months
- Group 2: Equal vision after a maximum refractive adaptation of 6 months
- Group 3: Unequal vision after a maximum refractive adaptation of 6 months - no occlusion therapy
- Group 4: Unequal vision after a maximum refractive adaptation of 6 months - occlusion therapy

The presence or absence of microtropia, determined by the 4^ prism test, was recorded.

Results: Case notes were available for a total of 532 children who were assigned to groups as follows:

- Group 1: 190 - 0 microtropias
- Group 2: 134 - 0 microtropias
- Group 3: 30 - 30 microtropias (all achieved 0.2 or better in worst eye)
- Group 4: 178 - 178 microtropias

324/532 children achieved equal vision with refractive adaptation alone, none had microtropia
30 children with microtropia achieved 0.2 or better in the affected eye after refractive adaptation and did not undergo occlusion therapy
178 children required occlusion therapy to achieve maximum acuity, all had microtropia

Conclusion: This study of 532 4-5 year olds supports a previous finding that amblyopia does not exist in ‘straight-eyed’ anisometropic children who do not have microtropia. The presence of microtropia with identity is a reliable predictor of the presence of amblyopia, and possible need for occlusion therapy, following refractive adaptation in these cases. These findings suggest that anisometropic amblyopia may not exist as an isolated condition.
PAPER 2

**Is the 15Δ base in prism test reliable for detection of amblyopia in anisometropic patients?**

**Fenna Burggraaf**
The Rotterdam Eye Hospital
Orthoptics
Rotterdam, the Netherlands

Burggraaf F., CO¹; Verkaik-Rijneveld M.C., CO¹; Wubbels R.J., PhD.²; de Jongh E., CO, MSc.¹
¹Orthoptic Department, The Rotterdam Eye Hospital, The Netherlands
²Rotterdam Ophthalmic Institute, The Netherlands

**Abstract**

**Purpose:** The 15Δ base in prism test (15Δ BIPT) introduced by Gobin is often used in The Netherlands to detect fixation preference, especially in young and preverbal children in whom a reliable measurement of the visual acuity (VA) is difficult. It is assumed that the fixation preference detected by the 15Δ BIPT can be used to predict the presence of amblyopia. The aim of this unicenter retrospective study was to investigate the accuracy of the 15Δ BIPT in detection of amblyopia in anisometropic patients.

**Methods:** Four-hundred-twelve files of anisometropic patients visiting the orthoptic department of The Rotterdam Eye Hospital were analysed. The following data were collected: the alternate prism cover test at 33 cm, the outcome of the 15Δ BIPT, objective refraction and best-corrected distance VA of the right and left eye. Amblyopia was defined as an intraocular difference in VA of 2 or more Snellen lines. The sensitivity, specificity, positive and negative predictive values of the 15Δ BIPT were calculated and the receiver operating characteristic (ROC) curve was plotted.

**Results:** One-hundred-fifty-three patients ranging from 3.3 – 13.1 years of age (median 5.4 years) met the inclusion criteria. The best-corrected median VA of the right eye was 0.9 (range 0.1 – 1.2) and left eye 0.8 (range 0.2 – 1.2). One-hundred-two patients were diagnosed with amblyopia. The sensitivity for the 15Δ BIPT (based on detecting amblyopia) was 34.3%. The specificity was 88.0%. The positive predictive value was 85.4% versus a negative predictive value of 39.6%. The area under the ROC curve was 0.65 (95% CI 0.556 – 0.744).

**Conclusion:** The low sensitivity, large number of false negatives and the area under the ROC curve show that the 15Δ BIPT can be considered a poor test for detecting amblyopia in anisometropic patients.
PAPER 3

Psychosocial impact of amblyopia therapy

Samantha McAuley
Moorfields Eye Hospital, London UK
Orthoptics
London, UK

Sam McAuley BSc(Hons); Sabeen Waqar BSc(Hons); Kelly MacKenzie MSc, BSc(Hons)
AdCertEd Moorfields Eye Hospital, London, UK

Abstract

**Purpose:** To assess parental preference and the impact of using either 1% atropine eyedrops or patching as a first line therapy for amblyopia.

**Methods:** In 2015, parents or guardians who were responsible for administering the child’s amblyopia therapy were asked to complete the Amblyopia Treatment Index (ATI) questionnaire at either the first or second follow-up visit. The overall ATI score and three subscales were calculated, with higher scores indicating a greater (more adverse) impact on the child and family.

**Results:** 60 questionnaires were available for analysis with 28% of parents choosing atropine as their preferred treatment option. Although the mean overall score and difficulty with compliance (2.49 vs. 1.94, P=0.34; 2.73 vs. 2.67, P=0.49 respectively) were higher in atropine group and adverse effects of treatment were higher in the patching group (2.08 vs 2.43, P=0.09) they were not of statistical significance. Only social stigma statistically favoured the use atropine (2.12 vs. 2.33, P=0.02).

**Conclusion:** Although literature indicates atropine therapy is well tolerated our patient’s parents still favoured the use of the more “traditional” patching as first line treatment. Atropine only appeared to be more advantageous in lowering the burden of social stigma.
PAPER 4

Effect of compliance to glasses wear and occlusion therapy on the outcome of visual acuity

Gail Maconachie
University of Leicester
Ulverscroft Eye Unit, Department of Neuroscience,
Psychology and Behaviour Robert Kilpatrick Clinical Sciences Building,
Leicester Royal Infirmary, PO Box 65
Leicester, UK

Gail Maconachie$, Shegufta Farooq$, Glen Bush$, Julie Kempton$, Frank Proudlock$, Irene Gottlob$.
$1Ophthalmology, University of Leicester, Leicester, United Kingdom;
$2Bradford Teaching Hospitals, Bradford, United Kingdom;
$3Medical Physics, Unive

Abstract

Purpose: Refractive adaption (RA) has become an important part of amblyopia treatment allowing time for patients to adapt to their glasses before beginning occlusion therapy. However, it is unknown whether the outcome of refractive adaptation is dictated by compliance to glasses wear since compliance has never been objectively monitored. The dose-response relationship between visual acuity and compliance has also never been established.

Methods: Forty amblyopes with no previous treatment and intraocular difference in visual acuity of 3 lines were recruited to the study: 20 anisometropes and 20 strabismic/mixed amblyopes. Patients were asked to wear their glasses full time for 18 weeks during which compliance to glasses wear was recorded using an electronic monitor. Following this, occlusion therapy was implemented, and both occlusion and glasses wearing was monitored for 12 additional weeks.

Results: Average compliance to glasses wear during RA was 65.95% (SD ± 25.3%). A highly significant relationship was observed between glasses wear and visual outcome after RA (r = 0.462, p = 0.003). Predicted visual deficit corrected with 100% compliance was 44.93%. A significant negative relationship was also found between age and visual outcome (r = -0.460, p = 0.003). Both age and compliance to glasses wear significantly contributed to predict visual outcome after RA (p < 0.05). Dose response relationships after 12 weeks of occlusion revealed only occlusion compliance alone could predict visual outcome (p = 0.005).

Conclusion: To our knowledge we have measured objectively for the first time adherence to glasses wearing. Evidence from this study reveals compliance to glasses wear is far from optimal. Dose response indicates that best expected improvement in visual acuity after RA is only 44.93% with 100% compliance. This is the first study to provide evidence that compliance to refractive correction for amblyopia treatment is also a significant issue which requires further exploration.
**PAPER 5**

**Trends in the incidence and causes of visual impairment and strabismus of teenagers in Israel**

**Eedy Mezer**  
Rambam Healthcare Campus, Ophthalmology, Haifa, Israel

Yinon Shapira¹, Michael Mimouni¹, Yossy Machluf², Yoram Chaiter³, Eedy Mezer¹,⁴  
¹Department of Ophthalmology, Rambam Health Care Campus, Haifa, Israel; ²Weizmann Institute of Sciences, Rechovot, Israel; ³Israel Defense Forces, Medical Corps, Israel; ⁴Bruc

**Abstract**

**Introduction:** The purpose of this study was to estimate the prevalence, predisposing factors, and analyze time trends of visual impairment among teenagers.

**Materials and Methods:** The cohort included records of 112,559 teenagers, average age 17.5±0.7 (median 17.3, range 15.3-20.9) born between 1971 and 1993. Visual impairment was defined as best-corrected visual acuity (BCVA) of <0.67 in either eye or an inter-ocular difference of the logarithm of the minimal angle of resolution (LogMAR) ≥0.2. The severity of visual impairment was classified as mild (BCVA ≥0.5), moderate (BCVA <0.5 and ≥0.25), or severe (BCVA ≤0.2). The prevalence across birth years was analyzed. Additionally, trends in potential causes of visual impairment, including anisometropia (anisohyperopia >+1.5 diopters (D), anisoastigmatism >2D, or anisomyopia >-|3D|), isoametropia (hyperopia >+4D, myopia >|-5D|, astigmatism>2D) and strabismus were examined.

**Results:** A total of 1024 (1%) unilateral and 258 (0.2%) bilateral visually impaired teenagers were identified in the general cohort. The prevalence of visual impairment decreased from 1.3% in subjects born before the year 1985 to 0.9% among those born after 1985 (R²=0.88, p<0.0001). This was mostly due to a decrease in unilateral visual impairment (R²=0.92, p<0.0001). Bilateral visual impairment did not significantly change over the years (p>0.05). The severity of visual impairment did not change in a specific way across the birth years, with 57-63% of subjects having mild visual impairment, 22-28% moderate visual impairment, and 12-15% severe visual impairment. Anisometropia ranged between 16-25% among unilateral visually impaired teenagers across the different birth years, without a significant trend (p>0.05), while strabismus ranged between 6-13% across the different birth years, with no significant trend (p>0.05). Among bilateral visually impaired teenagers there was no significant trend in isometropia (hyperopic, myopic, or astigmatic), ranging together between 52-58% (p>0.05), nor in isoametropia that was present in 2-10% in bilaterally visually impaired teenagers across the birth years (p>0.05). The incidence of strabismus in the entire cohort decreased over the years, ranging from 1.4% in subjects born in earlier years to 0.6% in those born in the later years (R²=0.75, p<0.0001). Amblyopia occurred in 5-17% of strabismic subjects, and increased over the birth years (R²=0.93, p<0.01). The increase over the last years was mostly attributed to higher proportion of mild amblyopia (1.5-11%) in teenagers with strabismus (R²=0.73, p<0.01). Moderate amblyopia (1.5%-5%) and severe amblyopia (0.8%-5%) did not have a consistent trend over the birth years.

**Conclusions:** The incidence of visual impairment and strabismus in Israel decreased among teenagers over a span of two decades. Refractive amblyopia was the leading cause of bilateral visual impairment accounting for over 50% of the cases. Refractive and strabismic amblyopia were only responsible for a fifth to one third of subjects with unilateral visual impairment. Amblyopia was present in only a small number of subjects with strabismus but increased across the birth years mostly due to a relative increase in mild amblyopia.
Amblyopia therapy improves more than just visual acuity

Miriam Langeslag-Smith
Counties Manukau Health
Ophthalmology department
Auckland, New Zealand

Dr. Nicola Anstice¹, Dr Ben Thompson³
¹Ophthalmology Department, Counties Manukau Health, Auckland, New Zealand
²School of Optometry and Vision Science, University of Auckland, Auckland, New Zealand
³School of Optometry and Vision Science, University of Waterloo, Waterloo, Canada

Abstract

Purpose: Amblyopia is a neuro-developmental disorder that affects processing within the primary and extrastriate visual cortex. The aim of this study was to assess whether the therapeutic effects of conventional amblyopia treatments that target visual acuity (refractive adaptation, patching and atropine penalization) extend to contrast sensitivity, stereopsis and global motion perception, a function of the dorsal extrastriate visual cortex believed to be particularly vulnerable to development insult.

Methods: Measurements of interocular acuity difference (IAD), stereoacuity, contrast sensitivity and global motion perception (using random dot kinematograms) were made pre- and post-therapy for 22 children with anisometropic amblyopia (age 4-7 years). Results were compared with those of 28 control children (age 4-8 years).

Result: Conventional amblyopia therapy reduced IAD by an average of 12 letters (p < 0.001) and this was not affected by reported compliance, treatment duration, gender or age at start of therapy. Post-therapy IAD was still greater in amblyopes compared to control children (0.10 logMAR, p < 0.001). Contrast sensitivity improved in all amblyopic eyes following therapy from 17±10% to 2±5% on the Lea Symbols contrast test. Stereacuity improved with therapy when measured with the Frisby and Stereofly tests (p < 0.0001) but showed no reliable change with the TNO test. Global motion processing showed significant improvement post-treatment in the amblyopic eye (change in threshold = 25.88%, p = 0.0004), but no change was seen in the fellow eyes (p = 0.7).

Conclusion: Conventional amblyopia therapies improved visual acuity, contrast sensitivity and global motion perception. This suggests changes in the response of both the primary and extrastriate visual cortex to information from
Rapid Fire Poster Presentations

Thursday 30 June 2016 11:30 - 11:40 h

Theme block #10: Amblyopia

RAPID FIRE POSTER PRESENTATION 1 (63)
Relative afferent pupillary defect: Pathology or amblyopia?

Gerdi Holtslag
University of Applied Sciences, Orthoptics
Utrecht, the Netherlands

S van Gemert1, 2, G Holtslag2, 3
1Canisius, Orthoptic department, Nijmegen; 2University of Applied Science, Orthoptic department, Utrecht; 3ErasmusMC, Orthoptic department, Rotterdam

Abstract

Purpose: Amblyopia is the most common cause of reduced visual acuity (VA) in children, it is rarely caused by ophthalmic pathology. Pupillary responses, specifically the Swinging Flashlight Test (SFLT) can be used to determine whether the optic nerve is affected by pathology. The purpose is to determine how the Swinging Flashlight Test (SFLT) can be used to distinguish between amblyopia and ophthalmic pathology as possible causes of decreased VA in children.

Methods: Pubmed was searched to identify articles describing the relationship between RAPD and amblyopia. Search terms included amblyopia, RAPD, pupillary reactions and SFLT. The reference lists of each article were reviewed in detail to find additional articles. A case of a child with a RAPD was retrospectively selected.

Results: A RAPD is present in 9% to 93% of amblyopic patients. RAPD is measured in log units, using neural density filters, or pupillary contraction amplitude, calculated as the difference in contraction between both pupils. In normal subjects a RAPD up to 0.3 log units or a difference up to 0.25 mm contraction amplitude can be found. In amblyopic patients with a RAPD the RAPD measured 0.3-0.6 log units. The contraction amplitude in amblyopic patients is not significantly different from that of normal subjects.

A 5 year old boy was referred to us by his general practitioner with a constant exotropia of his Left Eye (LE). During orthoptic examination there was normal visual acuity in the Right Eye (RE) but he was not able to fixate with his LE and only light perception was present. The Swinging Flashlight Test (SFLT) revealed a dense relative afferent pupillary defect (RAPD) of the LE. According to the literature ophthalmic pathology is the most likely diagnosis in this case. Cycloplegic refraction showed an anisohyperopia of S+0.75 in the RE and S+3.25 in the LE. The presumed diagnosis was confirmed by funduscopic examination: the RE showed no abnormalities and a pale optic disc was seen in his LE.

Conclusion: The literature shows that amblyopia may cause a subtle RAPD, which is very close to the range in normal subjects. Different instruments were used to obtain these results. Therefore it is questionable whether a subtle RAPD is detectable in every day practice. The patient in the case showed a marked RAPD, which is much more likely to be caused by pathology than amblyopia. The diagnosis of pathology was confirmed by funduscopic examination.
RAPID FIRE POSTER PRESENTATION 2 (65)
VisioPercept - quantification of visual competency

Dagmar Verlohr
Outpatient Eyesore & Orthoptic Unit
Orthoptics
Hamburg, Germany

Dagmar I. Verlohr, Fritz Dannheim
Outpatient Eyecare & Orthoptic Unit, 21218 Seevetal, Germany

Abstract

Introduction: Acquired binocular defects in the central visual field can cause deficits in orientation and reading as presented at the XII. IOC in Toronto, Canada, 2012. The results of an evidence-based study* showed the effectiveness of saccadic training and the ability of the patients to apply the newly learnt strategies to everyday life, regaining a higher quality of life. But is a compensational saccadic training for every patient with acquired hemianopic defects indicated?

Aim: To validate an additional diagnostic tool that reveals those patients who have already adapted themselves to their visual handicap and to measure the effect of compensational search saccade training.

Methods: We developed a computer programme, VisioPercept®, to measure the time required to visually recognize randomized appearing objects within the binocular visual field of 30-40°. While fixating a scenic view binocularly, the Lea-Numbers® 5, 6, 8 and 9 are presented in 11 positions in random order within a visual angle of about 30° to both sides. After an optional trial run, 2 sequences are performed for a total of 22 presentations. The aim for the patient is to search the screen with eye movements after the central fixation marker (smiley) disappears to find, recognize, and name the respective number as fast as possible. Locating the number is confirmed by pressing the space bar. Another part of the program is the Line Dissection Test which is used to differentiate between a purely cerebral visual pathway lesion (homonymous hemianopia / quadranopia) and an additional visual perceptual defect, such as hemineglect.

Results: This program proved to be useful for the quantification of visual competency in patients with visual field defects of both eyes. It not only allows the measurement of perception and visual resolution, but also assesses hemianopic asymmetries and short-term fluctuation as an indicator for further specific cerebral disabilities e.g. alertness. Furthermore the registration of the short- and long-term training effects within the course of a visual rehabilitation is possible.

Conclusions: VisioPercept® is a simple program to evaluate the reaction time in the paracentral visual field. It enables the specialists to distinguish reliably between those patients who need compensational search saccade training and those who show a spontaneous adaption to the visual field deficits. In particular, carefully selected cases it served as proof of virtually unlimited ability for orientation in binocular visual field defects. For some of these patients it was then possible, with an additional neuropsychological examination and driving performance testing, by means of a special permit, to participate in street traffic again.

* Neurology® 2009; 72:324-331; www.neurology.or
Thursday 30 June 2016 14:20 – 15:20 hr

Theme block #11: Strabismus

PAPER 1
Risk factors for Esotropia and Exotropia

Felicia Adinanto
University of Technology Sydney
Graduate School of Health
Ultimo, Australia

Felicia Adinanto, Dr. Amanda French, Prof. Kathryn Rose

Abstract

Purpose: The prevalence of strabismus (2-5%) is relatively consistent between populations though exotropia and esotropia appears to vary. This systematic review identifies risk factors that may be associated with the variation.

Methods: We have performed a systematic analysis of the literature to provide insight into the contributions of genetics and modifiable risk factors to the development of esotropia and exotropia in children. Papers that examined risk factors associated with esotropia and exotropia were identified through a database search of PubMed and MEDLINE. Search terms included; strabismus, esotropia, exotropia and risk factors.

Results: Genetic studies of strabismus have established that the risk of developing strabismus is 3-5 times greater if a first degree relative had strabismus. Other genetic anomalies such as cranio-facial syndromes and global syndromes also contribute to a greater risk of developing strabismus. The overall prevalence of strabismus in the European Caucasian (EC) populations (3.05%) and East Asian (EA) populations (3.28%) did not statistically differ (p=0.81). However, there is a statistically significantly difference in the type of strabismus present; in EC populations 62.6% had esotropia while 74.3% of those in EA populations had exotropia. Many papers have observed this difference, but a reason has not yet been identified. Risk factors such as low socio-economic status, maternal exposure to smoking, low birth weight, prematurity and admission to neonatal intensive care units have been identified as modifiable associated risk factors. Esotropia is associated with antenatal factors, such as admission to NICU and low birth weight, whereas exotropia is related to modifiable risk factors such as low socio-economic status.

Conclusions: While the prevalence of strabismus is consistent across different locations, there is variation in the prevalence of esotropia and exotropia based on ethnicity. A family history of strabismus increases the risk of developing strabismus, but in itself is unable to account for the majority of strabismus cases. The contributions of modifiable risk factors appear to play a major role in the development of esotropia and exotropia in children. However ethnic differences in esotropia and exotropia are unexplained by any of these risk factors.
PAPER 2

Large-Angle congenital exotropia secondary to absent bilateral medial rectus muscles

Kathleen Curtin
Houston Eye Associates
Pediatric Ophthalmology and Adult Strabismus
The Woodlands, USA

Abstract

**Purpose:** To describe an extremely rare cause of large-angle congenital exotropia due to absent bilateral medial rectus muscles.

**Methods:** Case presentation of a now 11-year-old African-American male who presented to our clinic for his large-angle exotropia and alternating face turn. Video, magnetic resonance imaging (MRI), and photographs will be included in the case presentation.

**Results:** Chart review for the child showed loss to follow up and poor compliance with neuro-workup due to limited access to healthcare in the child’s rural East Texas county. Limited bilateral adduction prevented the child from placing either eye in primary position; this resulted in the child adopting an alternating head turn. Surgical results were unimpressive yielding further investigation for the cause of the exotropia. Magnetic resonance imaging (MRI) was obtained and revealed absent bilateral medial rectus muscles.

**Conclusions:** After a thorough chart review, only two similar case reports of bilateral anomalous medial rectus muscles were found. Our patient is unique in that he has complete absence of both medial rectus muscles confirmed by magnetic resonance imaging (MRI). In patients with unknown etiology of severe congenital bilateral adduction deficit it is advisable to obtain magnetic resonance imaging (MRI) to better define orbital anatomy prior to surgical intervention.
PAPER 3

Exaggerated V-pattern strabismus and displacement of the superior and lateral rectus muscles near their origins: Impact of altered boney morphology of the posterior orbit in syndromic craniosynostosis

Sarah MacKinnon
Boston Children’s Hospital
Ophthalmology
Boston, USA

Sarah E. MacKinnon MSc, OC(C), COMT Sanjay P. Prabhu MBBS, FRCR Linda R. Dagi MD
Boston Children’s Hospital, Boston, MA

Abstract

Purpose: Excyclorotation of the extra-ocular muscles may contribute to V-pattern strabismus associated with syndromic craniosynostosis. We compared the degree of excyclorotation with severity of V-pattern and studied associated posterior orbital morphology.

Methods: Retrospective chart review of patients with Apert, Crouzon and Pfeiffer syndromes seen from 2003-2013 identified 43 patients with available imaging. Inclusion required documentation of one of four patterns: (1) Severe V-pattern with exaggerated hyper-elevation in adduction, inability to elevate the (contralateral) abducted eye past midline, and significant fundus torsion (2) Moderate to severe V-pattern retaining the ability to elevate the abducted eye and significant fundus torsion, (3) Moderate V-pattern with modest fundus torsion, and (4) Minimal to absent strabismus and fundus torsion.

Cyclo-rotation of the rectus muscles was measured in the coronal and quasi-coronal planes. This was compared with 18 age-matched controls. Boney morphology of the posterior orbit was studied and anatomical differences between the four severity groups noted.

Results: Severe, moderate to severe, moderate, and minimal V-pattern strabismus were associated with 27°, 17°, 10° and 0° of excyclorotation, respectively. The cyclotorsion measured was significantly less in the controls, than all partipants with syndromic craniosynostosis, except for those with only mild V-pattern strabismus.

Posterior orbital morphology was different in the moderate to severe and the see-saw group, when compared to the mild or moderate group. In the mild and moderate category, the posterior orbit was rounded at its corners and the extraocular muscles were unremarkable in location. For both the moderate to severe and severe groups the posterior orbit was crescentic in shape resulting in lateral shift of the superior rectus and infero-medial shift of the lateral rectus establishing excyclorotation at the muscle origins.

Conclusion: Exaggerated V-pattern strabismus is associated with greater excyclorotation that initiates posteriorly, near the orbital apex. Strabismus procedures designed to reverse excyclorotation and remediate V-pattern may have only modest impact on motility given the very posterior origin of this excyclorotation.
PAPER 4

Differences in adult patients with strabismus sursoadductorius with and without hypoplasia of the superior oblique muscle (SOM)

Gabriele Gusek-Schneider
Universitätsklinikum Erlangen
Augenklinik Department of Ophthalmology
Erlangen, Germany

Schürhoff S., Reil F. (orthoptists), Engelhorn T. Professor of Neuroradiology
Department of neuroradiology Universitätsklinikum Erlangen-Nürnberg

Abstract

Purpose: It has already been shown in children with strabismus sursoadductorius that in patients with hypoplasia of the SOM, head tilt manifested at an earlier age, whereas patients without hypoplastic SOM showed prominent overelevation in adduction. The purpose of this study was to search for further items in adults.

Methods: 15 patients seen in 2014 and 2015 with typical signs of strabismus sursoadductorius (i.e. gradual onset double vision, concomitant angle in adduction, small relatively concomitant excyclorotation), 7 with proved hypoplasia and 8 with proved side equal morphology of the SOM muscle were included.

Investigated were head tilt, difference of the vertical deviation and cyclorotation between up and downgaze in abduction, adduction and primary gaze and the Bielschowsky head tilt test in primary position and in up and down gaze.

Results: Incidence (7 of 7 with hypoplasia versus 2 of 8 in those without, p= 0.003) and degree (10,7 + 5,3° versus 1,9 + 3,7°, p=0,004 ) of head tilt was significantly higher in patients with hypoplasia of the SOM. The vertical deviation and cyclorotation significantly increased in downgaze ( 1,7 + 6,6 versus -1,8 + 4,6 p= 0,01 and 1,6 + 5,3 versus -3,9 + 2,5, p= 0,04) and abduction ( 2,6 + 2,7 versus -2,1 + 3,2, p= 0,009 and 4,1 + 5,8 versus -4,3 + 3,1, p= 0,008) in those with hypoplasia of the SOM, but did not differ in adduction ( 1,7 + 6,6 versus -1,8 + 4,6, p=0,26 and -0,4 + 4,7 versus -2,71 + 3,8, p= 0,34) in the patients with hypoplasia of the SOM. The Bielschowsky head tilt test did not significantly differ between the two groups in up gaze (6,6+ 8,6 ° versus 2,6 + 3,4°, p= 0,25), but did differ in primary positon (8,2 + 5,1° versus 2,9 + 3,4°, p= 0,04 as well as in downgaze 12 + 7 versus 1,4 + 2,2 , p= 0,006).

Conclusions: Patients with hypoplasia of the SOM do not differ from those without hypoplasia of the SOM in the squint angle in adduction but in the findings of the Bielschowsky head tilt test and incidence and degree of compensating head tilt.
PAPER 5

The role of the Hess/Lees Screen test in the clinical analysis of secondary changes of ocular motility in long-standing IVth Nerve palsy, and the implications for the surgical plan

Hilde Janssens
University Hospital Leuven, Belgium
Ophthalmology, Strabismology and orthoptics
Leuven, Belgium

Dieltiens M., MD; De Clippeleir L., MD; van Lammeren M., CO; Goovaerts L., CO; Cassiman C., MD

Abstract

Purpose: Superior Oblique palsy shows a variety of clinical pictures, due to the fact that in a number of patients secondary changes of ocular motility, eg tight vertical recti, develop. Concurrently, various typical signs of the original palsy may persist. The surgical plan should take into account all these different aspects.

It is the purpose of this paper to present our differential diagnostic scheme in long-standing IVth Nerve palsy and to underline the importance of the Hess/Lees Screen Test.

Methods: From 2011 to 2013, according to a set protocol of surgical principles, we performed the first surgery in 96 consecutive patients with symptomatic IVth Nerve palsy. Preoperatively, patients underwent a thorough orthoptic examination where the signs of a IVth Nerve palsy and the possible associated signs of tight vertical muscles were delineated. Special attention was paid to evidence of restricted ductions and to the “orientation” (straight or oblique) of the fields of the Hess/Lees Screen Test.

Results: Evaluation of the orientation of the Hess/Lees fields leads to an easy differential diagnostic scheme in long-standing IVth Nerve palsy, with consequences for the surgical plan. More specifically, oblique orientation of the fields points to an important residual underaction of the Superior Oblique muscle, sometimes due to a lax tendon of this muscle. A residual vertical deviation with a mainly straight orientation of the Hess/Lees fields points to a (partial) recovery of the Superior Oblique Muscle. The remaining incomitancies are largely due to overaction of the vertical recti, which at a later stage may lead to secondary strabismological entities, such as Superior Rectus Contracture Syndrome of the palsied eye or tight inferior rectus of the fellow eye. Further analysis of the Hess/Lees fields helps to differentiate between both syndromes. We will demonstrate this with a few clinical examples.

Conclusions: The Hess/Lees Screen Test plays an important role in the orthoptic analysis of the different factors in long-standing Superior Oblique Palsy. The straight or oblique orientation of the Hess/Lees fields points to the over- or underactive muscles: vertical recti versus oblique muscles. In combination with other orthoptic tests and forced duction test, the Hess/Lees Screen Test delivers important pre-operative information for the selection of the muscles to be treated and the surgical method.
PAPER 6

**Evaluating a new test method for measuring cyclotorsion in a patient population: A comparative study**

**Sara Flodin**

Sahlgrenska University Hospital
Department of Ophthalmology
Mölndal, Sweden

**Abstract**

**Background:** A new Swedish computerized test, the KMS screen, has been designed to assess cyclotorsion. This test has not been validated or compared to existing manual clinical methods such as the Maddox Rod and synoptophore. It is unknown if these three methods are comparable.

**Purpose:** To establish if cyclotorsion measurements obtained in a patient population using different methods of testing give equivalent results, and if the results from each test are repeatable over time.

**Methods:** Twenty referrals, from the orthoptic waiting list at Sahlgrenska University Hospital, Mölndal, Sweden with a vertical deviation stated as the primary reason for referral, were examined. Subjective cyclotorsion measurements using three different methods were performed. The methods included two standard tests: a synoptophore with torsion slides, the single Maddox rod (SMR) test, and a new computerised test: the KMS screen. Measurements were repeated three times for fixing either eye, and on two separate visits; for repeatability within each of the methods.

**Results:** At the first visit, eleven (55 %) showed excyclotorsion with the synoptophore, 18 (90 %) with the SMR test, and 15 (75 %) with the KMS screen. At the second visit, eleven (55 %) showed excyclotorsion with the synoptophore, 17 (85 %) with the SMR test and ten (50 %) with the KMS screen. Median perceived torsional measurements at the first visit for the three tests were -1, -5, and -1 degrees respectively. There were significant differences between the synoptophore and the SMR (p= 0.025), the SMR and the KMScreen (p= 0.025), but not between the synoptophore and the KMScreen (p=0.90). All three tests showed high repeatability. There was no significant difference between visit 1 and 2 for any of the tests (p>0.05). Strong correlations were found between visits for all tests. The 95% limits of agreement (LoA) between visits, defined as mean torsional difference±1.96 SD of difference, for the synoptophore, SMR and KMScreen methods were -0.5°±4.5°, -0.3°±5.0°, and -0.7°±3.5° respectively. P-values for differences between visits were p=0.45, p=0.75, and p=0.90, respectively, using an exact permutation test.

**Conclusions:** In this small study group, the three different methods used for assessing cyclotorsion produced significantly different values. This finding suggest these tests can not be used interchangeably. However, all methods showed good repeatability (test-retest reliability) with LoA within ±6°. This means a change at two consecutive visits greater than 6° should be considered a true change. Results demonstrated that the KMScreen is a valid test for measuring cyclotorsion. The findings from this study are of clinical importance when investigating cyclotorsion in patient.
Rapid Fire Poster Presentations

Thursday 30 June 2016  15:20 – 15:30 hr

Theme block #11: Strabismus

RAPID FIRE POSTER PRESENTATION 1 (70)
An atypical unilateral vertical gaze restriction

Roisin Buckels
University of Liverpool
Moorfields Eye Hospital
London, United Kingdom

Roisin Buckels (orthoptist), Gill Adams (consultant strabismus and paediatric ophthalmic surgeon)

Abstract

Purpose: We report on a uniocular vertical gaze restriction with ptosis and globe retraction on attempted downgaze, giving an overview of the investigation and potential differential diagnosis with supporting literature.

Method: Retrospective case report with photographs.

Results: A 42-yr old woman presented to a tertiary eye hospital complaining of a worsening childhood-onset ptosis. A moderate right ptosis, chin up head posture, latent nystagmus & good binocularity in primary position were noted. Motility revealed an A pattern, marked restriction of elevation and a small restriction of depression of the right eye accompanied by globe and lid retraction on downgaze.

The findings were suggestive of a congenital cranial dysinnervation disorder and not a superior rectus weakness alone which is commonly associated with congenital ptosis.

Conclusions: There are only half a dozen cases in literature with similar motility findings. Undertaking a full investigation in such cases helps reduce the need for unnecessary neurological work ups. Complex cases such as these should be seen by a strabismologist.
RAPID FIRE POSTER PRESENTATION 2 (72)
A case of bilateral sequential Brown's syndrome

Victoria Wilson
Moorfields Eye Hospital NHS Foundation Trust Orthoptic Department
London, United Kingdom

Abstract

Purpose: To report a case of suspected bilateral sequential Brown's syndrome in a young child.

Method: Retrospective case report.

Results: A six year old child with an infantile esotropia presented with signs of a newly acquired left Brown's syndrome following bilateral medial rectus recessions. Four months after a subsequent left superior oblique tenotomy, the motility remained unchanged but there were signs of slight Brown's syndrome developing in the right eye. By seven months post-operatively the left motility deficit had almost completely resolved yet the motility of the right eye had deteriorated. By 13 months post-operatively, left motility had fully resolved, right motility was improving without intervention but signs of a left ptosis were noted. No injury or change in general health was reported and tests for anti-acetylcholine receptor antibodies were negative.

Conclusion: Bilateral sequential Brown's syndrome has rarely been reported in the literature (1, 2). No underlying cause for the syndrome has been found in this case and it is presumed to be idiopathic, suggesting conservative management may prove effective in some cases.
PAPER 1

**Graded inferior oblique muscle surgery in unilateral fourth nerve palsy**

**Anne-Marie Langenhorst**
Vu Medical Centre
Ophthalmology
Amsterdam, the Netherlands

Abstract

**Purpose:** Policies for inferior oblique surgery vary hugely among clinics. Some clinics advocate graded surgery; others only perform (partial or complete) myotomies. In the literature, dose-response relations for graded inferior oblique surgery are available, but patient numbers are small and standard deviations are large. In the current study, we investigated the dose-response relation of graded inferior oblique surgery in our own patient population.

**Methods:** We included 60 patients with (congenital or acquired) unilateral superior oblique palsy. All patients underwent graded inferior oblique surgery, whereby an effect on the vertical angle in primary position of 0.5 deg/mm was assumed. In angles smaller than 3 deg, only a posterior myotomy was performed (and a recession effect of 3 mm assumed). In angles exceeding 6 deg, a graded anteriorisation of the muscle was added to the maximal recession (Elliott and Nankin, 1981).

**Results:** In primary position, we found an effect of 0.43 deg/mm (vertical angle change per mm recession of inferior oblique). This effect was similar in small and large angles and standard deviations were rather high. Invariably there was a small undercorrection in all patients, except for those with large angles before surgery; those had larger undercorrections. Overcorrections were never observed.

**Conclusion:** Graded inferior oblique surgery offers particular advantages over myotomies, particularly in intermediate angles. Based on these findings we may fine-tune our surgical strategy. In large angles we continue to perform 2-stage surgery as a preferred approach in order to obtain an optimal final result.
PAPER 2

The place of vertical rectus surgery in the surgical approach to N IV palsy

Maria Van Lammeren
UZ Leuven
Ophthalmology
Leuven, Belgium

Dr L. De Clippeleir, Dr M. Dieltiens, Mrs H. Janssens, Mrs V. Van Bellingen, Dr C. Cassiman
UZ Leuven

Abstract

Purpose: To discuss the role of vertical rectus muscle surgery in the treatment of patients with symptomatic fourth nerve palsy.

Method: The charts of all patients, operated for a fourth nerve palsy in our centre between 2008 and 2009, were reviewed in 2010. The orthoptic examination preoperatively, the surgical reports and the surgical outcome were studied. Based upon the results, a template was developed containing 9 factors to be considered before a surgical plan is made.

This surgical plan is staged, commencing with surgery on a single muscle, followed by an assessment of the postoperative result and if indicated, completed with surgery on a second or third muscle. The different surgical procedures include tucking of the palsied superior oblique muscle, anterior transposition of the ipsilateral inferior oblique muscle, recession of the ipsilateral superior rectus muscle; and recession of the contralateral inferior rectus muscle.

An analysis is made of the prevalence of each of these procedures in a group of patients who were treated according to the previously defined template in the period from 2011 to 2013. The orthoptic examination and the surgical reports were studied.

Results: Ninety-six patients underwent a primary operation for fourth nerve palsy, 33 patients underwent a second operation. The efficiency of the template is demonstrated by the fact that 80% of the patients are without any symptoms after the first intervention; after the second stage procedure, this percentage rises to 94%.

In 75% of the patients who underwent a first procedure, surgery was performed on the obliques, whereas in 25% vertical rectus surgery was performed with a slight preponderance of surgery on the contralateral inferior rectus muscle. For reinterventions this rate was the opposite: 26% of the procedures was performed on the obliques vs. 74% on vertical recti, with a clear preponderance of surgery on the contralateral inferior rectus muscle (18/25 muscles).

Conclusions: In the surgical treatment plan of patients with fourth nerve palsies, surgery on one of the oblique muscles is very often the treatment of choice. Our study shows that surgery on the vertical recti can also be a very effective procedure in selected cases. Although especially indicated in the second stage of the surgical plan, the procedure was also selected as the first choice in one fourth of the patients with satisfactory postoperative results.
PAPER 3

Comparison of medial rectus Y-splitting and faden-operation for the treatment of convergence excess or cross-fixation in cases of infantile esotropia

Oliver Ehrt
Klinikum of Ludwig Maximilians University Muenchen
Department of Ophthalmology
Muenchen, Germany

Oliver Ehrt, Tobias Fink, Tatiana Weber, Martin Nentwich

Abstract

Purpose: Treatment options for convergence excess or cross fixation include surgical procedures which reduce the muscle torque. This can be done by retroequatorial fixation suture on the medial rectus muscle or Y-splitting of the muscle. We compared the results of both procedures with a long follow-up of up to 4 years.

Methods: In this retrospective case-control study we included 120 patients (age 2-59, median 6,0y) who underwent Y-splitting between 2010 and 2015 (group 1) and 106 patients (age 1-14y, median 5,9y) who had a Faden procedure 1996 - 2009 (group 2). The dosage of Y-splitting was calculated from the axial length and Priglinger’s simplified 3 stage table.

Results: The groups did not differ significantly in terms of age at surgery, refractive error, or deviation. Horizontal deviation at distance decreased from a median of +15° to +6° in group 1 (+12° to +3° in group 2) the day after the operation, and further decreased during follow up to +2° in group 1. At final follow-up (1.5 - 4y) group 1 was unchanged whereas the deviation increased to +12° in group 2. Convergence excess decreased from 8° to 4° (1) and from +6° to +4° (2). Cross-fixation was reduced from 15-30° to no head turn in all but 2 patients in each group. We had no case of postop nausea after Y-splitting. Two patients needed a second surgery because of consecutive exotropia and 4% because of recurrence of the esodeviation in group 1. In group 2, 14% required a second surgery because of recurrence.

Conclusions: Medial rectus Y-splitting is a safe operation and more comfortable for the patient than Faden-operation which can induce nausea and vomiting more often. Postoperative deviation, convergence excess and head turn were very satisfying and comparable in all groups. However the effect of Y-splitting tended to increase with follow up, whereas the effect of the Faden-operation decreased significantly during long follow-up, resulting in a higher rate of second surgery. Y-splitting is more effective in decreasing convergence excess and easier to learn than Faden operation.
PAPER 4

Tendon elongation with bovine pericardium in strabismus surgery

Laurentius van Rijn

VU Medical Center
Ophthalmology
Amsterdam, the Netherlands

Laurentius J. van Rijn1,2, Stephanie J.N. van de Ven1, Jacqueline S.M. Krijnen1,
Suzanne M. Jansen1, Anne-Marie E.L. Langenhorst1
1VU Medical Center
2Onze Lieve Vrouwe Gasthuis

Abstract

Introduction: Sometimes conventional recess-resect surgery is not sufficient to obtain satisfactory ocular alignment. Patients who have previously undergone surgery and/or have a large difference in visual acuity between both eyes and do not wish to undergo surgery on their sound eye provide a surgical challenge. In these cases, tendon elongation with bovine pericardium may be an option.

Methods: We retrospectively reviewed the charts of 38 patients who underwent strabismus surgery with tendon elongation. Before surgery, 31 had exotropia (angle -21.8 ±5.7 degrees) and 7 esotropia (angle +19.1 ±5.4 degrees). Reasons for tendon elongation: 15 patients refused surgery on their sound eye; conventional recess-resect surgery was not possible in 15 patients; in 7 patients the elongation best fitted the motility pattern. In the final case, tendon elongation was preferred over conventional recession because of a thin sclera. Follow-up was 0.5 to 4 years.

Results: At last follow-up visit, in patients with previous exotropia, the angle was -3.3 ±5.9 degrees, in patients with previous esotropia +0.2 ±0.5 degrees. Most had some duction limitation in the direction of the elongated muscle. All patients but one were satisfied with the result. In the patients with previous exotropia, there was a small but non-significant regression to recurrence of the exodeviation (on average 0.5 degree per year).
Abstract

Purpose: Surgical success is traditionally deemed as improvement in ocular alignment or restoration of binocular functions, so the outcome is determined by the orthoptist or surgeon. However some patients remain unhappy, even with “successful” surgery suggesting other factors may influence their perception of outcome. This study seeks to identify clinical and psychological characteristics that may identify these potential patients pre-operatively.

Methods: This prospective cross sectional study included consecutive patients recruited from a tertiary referral centre between November 2010 and April 2012. Patients completed a range of psychological questionnaires, including Hospital Anxiety & Depression (HADS) scale. Those with identifiable mental health issues or cognitive impairment were excluded.

Results: Surgery improved overall quality of life and halved the rate of clinical anxiety and depression. 7% of the 214 participants regretted having surgery at 3 months post-op, and 5% at 6 months-post surgery. Patients regretting surgery were experiencing poorer quality of life after surgery both at 3 months and 6 months post-operatively (but no difference in anxiety or depression levels). No clinical variables were associated with regret. Regret was linked to placing more importance on appearance, believing that their strabismus would last a short time and placing more importance on the surgery at baseline.

Conclusions: Successful adjustment to strabismus appears to be associated with psychological rather than clinical factors. Surgeons should be aware of patients who feel strabismus has major and severe consequences on their life. A mismatch between expectation and outcome of surgery can lead to disappointment and complaint.
PAPER 6

A review of Cochrane systematic reviews of interventions relevant to orthoptic practice

Fiona Rowe
University of Liverpool
Health Services Research
Liverpool, UK

Fiona J. Rowe, Sue Elliott, Iris Gordon, Anupa Shah

Abstract

Purpose: To present an overview of the range of systematic reviews on intervention trials pertinent to strabismus, amblyopia, refractive errors and low vision, performed by Cochrane Eyes and Vision (CEV).

Methods: We searched the 2015 Cochrane Library database to identify completed reviews and protocols of direct relevance to orthoptic practice. These reviews are currently completed and published - available on www.thecochranelibrary.com (free to UK health employees) or via the CEV website http://eyes.cochrane.org/.

Results: We found 19 completed Cochrane Eyes and Vision reviews across the topics of strabismus, amblyopia, refractive errors, low vision and stroke. Eleven completed Cochrane Eyes and Vision protocols addressed topics of strabismus, amblyopia, refractive errors, low vision and screening. Within the Cochrane Stroke Library, we found three completed reviews addressing visual field loss, eye movement impairment and age-related vision loss.

Conclusions: The systematic review process presents an important opportunity for any orthoptic and ophthalmic clinician to contribute to the establishment of reliable, evidence-based strabismus and related practice. Each review has an abstract and plain language summary that many non-clinicians find useful, followed by a full copy of the review (background, objectives, methods, results, etc.) with a conclusion section which is divided into implications for practice and implications for research. The current reviews provide patients/parents/carers with information about various different conditions and treatment options, but also provide clinicians with a summary of the available evidence on interventions, to use as a guide for both clinical practice and future research planning. The reviews identified in this overview highlight the evidence available for effective interventions for strabismus, amblyopia, refractive errors and low vision rehabilitation as well as the gaps in the evidence base. Thus, a demand exists for future robust randomised controlled trials of such interventions of importance in orthoptic practice.
PAPER 7
The application of vergence training in the management of Intermittent Exotropia

Wai Ling Chiu
Hong Kong Eye Hospital
Orthoptic
Kowloon, Hong Kong

Abstract

Purpose: Intermittent Exotropia is difficult to treat. Both surgical and non-surgical treatments are not very effective. The treatment result is not long lasting and recurrence of the deviation frequently occurs. While binocular single vision and fusion gradually deteriorates, many patients finally lose control of the deviation completely, resulting in a constant exotropia. The purpose of the study is to investigate the effect of vergence training with 5 dioptres prism base out on fusional reserves and the control of deviation.

Methods: 43 patients with intermittent exotropia were recruited. The control of the deviation was measured using the Newcastle Control Scores. Binocular visual acuity and prism fusion range were measured.

Results: Results to be reported and discussed.
Rapid Fire Poster Presentations

Thursday 30 June 2016 17:10 – 17:20 hr

Theme block #12: Strabismus Management

RAPID FIRE POSTER PRESENTATION 1 (75)
The effect of prism and foil therapy on the quality of life in adult patients with diplopia

Clare Field
Moorfields Eye Hospital NHS Foundation Trust Orthoptic
London, UK

Vicortia Wilson BMedSci Orthoptics, Emma Smyth BMedSc Orthoptics,
Kelly A MacKenzie MSc, BSc (Hons), AdvCertEd

Abstract

Purpose: Prism therapy and the use of Bangerter foils have long been used in the management of binocular diplopia. As traditional clinical measures of health are increasingly being accompanied by Patient Reported Outcome Measures (PROMS), this study aimed to assess the impact of orthoptic treatment on our patients’ quality of life.

Methods: Forty-six adult patients with recently acquired diplopia (mean age 55, SD 13, 61% male) completed the Adult Strabismus questionnaire (AS-20) before treatment and at the first follow-up visit after treatment had been administered. The higher the overall, psychosocial and functional score (100-0) the better the quality of life.

Results: 45 questionnaires were available for analysis. The overall score, psychosocial, and functional scores all improved after prisms or foils had been administered (scores improved from 62 to 70, 62 to 77.5 P=0.50 and 46 to 62 P=0.03, respectively).

Conclusion: Successful Orthoptic treatment indicates significant improvement in patients functional gains, with overall improvement in quality of life, comparable to that of other interventions i.e. botulinum toxin therapy (score 72) and strabismus surgery (score 70).
RAPID FIRE POSTER PRESENTATION 2 (76)
The development of mobile application MyEyeGym as an orthoptic stereogram exercise

Yi Ling Tan
Singapore National Eye Centre
Ophthalmology
Singapore, Malaysia

Abstract

**Purpose:** Over the last few years there has been a widespread increase in the use of smartphones worldwide. Smartphones have become so common that it is now considered unusual for one to be seen without it. In a study conducted amongst Southeast Asian countries, 98% of adults allow their children to use mobile devices. In recent years, there has also been an increasing trend globally in the use of mobile applications (apps) in healthcare. Healthcare professionals are now complementing their clinical skills with various medical software apps.

In Singapore, the Cats stereogram exercise has often been prescribed as treatment for patients with intermittent exotropia (IXT) in the clinical orthoptics setting. This traditional stereogram exercise has been shown to be effective in its management of IXT. The Cats stereogram card can easily be lost or damaged. In light of the above-mentioned increasing trend of apps in healthcare, as well as the increase in smartphone usage in Singapore, a mobile application for stereogram exercise – MyEyeGym – was developed.

**Methods:** MyEyeGym App stereogram exercise was developed with the aim of improving compliance through the easy access to the exercise in their smartphones, and increasing interest in doing the exercises. As a result, it may help patients achieve better control over their IXT. MyEyeGym runs on both Apple iOS 6 onwards and Android OS version 4 and higher. It consists of three levels of exercises, a summary report to track activity, an exercise reminder alarm, and games as incentives for children to complete their exercise. These features of MyEyeGym complement stereogram exercise through encouraging patients to perform the exercise, and allowing clinicians to monitor and track the patients’ progress.

A qualitative survey of 32 patients was done to obtain information on their preferences in doing MyEyeGym exercise over the Cats stereogram exercise.

**Results:** 62.5% of patients who were interviewed stated that they preferred the MyEyeGym app exercise to the Cats stereogram card. Demonstrating improvements in compliance or effectiveness of the app in the control of IXT will further require an ethics-approved research study of sufficient duration.

**Conclusion:** The survey results show a positive response in the use of mobile application – MyEyeGym – adapted as an Orthoptic exercise, indicating its feasibility and potential effectiveness.
Degree in Orthoptic and Ophthalmologic assistance in Bolzano: bilingual education and clinical practice

Karin Waldhauser
Division of Orthoptic
Hospital of Bolzano
Bolzano, Italy

Nevia Delladio
Claudiana – College of Health-Care Professions,
Bolzano/Bozen, Italy

Abstract

Aim: We report on the organization of the degree course in Orthoptic and Ophthalmologic Assistance at the Claudiana – College of Health Care Professions in Bolzano.

Methods: In South Tyrol, an autonomous province in northern Italy, there are two principle language groups: Italian and German. To access a position in public health, a certificate of bilingualism is mandatory. In this regard at the Claudiana College of Health Care Professions, courses are designed to provide teaching in the two languages in a balanced way.

Results: Orthoptic undergraduate education in Italy has been undertaken at university since 1955. The Claudiana College of Health Care Professions collaborates with the Università Cattolica del Sacro Cuore di Roma. In the degree in Orthoptic and Ophthalmologic Assistance of Bolzano, teaching and examinations are assessed 50% in Italian and 50% in German, by teachers from the Università Cattolica del Sacro Cuore di Roma and from South Tyrol and Austria. An admission requirement for undergraduates is a test of understanding of both languages. Clinical practice is assessed continuously throughout the three years of degree programme. During internships in the province, both Italian and German native-speaking students experience communication with patients and professionals from both linguistic groups. All students must also carry out clinical practice periods in Rome and abroad in a German-speaking country.

Conclusions: The permanent integration of both languages in theoretical and clinical work during the three years of the course, permits students to improve their knowledge of the other language and culture and therefore to be better prepared for their future work in a multilingual environment.
Abstract

**Purpose:** Student-led learning offers numerous advantages, from a pedagogical point of view, the main advantage is active involvement of the learner as opposed to passive exposure to material. The purpose of the project was to develop student autonomy in learning by placing responsibility for development of learning resources in the hands of students to enable lifelong learning and independent problem-solving. The project also aimed to build active partnerships between staff and students.

**Method:** The Faculty of Medicine Dentistry and Heath curriculum development fund supported this project to enhance student-led development of Orthoptic learning resources. Students were challenged with the task of exploring the effect of nystagmus on daily living and the experience patients have of eye departments, to enable them to provide a resource for other students to promote awareness and improved care. Students and academic staff attended the 2015 Nystagmus Network Open Day. As a team, students identified themes for exploration during the open day. Students were split amongst tables to interact with as many parents, people with nystagmus, clinicians and educationalists as possible. Outcomes of the sessions and experiences were pooled and reflected on to develop learning resources for other Orthoptic students.

**Results:** Student engagement was high in terms of advanced preparation, commitment, selfmotivation, enjoyment, and participation on the day. Student feedback was enthusiastic regarding their interactions with people, family and carers living with nystagmus. The informal, ‘out of clinic’ environment enhanced the learning experience, the insight gained and subject knowledge. Positive comments from Nystagmus Network members were notable, both appreciative for the interest of future clinicians and also upon the accomplished communication and professionalism of student Orthoptists. Information was shared within Google docs to develop two conference posters and an online presentation for peer groups which included narration and animations.

**Conclusion:** The project provided an inspiring and challenging educational experience for students. Service users enhanced the learning process and provided vital information to develop curriculum and teaching resources. The student-led approach created greater confidence and independence in learning and a deeper understanding. It enhanced relationships between students and staff, led to a greater sense of belonging, student satisfaction and social accountability. For a relatively low-cost investment the student-led project resulted in opportunities to build student engagement and the potential for partnerships between students, academic staff and the wider learning community.

**Key words:** student-led, learning and teaching, blended learning, online resources.
**Education on visual impairment for Dutch Orthoptic students**

**Diny van Drunen Msc**  
FG orthoptics  
University of Applied Science Utrecht  
Utrecht, Netherlands  
Department of Orthoptics, University of Applied Sciences Utrecht

**Abstract**

**Purpose:** In the Netherlands orthoptists play an important role in the referral of visually impaired patients to the Low Vision Multidisciplinary Rehabilitation Centres (LV-MRC). In 2004 it was recognized by the two Dutch LV-MRC and several patients’ associations that Dutch orthoptists did not have the proper qualifications to recognize and treat visually impaired patients and refer them to the LV-MRC’s. The Dutch LV-MRC use the International Classification of Functioning, Disability and Health (ICF) model for measuring the degree and impact of the visual disability. The purpose is to prepare students of the Orthoptic department of the University of Applied Sciences Utrecht, to recognize and refer visually impaired patients, using the ICF model.

**Methods:** Together with the Dutch LV-MRC’s, a course has been introduced based on the visually impaired patient which consists of several activities, including: a 1 day visit to a LV-MRC, 12 hours of lectures given by professionals from the LV-MRC’s and writing and presenting a case report of a visually impaired child using the ICF model.

**Results:** By presenting their case reports the orthoptic students show their improved basic knowledge of the clinical picture of patients who are visually impaired and the problems they face in their everyday lives. They are familiar with all the aspects involved in examining and supporting these patients, especially children. They know how to apply the ICF guidelines in the examination of patients who are visually impaired through practical examples.

**Conclusion:** Dutch orthoptists play a major role in the recognition and referral of visually impaired patients. This course provides orthoptic students with the necessary knowledge on the theoretical and practical aspects involved in working with these patients.
Poster D  

**Connecting practice, education, and research**  

Dr Janna Bruijning  
Eye care (Optometry and Orthoptics)  
HU University of Applied Science  
Utrecht, Netherlands  

Abstract  

**Purpose**: Traditionally, bachelor studies (such as Orthoptics and Optometry at the Hogeschool Utrecht (HU)) in the Netherlands were merely educational institutions. Over the last decade, they shifted their focus towards doing practically oriented research as well. By integrating education, research and professional practice, innovations in the professional field will be stimulated. In addition, lecturers, students and professionals will be facilitated in being a reflective practitioner. For this reason, education in Evidence Based Practice (EBP) will be further improved. Moreover, a research program will be developed to build on a body of knowledge.  

**Methods**: The existing education in EBP was evaluated and changed. In addition, in line with recent developments in the professional field and the (Dutch) care system, the Eye care bachelor studies developed a joint research focus and associated research lines. Several brainstorm sessions with Eye care lecturers having a background in doing research (e.g. PhD’s or candidates) were organized for this purpose.  

**Results**: Overall, the EBP courses represent 840 (12,5%) hours of study across 4 years of bachelor education. The EBP courses are integrated in the existing theoretical and practical education. The focus of the EBP education represents research topics such as research questions, literature search, critical appraisal of studies, participating in data collection, applying results in daily practice and to individual patients and ethical concerns. The focus of the Eye care research program was defined as ‘Visual functioning and lifelong participation’. This was divided into four topics: Prevention, Multiple/complex care (in co-morbidity), Optimal visual functioning in demanding tasks and/or with sub-normal vision, and Optimizing patient-centered eye care.  

**Conclusions**: Development of a research focus for the Eye care bachelor studies at the HU, was an important step in connecting all parts of the triangle education, research and professional practice. HU is on its way to become a University of Applied Sciences. In the research program lecturers and students will be involved to participate in doing practically oriented research under supervision of scientific researchers. We expect this to contribute to better professional teachers, more critical students who understand the need of EBP and lifelong learning, innovations in professional practice and a better quality of Eye care in the Netherlands.
Poster E

Evaluation of the use of individualised learning contracts for clinical placement

Joanne Adeoye
Directorate of Orthoptics
University of Liverpool
Liverpool, United Kingdom

Joanne Adeoye, Craig Murray
University of Liverpool

Abstract

Purpose: To evaluate the use of individualised learning contracts (ILC) for clinical placements from multiple perspectives.

Methods: In 2013 the University of Liverpool Orthoptic Undergraduate Placement Objectives system was reviewed. Based on feedback from students, clinical tutors and external examiners a decision was taken to move away from standard set objectives and move towards a more student centred approach to learning. This new system makes use of learning contracts to encourage students to reflect on their strengths and areas for development in order to form individualised objectives that are set and agreed with an academic advisor prior to each placement block. After two full academic years of the learning contracts being in use, feedback was sought from all parties (students, academic staff, and clinical tutors) in the form of questionnaires.

Results: 90% of students, 100% academic staff preferred the new system and felt it enhanced learning and encouraged reflection and ownership. Comments included; ‘teaching is more catered to my needs’ ‘made me more aware of my strengths and weaknesses’ ‘feel more in control of the process’. 62% of clinical tutors preferred the new system. 48% felt it enhanced learning and 61% encouraged reflection and ownership. There were some suggestions made by clinical tutors in relation to communication of objectives in advance of placement and appropriateness of objectives set; ‘students not always good at pinpointing their weaknesses’, ‘would be useful for tutors to have access to reports from previous placements’, ‘ensure objectives are sent through 2-3 weeks in advance of placement’.

Conclusion: The new system has been well received by students, academic staff and the majority of clinical tutors. Further actions identified to enable more effective use of the ILC’s on clinical placement include: improved guidance for students and greater input to objective setting from clinical tutors.
Poster F

Patients as educators: enhancing student skills and curriculum

Gemma Arblaster
Academic Unit of Ophthalmology and Orthoptics Faculty of Medicine, Dentistry and Health, University of Sheffield
University of Sheffield
Sheffield, UK

Gemma Arblaster MSc B Med Sci Orthoptics, Helen Griffiths PhD BSc (Hons) DBO,
Anne Bjerre MSc BSc Orthoptics

Abstract

Purpose: To describe Orthoptic programme enhancements by service user involvement in the se-
lection of potential students, learning, teaching, assessment of students and curriculum review.

Background: During the last decade, UK government policy has called for the involvement of ser-
vice users in healthcare programme curricula. This is in accordance with a drive for greater consumer
participation in health services generally. To date however there are few examples of published re-
search that identifies what service user involvement in Orthoptic education might look like and the
effects of implementing such initiatives.

Method: Service users were trained to be Patients as Educators (PaE), to be involved in student se-
lection, teaching and assessment of undergraduate orthoptic students at the University of Sheffield.
Questionnaires were used following their involvement to inform curriculum review, future assess-
ment and recruitment strategies.

Results: The PaE scheme has enhanced all aspects of the Orthoptic degree programme at the Uni-
versity of Sheffield. The student selection process and learning and teaching experiences have been
strengthened. PaE are also able to contribute to the assessment of students and to curriculum re-
view, ensuring that the course has a strong input from NHS service users.

Conclusion: The PaE scheme ensures that students deepen their understanding of the patient per-
spective and develop desirable attributes for a caring profession.

Key words: Patient as educators, service users, student selection, curriculum, learning and teaching.
Evaluation of an orthoptic undergraduate curriculum to prepare graduates for clinical practice

David Newsham
Orthoptics and Vision Science, University of Liverpool
Liverpool, United Kingdom

Dr David Newsham¹, Dr Simon Watmough²
¹Directorate of Orthoptics and Vision Science, University of Liverpool
²Institute of Learning and Teaching, University of Liverpool

Abstract

Purpose: There has been interest in curriculum evaluation and preparedness for practice in recent years, certainly in medical education which has been widely published. However, there is very little known about the other clinical professions. Allied Health Care Professions (AHCP) in the United Kingdom (UK) are regulated by the Health and Care Professions Council (HCPC). Important functions of the HCPC are to set standards for registrants’ education and training, maintain a register of professionals who meet those standards and approve programmes which professionals must complete in order to register. Although the HCPC sets the standards of proficiency for the professions it regulates; little appears to be known about the relevance of the standards or whether first year graduates are fully prepared to undertake these skills. A large study is therefore being undertaken including many AHCP and involving both graduates and senior clinicians. This abstract will present the first part of this study which aimed to gather views of newly qualified orthoptic graduates regarding their curriculum and the extent to which they felt it had prepared them for clinical practice. It is hoped this work will lead to curricula reform if required and will also be used to assess whether the requirements expected of the HCPC are fit for purpose.

Methods: Following ethical approval, orthoptic graduates from the University of Liverpool (2014 and 2015, n =65) were invited by email to complete an anonymous online questionnaire. The questionnaire adopted a likert scale and initially explored graduate preparedness via an overall question and then in more detail via the HCPC Standards of Proficiency (SOP’s). The questionnaires were approved for content and face validity by several experienced clinicians.

Results: The response rate of completed questionnaires was 37% (n=24), 96% were female and 4% male. All respondents indicated that they were either quite well or very well prepared for practice. In relation to the SOP’s, the majority of respondents agreed/strongly agreed that they had achieved most of the competencies on graduating. The areas where there was less consensus (i.e. some responded neutrally or disagreed) were: able to maintain records appropriately (13% and 8%), be able to assure the quality of your practice (13% and 4%) and understand the principles/techniques used to: examine anterior/posterior segments of the eye (33% and 29%), assess visual fields (13% and 8%) and electrophysiological assessment of visual function and visual pathway (42% and 13%).

Conclusions: This pilot study will be reinforced with data from clinicians working with the graduates/interviews to supplement the questionnaires. The SOP’s were a useful method to determine graduate preparedness for practice. In the majority of areas graduates felt they were well prepared following successful completion of the curriculum. The areas that scored less well related mostly to extended roles of orthoptic practice and consideration needs to be given as to whether knowledge in these areas should be strengthened at undergraduate level or consolidated via postgraduate study/experience.
Abstract

Purpose: At the end of the first year of orthoptic training students already possess the basic skills to assess visual acuity, binocular vision, ocular deviation and motility. They have learned about the importance of early detection of vision and ocular disorders. The aim of the project was to enable the students to develop their competencies in different areas: social and communication, professional, knowledge and orthoptic skills, self-reflexion.

Methods: Together with our students we developed a screening project for children at the age of 3-5 years. The children and parents of a bilingual kindergarten (English-German) were educated about the necessity for early detection of vision and ocular disorders ahead of the project day. The children were invited into clinic where they completed an eye test parcour. The students were involved in all stages of planning and implementation.

Results: Evaluation of this learning experience / teaching project was favourable for future projects. Students took great interest in the planning process and enjoyed the project day with the children. They regarded this experience as fulfilling as did their teachers.

Conclusion: Orthoptic teaching outside of the class-room or traditional clinical setting leaves marks and constitutes a memorable and fulfilling learning and teaching experience.
RAPID FIRE POSTER PRESENTATION 1 (1)
Correlation between Symptomatic Heterophoria and Asthenopic Syndrome

Federica Ristoldo
University of Milan, School of Medicine, Milan, Italy

Sara Bettega, Nicolo' Daniele Ceccarelli,
Hospital "A.O. Luigi Sacco", University of Milan

Abstract

Purpose: the aim of the study is to find a possible correlation between the symptomatic heterophoria and the asthenopic syndrome. The main features, of the heterophoria related asthenopia will be analyzed. In addition the prevalence of pure and mixed symptomatic heterophoria and the related symptoms will be described. Possible visuomotorial and visuosensorial indexes that could help in improving the classification of these forms, identifying their causative agents and the eventual treatment will be searched.

Material and methods: 115 subject between 20 and 35 years of age were enrolled in the study. Among them 15 were excluded after preliminary examination because they did not entirely match the inclusion criteria. The remaining 100 subjects were divided into two groups: symptomatic (Cases) and asymptomatic (Controls). Each subject underwent a single examination including: an accurate anamnestic interview mainly focused on the typical asthenopic symptoms, a best correct visual acuity test and a complete orthoptic exam. The following indexes were evaluated: near and far heterophoria measurements, negative and positive fusional amplitudes (near and far), near point of convergence and amplitude of accommodation.

Results: Mean age was 25.70 SD 4.36 in cases group and 24.60 SD 3.62. Amplitude of accommodation was significantly lower in symptomatic subjects as compared to controls (p<0.001). A statistically significant difference was found in near and far fusional amplitude (both p<0.001) between cases and control with cases showing the lowest values. Similarly the far relative convergence, near relative positive vergences were significantly lower in symptomatic subjects (both p<0.001). Finally near point of convergence resulted significantly lower in symptomatic population (p<0.001).

Conclusions: According to our datas, asthenopia is a complex condition with multiple etiopathogenetics factors. In symptomatic heterophoria related asthenopia a single analysis of fusional amplitude values or heterophoria measurements is not enough to explain the symptoms. Only a joined analysis of the fusional amplitude and the heterophoria can explain the subject symptomatic condition. The more significant indexes for the identification of the asthenopia causative agent resulted: the near point of convergence and the symptomatic heterophoria in particular, focusing on the near positive relative convergence value.
**Abstract**

**Purpose:** To establish whether there is a difference in strength of binocular function between regular players of a multiplayer online battle arena (MOBA) game, and those who infrequently play video games. If a relationship did exist between frequent videogame play and strength of binocular single vision, it would have important implications for any research evaluating dichoptic viewing modalities for perceptual learning training in amblyopia.

**Methods:** Players of a MOBA game (League of Legends) aged 18-30, who played >5 hours a week were recruited from a local social media community for the game. Individuals who played video games <5 hours a week (non-video game players, NVGPs) were recruited from the staff and student population of Glasgow Caledonian University. Inclusion criteria for both groups were corrected monocular visual acuity ≤0.200 logMAR in each eye, interocular acuity difference < 0.200 logMAR Frisby stereoacuity ≤ 20” arc and fusional amplitudes ≥20BO and ≥10BI. All participants underwent measurement of uniocular visual acuity (VA) with Thompson 2000 logMAR test chart at 5m, prism fusion amplitudes at 33cm and 5m, and Frisby and TNO stereoacuity. Frisby stereoacuity values were manually calculated by recording threshold test distance, plate thickness and interpupillary distance. Participants were also tested using a computerised random dot stereogram program written in MATLAB, which tested dichoptic stereoacuity thresholds using an adaptive staircase method.

**Results:** 10 MOBA players (mean age = 22.2 ± 3.4 years) and 16 visually normal individuals (mean age = 25.4 ± 3.0 years) were recruited. MOBA players had better near positive (base out) fusional amplitudes than NVGPs (p = 0.01, Z = -2.58; MOBA players median = 45Δ, IQR = 18.75Δ; NVGPs median = 37.5Δ, IQR = 12.5Δ). However, NVGPs had better near negative fusional amplitudes (p = 0.003, Z = -3.01; MOBA players median = 13Δ, IQR = 4Δ; NVGPs median = 18Δ, IQR = 2Δ). There were no significant differences between the groups in uniocular VA, distance fusional amplitudes or stereoacuity.

**Conclusions:** There are differences between regular MOBA players and NVGPs in fusional amplitudes. Studies evaluating dichoptic perceptual learning modalities for improving binocular function in amblyopia should consider this potential source of elevated fusional amplitudes. Future research could focus on changes in binocular function when introducing a group of NVGPs to a MOBA.
POSTER 3
The “8 Diopter Base – in Test” for Microstrabismus

Andrea C. Piantanida
Centro Oculistico Lariano
Pediatric Ophthalmology
Cernobbio – Como, Italy

Ms. Orth. Roberta Nobili, Ms. Orth. Manuela Spera, Ms. Orth. Giulia Gerosa
Centro Oculistico Lariano Italy

Abstract

Purpose: The diagnosis of microesotropia is considered one of the most difficult to obtain. Cover and uncover test is considered one of the gold standard tests in the diagnosis of heterotropic patients, but even in this test there are some limitations: poor patient cooperation, small angle deviation, amblyopia, eccentric fixation, nystagmus. To overcome these difficulties, during the 80’s it has been described in the literature by G.P. Paliaga and co-workers the “8 diopter base-in test”. The authors stress the importance of the “8 diopters base-in test” (Paliaga test) that seems to be forgotten in the ophthalmic literature of these last years.

Methods: We have considered 415 patients whose age ranged from 1 to 18 years (mean age 7,75 yrs., median age 7 yrs.) suspected to be microesotropic. We have positioned an 8 diopter base-in prism in front of the suspected non dominant eye and we have observed the different movements obtained. We founded three different clinical situations caused by the prism: “normometric divergence”, “no movements” and “paradoxic convergence”. All the patients underwent a complete orthoptic and ophthalmological examination. Among those considered normal all turned out to be actually orthotropic on cover test (unilateral and alternate), and had stereopsis on the Lang 1 stereotest. Among the patients suspected to be microesotropic, we found in all but one an esodeviation under 2 degrees on the gold standard test.

Results: Using the 8 diopter base-in test we found 354 (85,3%) patients orthotropic (negative at the test) and 61 (14,7%) microesotropic (positive at the test). We found a specificity of 99,7% and a sensitivity of 98,3%. We also calculated the positive predictive value (98%) and the negative predictive value (99%) of the test. The likelihood ratio of the test was 98 confirming the high validity of this diagnostic test.

Conclusions: We highly recommend the use of Paliaga 8 prism diopters base-in test, where the cover test may give unreliable results in the diagnosis of microesotropia. According to the results referred by the literature and confirmed in our work we can reasonably point out the high efficacy of this test in daily practice to detect microesodeviation. We stress the importance of having a simple and reliable test especially in young children and in those clinical conditions where it appears very troublesome to get correct informations on the status of the eyes in primary position.
Could Modifying the Bagolini Glasses Improve the Reliability of Responses?

Anna R O’Connor
University of Liverpool
Liverpool, UK

Ashli Milling, Laurence P. Tidbury

Abstract

**Purpose:** Bagolini Glasses are used to determine the state of binocularity, or identify the presence of suppression, which is important in a range of patients. While the test is simple to undertake, the responses (in particular from young children) can be variable and difficult to interpret. We created, therefore, some modified versions, with coloured lenses (one red, one blue) and varying widths of striations and compared them to the original Bagolini Glasses to evaluate the responses.

**Methods:** A series of glasses were created, with the striations created by laser. Three widths of striations were created in clear, transparent red and transparent blue plastic. In addition, the original Bagolini Glasses were used with and without the addition of blue and red filters. Subjects were asked to report what they saw through each set of lenses (no prompts given as to what to expect), followed up with specific questions on how many lines they could see and estimate their length. The test order was randomised with a standard bright light source in a darkened room. All testing was conducted with the subjects’ habitual correction in place.

**Results:** 41 adult subjects were assessed. Visual acuity ranged from -0.18 to 1.10 logMAR, with 7 subjects with an interocular acuity difference of greater than 0.2 logMAR. The addition of red/blue filters to the original Bagolini Glasses did not alter the rates of subjects perceiving a cross (chi-square, p=0.8). Comparisons of the number of lines seen when varying the line thickness did not vary between coloured and clear lenses (Chi-square 1.36, p=0.7). The laser cut lenses produced a significantly shorter light streak than the original lenses (p<0.001), but the colour of the filters made no difference to the length of streak perceived (p>0.20).

**Conclusions:** The addition of blue and red filters did not impact on the responses given, suggesting that this modification may be beneficial to clinical testing. However, the lines perceived through the laser cut lenses were significantly shorter, even in a dark room. This may be due to the density of the striations created by the laser or reduced light transmission through the slightly thicker lenses. Further evaluation is required with finer striations to allow greater transmission of light.
POSTER 5

The Prognosis for Binocular Vision in Two Cases of Acquired Non-Accommodative Esotropia

Chloe Lafferty
Moorfields Eye Hospital
Orthoptic Department
London, UK

Chloe Lafferty, Joanne Hancox

Abstract

Purpose: We discuss the treatment and outcome of two patients with acquired non-accommodative esotropia who regained their binocular single vision (BSV) a significant period of time after treatment.

Methods: We reviewed paediatric case notes retrospectively from January 2014 to October 2015 to identify cases of acquired non-accommodative esotropia.

Results: Two patients were identified with acquired non-accommodative esotropia, who after a significant period of time (30-36 months), regained their binocular single vision. Both patients underwent botulinum toxin to bilateral medial recti, which resulted in a reduced angle but no demonstrable BSV. Both patients then underwent squint surgery. At their initial post-operative appointment neither patient had demonstrable BSV but by 6 months and 14 months respectively (post-operatively) both patients had BSV.

Conclusions: The prognosis to regain binocular single vision, even after a significant time can be good in patients with acquired non-accommodative esotropia.

We have no financial interests to declare.
Abstract

Introduction: Visual symptoms associated with reading are common in struggling readers, however, they are not diagnostic indicators of dyslexia.

Methods: A pilot study, determining the visual competencies of 58 adult learners attending literacy classes was carried out. A large proportion (56) had difficulties with both motor and perceptual aspects of vision. The pilot was extended to include a total of 108 learners.

Results: Out of 108 learners tested, one or more visual problems out of a possible 7 categories were identified in 107 learners, including low vision, poor binocular vision (such as convergence and accommodation insufficiency, ocular motor dysfunction) and visual perceptual dysfunction (Visual Stress and poor Visual Perception) suggesting difficulties with basic and higher level visual processes. The majority of visual problems were unlikely to be detected during a routine eye test where emphasis is placed on the need for glasses and ocular health. Seventy eight pairs of glasses were prescribed to correct the range of visual problems found in addition to fifty six receiving binocular vision exercises and all learners receiving visual perceptual training using computer software.

Conclusions: The visual problems were likely to have been significant barriers to learning to read, in that they would preclude a learner from accessing small font sizes, could result in headaches and significant visual discomfort when reading and would interfere with seeing words accurately. These difficulties also impair motivation to read. Intervention and correction of these visual deficits has resulted in a significant increase in reading skills for those receiving treatment, with the average increase in reading equating to one reading level. An initial improvement in reading was noted after 3 months of visual correction but a sustained improvement was seen in those evaluated up to 12 months after visual treatment had been instigated. Improvement in literacy was seen even in those who were no longer receiving literacy tuition, implying that visual correction on its own can have a positive impact on literacy.
Tuesday 28 June 2016

Theme block #2: Binocular Vision / Stereopsis

POSTER 7
Which test for a Fast and Reliable Screening of Stereoscopy: Lang I vs pocket Frisby vs Titmus (Wirt)

Benoît Rousseau
Institut Mutualiste Montsouris
Ophthalmology
Paris, France

Benoît Rousseau, Clémence Athéna Lalouette

Abstract

Purpose: The revealing of stereopsis is one of the fastest and most reliable ways to confirm a normal sensory status, in cases of oculomotor imbalance. The aim of our study is to find which stereoscopic test is the most satisfying tool.

Methods: Considering a population of 15 adults, all presenting with a small angle esotropia (ET< or = to 8pd), a visual iso-acuity and abnormal retinal correspondence, have been presented randomly with these 3 stereotests: Lang I, Pocket Frisby and Titmus Test. Concerning the Lang I and Pocket Frisby, it has been established that the pointing out or naming of one of the stereograms (or stereoscopic figures) of the stereotests are considered as a “positive response answer”, whereas for the Titmus, the subject must locate (or identify) one or more stereoscopic pins.

Results: For the Lang I: no positive answers. For the Pocket Frisby: 5 positive answers. And for the Titmus test (Wirt): 11 positive answers.

Conclusion: The Titmus, a contour stereotest, is not a good screening test of neither stereopsis nor sensory state. Too many abnormal subjects are able to provide responses considered as normal/positive. The Pocket Frisby presents higher performances, however, it remains a too loose-knit net. Amongst these 3 stereotests, only the Lang I does not allow any abnormal subjects to locate the stereoscopic displays and can therefore be considered as a satisfying/good screening test.
RAPID FIRE POSTER PRESENTATION 1 (8)

Comparative study of Stereopsis with 3 different tests: TNO® Stereoscopic Acuity Test, Fly® and StereoTAB® in students in Higher School

Ilda Maria Poças
Escola Superior de Tecnologia da Saúde de Lisboa De Ciências e Tecnologias de Reabilitação lote Lisboa, Portugal

Rúben Morais; Ilda Maria Poças; Ana Miguel; Denise Monteiro; Cleide Cassandra

Abstract

**Purpose:** Stereopsis is the perception of depth based on retinal disparity. Global stereopsis depends on the process of random dot stimuli and local stereopsis depends on contour perception. The aim of this study was to correlate 3 stereopsis tests: TNO®, StereoTAB®, and Fly Stereoscopic Acuity Test® and to study the sensitivity and correlation between them, using TNO® as the gold standard. Other variables as near convergence point, vergences, symptoms and optical correction were correlated with the 3 tests.

**Materials and Methods:** Forty-nine students from Escola Superior de Tecnologia da Saúde de Lisboa (ESTeSL), aged 18-26 years old were included.

**Results:** The stereopsis mean (standard-deviation-SD) values in each test were: TNO® = 87.04° ±84.09°; FlyTest® = 38.18° ±34.59°; StereoTAB® = 124.89° ±137.38°. About the coefficient of determination: TNO® and StereoTAB® with $r^2 = 0.6$ and TNO® and FlyTest® with $r^2 = 0.2$. Pearson correlation coefficient shows a positive correlation between TNO® and StereoTAB® ($r = 0.784$ with $\alpha = 0.01$). Phi coefficient shows a strong and positive association between TNO® and StereoTAB® ($\Phi = 0.848$ with $\alpha = 0.01$). In the ROC Curve, the StereoTAB® has an area under the curve bigger than the FlyTest® with a sensitivity of 92.3% for 94.4% of specificity, so it means that the test is sensitive with a good discriminative power.

**Conclusion:** We conclude that the use of Stereopsis tests to study global Stereopsis are an asset for clinical use. This type of test is more sensitive, revealing changes in Stereopsis when it is actually changed, unlike the test Stereopsis, which often indicates normal Stereopsis, camouflaging a Stereopsis change. We noted also that the StereoTAB® is very sensitive and despite being a digital application, possessed good correlation with the TNO®.
**RAPID FIRE POSTER PRESENTATION 2 (9)**

**Stereopsis and Professional Football Players**

**Anna Barducco**  
Orthoptic and Ophthalmologic Assistance Course, University of Ferrara, St. Anna Hospital  
Department of Biomedical and Specialty Surgical Sciences  
Ferrara, Italy

**Perri Piera, Borghi Federica, Mancioppi Silvia**  
Orthoptics and Ophthalmologic Assistance Course, Department of Biomedical and Specialty Surgical Sciences, University of Ferrara, Italy.

**Abstract**

**Purpose:** Stereopsis is the most important visual skill in sport activities because the perception of depth is the unique condition for the evaluation of the surrounding temporal-space relations. The Orthoptist/assistant in Ophthalmology can support the Sport’s Doctor in the evaluation of visual skills in professional athletes. Stereopsis (static and dynamic) is fundamental in sports such as football. For this reason we decided to compare the near static stereopsis between two groups belonging to the same cross-section (118 subjects). The clinical trial started in March 2013 and finished in September 2013.

**Methods:** Cross-section choice (118 subjects):  
Group A: 59 professional football players who played in the Italian football championship for the year 2013/2014;  
Group B: 59 students of the University of Ferrara who did not play any sports and were chosen randomly.  
Cross-section inclusion/exclusion standard: age ≤ 36 years old, refractive error ≤ -2D sphere or ≤ +1.50D sphere with max +1/-1D cylinder and without any evident strabismus forms.  
The whole cross-section has been provided with TNO stereopsis Test.  
Before the real test, a simulation-test on 5 volunteers, to choose the execution time, was performed. In the end all the information was collected and analyzed by the Chi-square test.

**Results:** The static stereopsis value of the cross-section and the Chi-square test analysis have given significant results. The lowest difference disparity, which means a range of 30-15 arcsecs at TNO test was perceived by 78% in Group A (46 subjects) instead of 27% in Group B (16 subjects); the Chi-square test results were statistically and clinically significant (p-value < 0.001).

**Conclusion:** The results have shown a better perception of depth in professional football players (Group A) versus non athletic young men (Group B), in the future an analysis of dynamic stereopsis, as the literature suggests, could be interesting. Unfortunately in Italy the Orthoptist/assistant in Ophthalmology is not involved in the sporting-medical team, but in light of what the clinical trial has shown we hope that this assessment can be included and help to improve the sport performance with the evaluation and visual training technique.
Tuesday 28 June 2016

Theme block #3: Myopia & it’s Complications

RAPID FIRE POSTER PRESENTATION 1 (10)

Unilateral High Myopia

Yvette Braaksma-Besselink
AMC (Academic Medical Centre)
Ophthalmology / orthoptics
Amsterdam, The Netherlands

Abstract

Purpose: To clarify and present possible mechanisms of unilateral high myopia illustrated on the basis of a series of patients in light of existing literature with emphasis on the clinical relevance of these conclusions.

Methods: Patient records between 2007 and 2015 were reviewed retrospectively. Orthoptic patients of all ages with unilateral high myopia and anisometropia of at least 3dpt were included. A literature review was performed to examine existing theories regarding the cause of unilateral high myopia.

Results: 24 patient records were identified (aged 3 years to 18 years; mean age 11.4 years) The mean anisometropia was 8.25dpt (SD±3.2) Visual acuity of the most affected (myopic) eye ranged from LP+ to 0.5(Snellen) and refractive error from S-4.0 to S-20.0. In 7/24 (29%) ocular pathology was identified. 9/24(38%) showed strabismus and 10(42%) were anisometropic.

Conclusion: Four possible mechanisms are identified as a potential cause of high unilateral myopia in the patient group. At a time in which myopia is a frequently visited topic, one can conclude that the collected knowledge with regard to cause, treatment and prognosis can be applied to the more uncommon condition of patients with unilateral high myopia where, unfortunately, the visual prognosis remains very variable.
RAPID FIRE POSTER PRESENTATION 2 (11)

Post-Operative Hypertropia after Esotropia Surgery in High Myopia

Vanessa Sebag
Ophtalmological clinic
Orthoptie
Paris, France

Vanessa Sebag, Aline Kostas, Mitra Goberville, Michele Leite

Abstract

Purpose: Over the last fifteen years, the understanding of the pathophysiology of esotropia in high myopia has allowed the adaptation of surgical techniques plus a clear improvement of results with increased stability and few undesirables effects. However, the occurrence of postoperative marked hypertropia may, in rare cases, and hinder the result of this surgery. The mechanisms for the appearance of this hypertropia are not yet well known and its management is not defined.

Methods: A retrospective study of the records of 35 patients, operated on for esotropia associated with high myopia, between 2003 and 2011 was conducted. The horizontal and vertical deviation pre- and postoperatively were evaluated. The cases with hypertropia after surgery were analyzed

Results: There were 7 men and 28 women. The average age was 56 years. In 27 cases a raising of the lateral rectus surgery was performed according to the Kaufmann technique. In 8 cases the technique to unite the lateral rectus and superior rectus, or “looping” according Yokoyama, was used. High myopia was unilateral in 10 cases and bilateral in 25 cases. The operated eye had amblyopia in 28 cases. The average follow-up was 1 year and 10 months. The average preoperative horizontal deviation was 52 Dioptres. The average preoperative hypotropia was 19 diopters. Postoperatively the average horizontal deviation was 16 diopters. The average post operative hypotropia was 8 diopters but in 4 cases a major hypertropia appeared (2 cases following surgery of “looping” and 2 cases after raising lateral rectus). In 4 cases moderate hypertropia was noted. In all cases with a hypertropia, myopia was bilateral and/or preoperative hypotropia was minimal.

Conclusion: The new surgical techniques used to treat esotropia in high myopia give excellent results and have improved the prognosis of the hypertropia, which previously recurred almost always. However, we must be vigilant as to how we quantify our technique that is not yet well established, especially when bilateral high myopia is at risk of developing a functionally disabling and sometimes aesthetically unsightly postoperatively. A second surgery after these interventions, particularly after fixing the lateral rectus and superior rectus, can be very complicated.
POSTER 12

Changes Over Time in UCVA in Ogasawara Islands

Misae Ito
Kitasato University
Orthoptics and Visual Science
Sagamihara, Kanagawa, Japan

Misae Ito, Kimiya Shimizu, Takushi Kawamorita, Nobuyuki Shoji

Abstract

Purpose: Recent reports indicate that the rates of myopic patients are rising worldwide. The Ogasawara Islands are situated in the Pacific Ocean, approximately 1,000 km south-southeast from specified districts in Tokyo Metropolis. The only method of transportation to Ogasawara Islands is an ocean liner that departs once every six days and takes 25.5 hours for a one-way journey. This study examined changes in uncorrected visual acuity (UCVA) in individuals who spent their nine years of compulsory education in Ogasawara Village, Tokyo, Japan and explored environmental factors for myopia progression.

Methods: Ogasawara Village is an area where influx and efflux of people occur, therefore, we selected 333 individuals (males: 173, females: 160) who spent nine years continuously in Ogasawara Village from their junior through junior high school education. We divided them into two groups (before and after 1996, when overland television broadcasting was introduced), and investigated changes comparatively in UCVA over time.

Results: The proportion of individuals with UCVA of <0.0 logMAR was higher in the 1996-onward group than the pre-1996 group, with a clear increase in individuals with poor UCVA from 1996 onwards. For all grades, the proportion of individuals with UCVA of <0.15 logMAR was higher in females than males. In the pre-1996 group, the proportion of individuals with UCVA of <0.15 logMAR in the first year of junior high school was 0% (0/179), whereas this figure was 27% (41/154) in the 1996-onward group.

Conclusions: Progression of myopia during school years (late onset myopia) is often low myopia, which is more heavily affected by environmental factors than genetic factors. As most of the individuals from Ogasawara Village with worsening of UCVA appear to reflect myopia progression, it appears that the introduction of overland television broadcasting in 1996, the simultaneous spread of televisions to each household, the popularization of mobile phones and smartphones, decreased time spent on outdoor activities by children, and longer periods time spent on near work might be environmental factors related to myopia progression.
POSTER 13
Orthoptists’ Work During Scleral Lens and Orthokeratology Lens Adaptations

Céline Liria
Private Practice
Ophthalmology
Strasbourg, France

Aurélie Mounot

Abstract

Purpose: Scleral lenses and large diameter rigid gas permeable contact lenses are recommended for irregular cornea, including eyes with keratoconus, hard-to-fit eyes and dry eyes. This is due to their studied design to vault above the corneal surface and rest on the less sensitive surface of the sclera.

Overnight orthokeratology lenses are a technique that uses reverse-geometry rigid contact lenses to flatten the central corneal curvature and reduce the corneal eccentricity. The goal is to allow the myopic patient with or without with-the-rule astigmatism, to be free of glasses during the day.

Methods: We present a poster to promote these special lenses, and the work of orthoptists in their fitting and follow-up care, according to the patients’ needs. We illustrate our poster with pictures and diagrams.

Conclusion: Orthoptists work in partnership with ophthalmologists for the fitting of these special contact lenses, achieving improved visual acuity and corneal topographies.
POSTER 14

Yokoyama Procedure in Highly Myopic Strabismus

Elsbeth Voskuil-Kerkhof
UMC Utrecht
Ophthalmology
Utrecht, the Netherlands

Abstract

Purpose: To investigate the surgical outcomes of patients with high myopia (> -18) with esotropia, hypotropia and diplopia who underwent a re-union of the muscle bellies of the superior rectus muscle and the lateral rectus muscle.

Methods: Retrospective evaluation of the records of 7 patients with high myopia (-18 - -24) and esotropia, hypotropia and diplopia who underwent a unilateral or bilateral Yokoyama procedure in our clinic.

Results: From January 2011 until May 2015 7 patients (9 eyes) underwent a Yokoyama procedure. We collected data retrospectively of squint pre- and postoperatively; a few patients had a MRI scan of the orbit.
All patients had improvement in elevation and abduction.
6 patients had a reduction of esotropia; in 3 cases an additional recession of the medial rectus muscle was necessary.
3 patients had a reduction of the vertical squint, however, in 2 patients the vertical deviation was overcorrected. In those cases an additional inferior rectus muscle recession of the fellow eye was necessary.
Whereas some needed additional strabismus surgery, 4 patients had good binocular single vision, 3 were still slightly esotropic, but were satisfied with the result.

Conclusions: Muscle union surgery seems to be an effective method for restoring the dislocated globe back into the muscle cone in patients with highly myopic strabismus. Additional recession of the medial rectus muscle may be necessary. MRI can be helpful to prove the diagnosis.
Tuesday 28 June 2016

Theme block #4: CVI & Low Vision

RAPID FIRE POSTER PRESENTATION 1 (15)
CVIT 3-6, a screening test for cerebral visual impairment in young children

Kathleen Vancleef
Newcastle University, Institute of Neuroscience
Newcastle-upon-Tyne, United Kingdom

Dr Kathleen Vancleef PhD\textsuperscript{1,2}, Yasmine Petre MSc\textsuperscript{1}, Eva Janssens MSc\textsuperscript{1}, Silke Bäumer MSc\textsuperscript{1}, Prof Els Ortibus PhD, MD\textsuperscript{1}
\textsuperscript{1}University of Leuven, \textsuperscript{2}Newcastle University

Abstract

\textbf{Purpose:} The lack of specific tests for Cerebral Visual Impairment (CVI) makes diagnosis complex. Test results are sometimes confounded by comorbid cognitive or motor difficulties, and available tests are often too complex for young children. To address these problems, we developed the Cerebral Visual Impairment Test for 3 to 6 year olds (CVIT 3-6) focussing on object recognition, degraded object recognition, motion perception and local-global processing.

\textbf{Methods:} Normative data were collected from 348 children without visual and developmental disorders. Validity and reliability was evaluated in children with CVI, intellectual impairment, or with a typical development. We determined test-retest reliability and Cronbach’s alpha. Confirmatory factor analysis was performed to assess internal validity. Convergent and discriminant validity was assessed by correlating CVIT 3-6 performance with other measures of visual functions, visual acuity, intelligence (IQ) and autism. In addition, we compared performance between validation groups.

\textbf{Results:} Cut-off scores for normal visual perception for the total score on CVIT 3-6 and for the 4 sub-scale scores were determined based on our normative data sample. Multiple regression indicated CVIT 3-6 scores increased with age for children born at 35 weeks gestational age or later. Cronbach’s alpha in our normative data sample was .65 and test-retest reliability in our validation groups was .80. The confirmatory factor analysis confirmed the hypothesized internal structure of CVIT 3-6. We found a non-significant correlation between CVIT 3-6 performance and performance on a visual-motor integration task, probably related to the motor component of the second task. A high correlation was observed between CVIT 3-6 and scores on L94, a visual perception battery. Autistic traits were not correlated to CVIT 3-6 performance. Significant correlations were found between CVIT 3-6 scores and visual acuity or IQ. The correlation with IQ is probably mediated by the visual nature of test materials, because we observed a significantly better score on CVIT 3-6 for children with an intellectual impairment compared with CVI children.

\textbf{Conclusions:} We developed a screening test for mid- and high level visual functions in CVI. Factor analysis confirmed the test measures four domains of visual functions. Age-dependent normative data are available for 348 children. We observed good reliability of CVIT 3-6 and validity research showed satisfying results.

\textbf{Key words:} Cerebral Visual Impairment, diagnosis, test development, mid-level vision, high-level vision
Rapid Fire Poster Presentation 2 (16)

A 10-Year Review of Patient Outcomes from a Neurorehabilitation Orthoptic Assessment Service

Jennifer Earl
Newcastle Eye Centre, Royal Victoria Infirmary Orthoptics Orthoptics Department, Level 2 Claremont Wing, Royal Victoria Infirmary Newcastle Upon Tyne, UK

Jennifer Earl, Kate Taylor, Tina Sharma, Margaret Dayan

Abstract

**Purpose:** A 10 year review to look at outcomes of patients referred to the Newcastle Eye Centre at Royal Victoria Infirmary (RVI) from Walkergate Park Hospital from 01/04/2005- 31/03/2015. Walkergate Park Centre for Neurorehabilitation is a service for patients with a disability caused by injury or disease affecting the brain, spinal cord or muscles. All new patients are offered an orthoptic vision and ocular motility assessment upon admittance to the centre. We are reviewing this service to look at numbers of patients seen, referral rate, the outcomes of those referred, length of treatment/follow-up, attendance rate and type of treatment issued.

**Methods:** We undertook a retrospective case notes review using the hospital database to review patient’s appointments, treatment given and outcomes.

**Results:** 521 patients were seen by the Orthoptic screening programme at Walkergate Park Hospital over this 10 year period. 326 (62.57%) were referred to Newcastle eye centre at RVI for further assessment and treatment. (Figures may change due to ongoing data collection). We report the diagnoses, treatments and outcomes for these complex patients.

**Conclusion:** The incidence of visual disability in patients with brain injuries is high and many of these patients are unable to communicate their visual disability. Orthoptic screening of these patients on admission allows identification and management of their visual disability. Close communication with the rehabilitation team allows this information to be used in their rehabilitation planning.
Rehabilitation of Visual disorders after Acquired Brain Injury: A Multidisciplinary approach

Edith van Schoot
Royal Dutch Visio
Regional Centre Nijmegen
Nijmegen, the Netherlands

Abstract

**Purpose:** Visual disorders after acquired brain injury are often described in the literature. These include eye alignment/movement impairment, reduced visual acuity, visual field impairment and perceptual difficulties. Visual complaints include blurred vision, diplopia, reading difficulties, fatigue, mobility problems, difficulty in object or face identification and problems with depth or space perception. Insight in patient’s visual deficits is necessary to understand the reported visual problems in daily functioning, to set relevant rehabilitation goals and choose specific compensation strategies.

**Methods:** Royal Dutch Visio Nijmegen developed a multidisciplinary assessment for patients with visual problems due to acquired brain injury. All patients are examined by the orthoptist, the neuropsychologist and the occupational therapist. If needed, also an ophthalmic examination is performed. Relevant medical data is obtained from the hospital.

For this patient group orthoptic examination includes: ocular alignment and motility, fixation, smooth pursuit, saccades, fusional vergence, accommodation, binocular vision, stereopsis, lid and pupil function. In addition, visual functions such as acuity, reading acuity, crowding, contrast sensitivity, glare sensitivity, colour vision and visual field are examined. Finally, low vision aids are prescribed if needed. A neuropsychological screening is performed to detect impairment in visual perception: visual perception of objects and faces, discrimination of size, hue and shape, visuospatial perception and simultaneous perception are assessed. If needed, a more profound neuropsychological assessment is conducted. The occupational therapist examines the impact of visual impairment on daily activities such as reading, mobility, ADL, computer and home lighting. The therapist also relates the assessed visual disorders to the reported problems in daily life. Rehabilitation includes training compensation strategies.

**Results:** Over the past seven years, we used this multidisciplinary assessment in a large group of patients with acquired brain injury. Our opinion is that this approach proved to be very successful in practical visual rehabilitation. The contribution of each individual professional appeared to be essential. A case study is used to illustrate the importance of multidisciplinary assessment in visual rehabilitation.

**Conclusion:** A multidisciplinary approach of visual impairment is essential to get the full spectrum of visual functioning after acquired brain injury. It provides insight into the visual problems, helps to choose relevant rehabilitation strategies and to set realistic goals in daily life.
POSTER 18
Profile of Visual Impairment in Children Requiring Special Needs Education

Annette Dillon
Central Manchester Hospitals NHS Trust, Longsight Health Centre
Orthoptics
Manchester, UK

Abstract

Purpose: Visual impairment is common in children who have special needs. The aim of this study is to assess all children attending a specialist school to profile their background conditions, types of visual impairment and therapy options.

Methods: All children attending one special school were assessed over the 2015 calendar year. Consent for assessment was obtained from parents/guardians. All were assessed whilst in school. The visual assessment captured results of refraction, visual acuity, ocular alignment and motility, visual field, functional ability and attention. Parental and school staff observations were also captured. The range of therapy options used were recorded.

Results: 76 children were reviewed: mean age 11.2 years (SD 4.6). There were 54 males and 25 females. General conditions resulting in special school attendance included autistic spectrum disorder, cerebral palsy, learning difficulties (moderate and severe), Down syndrome and complex syndromes. Autism and learning difficulties were most frequently noted. On assessment, 48 children achieved a functional observation of vision; the remainder could achieve single or linear visual acuity testing. Staff and parent feedback contributed to functional visual assessment with information about the child’s preferred viewing gaze and distance. Manifest strabismus was present in 21 children and nystagmus in ten. Thirteen children (17%) had entirely normal results on visual assessment. Cerebral visual impairment was formally diagnosed in 18 children. Glasses formed the mainstay of treatment (80%). Six children were registered as partially sighted. One child was registered blind. Visual stimulation was provided to ten children to promote hand-eye coordination and strategies to maximise use of residual visual function.

Conclusions: Visual assessment in school encourages better engagement as the children are in a safe familiar environment. A wide range of background conditions resulted in the need for special education. A high prevalence of visual impairment was noted (73%), most commonly reduced visual acuity and strabismus. Therapy options were provided, but were specifically targeted to the individual child’s needs. Feedback to staff and carers is vital so that visual function can be maximised in daily activities.
POSTER 19
The CVI experience

Florine Pilon
Bartimeus Institute for the Visually impaired
Diagnostic Department
Zeist, the Netherlands

Marjoke Dekker

Abstract

Purpose: At Bartiméus, we diagnose a large number of children and adults with cerebral visual impairment (CVI). Subsequently we explain this diagnosis to parents, carekeepers and professionals. We noticed that verbal information alone gives limited insight into the complexity and impact of CVI. Therefore, we developed a complementary method for information transmission, in order to improve the understanding of the problems that a person with CVI may experience.

Methods: We developed a method (CVI Experience) based on literature and experiences to improve the illustration of the problems that children and adults with CVI may encounter.

Results: CVI Experience contains several tests of the following problems and areas: form and face recognition, visual attention and visual selection, depth and motion perception, route finding and visually controlled locomotion.

Conclusions: The use of The CVI Experience is a way to raise awareness among parents, carekeepers and professionals to improve understanding of the limitation faced by children and adults with CVI in daily life. This experimental tool has already been used during several CVI courses. The results of questionnaires, used to measure effectiveness, are being processed.
Wednesday 29 June 2016

Theme block #5: Neuro-ophthalmology

POSTER 20

Ocular motility dysfunction in patients with meningiomas

Gill Roper-Hall
Saint Louis University
Ophthalmology
St. Louis, Missouri, USA

Abstract

Purpose: Menigiomas are slow-growing, usually benign tumors that account for twenty-seven percent of all primary brain tumors. They arise from the meninges and can occur anywhere in the brain or spinal cord, a common location (20 percent) being the sphenoid wing. In many cases the presence of the lesion is unknown or is asymptomatic. To conduct a retrospective chart review to evaluate the ocular signs and symptoms of patients seen in the Department of Ophthalmology at [institution] between 2002 and 2015 with a diagnosis of meningioma.

Methods: Exclusion criteria were previous strabismus, strabismus surgery or unilateral loss of vision. Evaluation included visual acuity and visual field testing, ocular motility, exophthalmometry and a dilated fundus examination. A subset of patients with meningioma and diplopia was studied further to determine the type of ocular deviation present and the mechanism causing the diplopia. The study was conducted with HIPAA compliance and in accordance with the Institutional Review Board requirements for our institution.

Results: One hundred and seventeen patients with meningioma seen at our institution between 2002 and 2015 were identified. There were 99 females and 18 males with an age range of 30 to 82 (mean 55) Thirty-three patients were found to have normal neuro-ophthalmologic examinations, and one had functional vision loss. Forty-eight patients had decreased vision or visual field loss and the remaining 35 patients had ocular motility dysfunction, including diplopia. The patients with motility disorders were further studied. The age range and gender distribution was similar to the total group (age 37 to 79; 30 females and 5 males.) Four patients with meningioma had eye movement findings without diplopia including nystagmus, abnormal pursuit, and square-wave jerks. Four further cases were excluded due to insufficient information.

Data for the remaining 27 cases showed that cranial nerve involvement was the most common cause for diplopia (22 of 27.) Ten patients had VI nerve palsy; 5 patients had III nerve palsy; only one patient had IV nerve palsy. Four patients had combined III and VI nerve palsies; two had involvement of the III, IV and VI nerves. A few patients had additional involvement of other nerves (II, V, VII, VIII), two had ocular neuromyotonia and one had an associated Horner syndrome. The remaining five patients had sensory exotropia from visual field defects (2), convergence insufficiency (1), proptosis (1) and recurrent cranial neuropathies from unrelated polyneuritis (1).

Conclusions: Although 90 percent of meningiomas are benign they can have damaging effects on the ocular structures affecting vision and eye movements. Patients develop visual field defects or vision loss from optic nerve or chiasmal involvement and ocular motility limitations from associated cranial neuropathies. Meningiomas cause most neurological deficits due to mass effect.
RAPID FIRE POSTER PRESENTATION 1 (21)

**Ocular motor function in children with unilateral spastic hemiplegia evaluated by the ocular motor score**

Agneta Rydberg
Karolinska Institutet
Department of Clinical Neuroscience
Stockholm, Sweden

Ygge J.; Olsson M.
Affiliations: Karolinska Institutet, Department of Clinical Neuroscience, Section of Ophthalmology and Vision, and St. Erik Eye Hospital, Stockholm, Sweden

Abstract

**Purpose:** To assess the ocular motor functions in children with spastic hemiplegia by using the Ocular Motor Score (OMS).

**Material:** 34 children (20 boys and 14 girls, age range 7-17 years, median age 11 y) were included in the study. The children were divided into 3 groups according to the underlying brain lesion: 1) malformations (polymicrogyria, schizencephaly and grey matter heterotopia; n=7), 2) white matter damage of prematurity (WMDP; n=15) and 3) cortical/subcortical lesions (middle cerebral artery or anterior cerebral artery infarct; n=12).

**Methods:** The OMS protocol consists of 15 different subtests evaluating ocular motor functions. The OMS is divided into 2 parts, a static and a dynamic. The static tests include examination of head posture, eyelid position, stereo acuity, pupil response and strabismus. The dynamic tests include examination of ductions/versions, fixation in primary position, fixation in 8 gaze directions, saccades, smooth pursuits, convergence, fusional vergence, VOR and OKN. The results from each subtest is scored 0, 0.3, 0.5 or 1, according to the level of disturbance, where 0 corresponds to normal function and 1 represents pathological function. A total score between 0 and 15 can be obtained.

**Results:** The median OMS score in the whole group was 2.7 (range 0.3-9). In group 1 the median score was 3.7 (range 0.3-9), in group 2 the median score was 2.1 (range 0.3-8.1) and in group 3 the median score was 2.9 (range 1-5.7). Strabismus was found in 45% (15/34) of the children, with an equal percentage in all 3 groups.

**Conclusions:** The children with spastic hemiplegia caused by different brain pathologies had a total median OMS of 2.7 and the highest median score was seen in children with malformations. This is in accordance with another study by Olsson and coworkers in children with various neurological problems. The score is, however, higher than the OMS in a reference group of children, without any known ocular problems and with normal psychomotor development, which was 0.3 in children age 7-10 and 0 in children 11-19 years. The OMS score is easy to use clinically and gives a quick overview of the patient’s ocular motor functions. Some modifications of the protocol will be needed for better comparison between the static and dynamic part of the protocol.
RAPID FIRE POSTER PRESENTATION 2 (22)
Oscillopsia due to malabsorption secondary to Wernicke encephalopathy

Angela Dillon
Houston Eye Associates
Pediatric Ophthalmology and Adult Strabismus
The Woodlands, USA

Abstract

Purpose: To describe the cause and treatment of oscillopsia induced by Wernicke Encephalopathy secondary to gastric bypass surgery.

Methods: Case presentation of a 40-year-old female who presented to our clinic with complaints of diplopia and oscillopsia after undergoing gastric bypass surgery. Based on the presentation and exam findings, a surgical plan was formulated and executed.

Results: The cause of the oscillopsia was found to be due to Wernicke Encephalopathy secondary to gastric bypass surgery. After bilateral guarded superior oblique tenotomies, surgical results yielded resolution of oscillopsia and improvement of diplopia.

Conclusions: A clinician should add malabsorption syndrome secondary to Wernicke Encephalopathy on their differential for sudden-onset oscillopsia. Guarded superior oblique tenotomies can be a successful treatment for oscillopsia secondary to Wernicke Encephalopathy.
POSTER 23

An unusual case of opsoclonus-myoclonus-syndrome in a 9-year-old child.

Alinda Groenveld
Academic Medical Center Amsterdam
Ophthalmology
Amsterdam, the Netherlands

Abstract

Purpose: Opsoclonus is an involuntary conjugate arrhythmic multidirectional eye movement. Due to its large amplitude (10-40 degrees) and high frequency (10-15 Hz), it commonly causes visual blur and oscillopsia. The cause of opsoclonus in children is in 50% of the cases a neuroblastoma, although it can also be provoked by an infection or is sometimes idiopathic. In some cases neuroblastoma is difficult to find, only in 60% of the cases in the first 3 months. We present a case of opsoclonus-myoclonus-syndrome with small amplitude caused by an infection.

Methods: We present an unusual case of opsoclonus-myoclonus-syndrome in a patient without neuroblastoma.

Results: A 9-year-old patient presented to our tertiary referral center with intermittent opsoclonus, which was especially provoked by visual attention. She also had light myoclonus of her head, mouth and trunk (opsoclonus-myoclonus-syndrome). Her presentation of opsoclonus-myoclonus-syndrome was distinctive because of her small amplitude, 1-5 degrees. Neuroblastoma, the most frequently cause of opsoclonus-myoclonus-syndrome, was ruled out by neurologic examination. The cause was assumed to be due to an infection many years ago. Due to the intermittent character of the opsoclonus myoclonus syndrome, she had slight visual complaints and she was left untreated. We advised a follow up in 6 months.

Conclusion: Be aware of an opsoclonus-myoclonus syndrome in patients with abnormal multidirectional eye movements with small amplitude. When an opsoclonus myoclonus syndrome is confirmed in children, a neurologic examination is essential to exclude neuroblastoma. If negative, the test should be repeated after several months.
Abstract

Purpose: To review a sample of patients presenting with sudden onset esotropia, complaining of horizontal binocular diplopia with particular attention to the underaction of ocular motility at presentation.

Method: A retrospective cohort study of patients with a suspected sixth nerve palsy presenting to urgent care between November 2014 and October 2015 was reviewed. 10 patients were identified. Each patient had been assessed by an Orthoptist documenting their near and distance angle in the primary position and ocular motility. Underactions of abduction were documented on a scale of 0 to –4; 0 representing no underaction and -4 representing maximum underaction of abduction.

Results: All patients attended within 5 days of the onset of symptoms. 40% of the patients presented with no apparent underaction of abduction, 30% had up to -1, 10% with -2 and 20% up to -4. The 4 patients showing no underaction of the lateral rectus on initial presentation went on to develop underaction of abduction within one week of the onset of symptoms confirming the diagnosis of a sixth nerve palsy.

Conclusion: All patients had suspected recent onset sixth nerve palsy due to their reported symptoms and an esotropia measuring greater for distant than near. It is apparent not all underactions of abduction are initially clinically obvious. It is important that all examining medical professionals are aware that a sixth nerve palsy cannot be ruled out based primarily on the absence of an underaction of abduction at the initial assessment.
POSTER 25

Collaborative development of a care pathway for III, IV and VI cranial nerve palsy (CNP)

Craig Murray
University of Liverpool
Orthoptics, Thompson Yates Building
Liverpool, UK

Craig Murray¹, Joanne Adeoye¹, Patrick McCance²
¹University of Liverpool, ²Altnagelvin Hospital

Abstract

Purpose: To produce an evidenced based collaborative care pathway for IV, III and VI Cranial Nerve Palsy (CNP).

Methods: The University of Liverpool was approached by the Orthoptic managers from Northern Ireland (NI) to provide a continuing professional development (CPD) update in relation to the investigation and management of cranial nerve palsy (CNP). A literature review of research published within the previous 20 years along with reviews of current professional body guidelines and competencies was carried out by academic staff at the University in relation to the ophthalmological and orthoptic investigation of III, IV, and VI CNP. Following this, an interactive update session and workshop was delivered in Northern Ireland in September 2014. Input from NI orthoptists based on local policies and protocols was added to the published evidence base in relation to investigation of CNP patients and following the contact session, university academic personnel created the care pathway using Bizagi © software. The software produces a flow chart along with expanded documentation outlining the justification for each point along the care pathway. The completed pathway was sent back to the NI trust personnel for review and following that, the pathway was finalised.

Results: This collaborative process has resulted in a care pathway based on current evidence base, clinical experience and local policies and frameworks. The pathway will be rolled out across NI with early feedback from clinicians positive in relation to its use in the clinical setting.

Conclusions: A systematic approach to this area of practice has enabled a standardised pathway to be devised that takes into account both local policies as well as the current evidence base in order for clinicians to have some guidance for practice in this particular area.
POSTER 26

A case of a sudden onset VIth nerve palsy of unknown aetiology in a teenage boy

Annie Airey
Guy’s and St Thomas’ Hospital
Ophthalmology
London, UK

Abstract

Purpose: The presentation and investigation of a 13 year old male with a sudden onset VIth nerve palsy due to a cavernous sinus mass and a discussion of the possible aetiologies.

Methods: The patient presented with sudden horizontal double vision for one day. Mum was also concerned by a left lid lump, exaggerating his congenital left ptosis. No headaches or fever reported. The patient was then assessed by an ophthalmologist. His vision was 6/4-3 right (eye) and 6/6+1 left. Cover test revealed a left to alternating intermittent esotropia. Ocular motility was recorded as ‘NAD – full movement of left lateral rectus.’ The patient reported diplopia in primary gaze, upgaze and on left medial gaze i.e right gaze. There was a slight left upper lid chalazion which was to be treated with a hot compress at home. The anterior segment was quiet and no disc swelling reported. The patient was instructed to report back the following day for treatment of a decompensating esophoria.

When assessed by an orthoptist, the boy was using a left face turn to control his double vision. Without a head posture he had a slight left esotropia at near, increasing in the distance. On assessment of the extra ocular muscles, there was -1 restriction of the right lateral rectus alongside a congenital left ptosis.

The boy was diagnosed with a right VIth nerve palsy of recent onset. He was admitted to hospital that day for an MRI and further investigation.

Results: A small cuff of enhancing soft tissue was found in the anterior aspect of the cavernous sinus, extending into the inferior orbital fissure. The blood sample had a high B lymphocyte count but all other tests were normal. Lumbar puncture was unremarkable. The following day he began a 3 day course of high dose intravenous steroids which was then switched to a lower oral dose.

During his forth day in hospital the boy was assessed again; his esotropia had increased significantly to -4 restriction of the right lateral rectus with some right VIth nerve involvement. After 10 days of steroids, a second MRI was performed. It was found that there was a modest resolution of the enhancing soft tissue abnormality centred within the right superior orbital fissure, though some residual enhancement persisted. An orthoptic report from the same day showed that the restriction the right lateral rectus showed a slight improvement.

The patient was discharged after 13 days in hospital and was to continue with the steroids and be followed up by paediatric ophthalmology.

Conclusion: The diagnosis at discharge was an idiopathic orbital pseudotumor. The likelihood of sarcoid, tuberculosis, tolosa-hunt syndrome and lymphoma as the primary aetiology are discussed. The cause is unknown pending reoccurrence.
POSTER 27

Diplopia and loss of vision due to a sphenoid-orbital meningioma

Meike Veenman
University Medical Center Utrecht
ophthalmology
Utrecht, the Netherlands

Denise van der Linden, orthoptist, Netherlands; Rachel Kalmann, ophthalmologist, Netherlands

Abstract

Purpose: Spheno-orbital meningiomas (SOM) are benign tumors originating from the dura at the skull-base. Mostly they present with proptosis and/or decreased vision. Early diagnosis and treatment can prevent serious function loss in a considerable portion of these patients. We describe 4 patients with at first unexplained diplopia and/or vision loss, caused by a spheno-orbital meningioma.

Methods: 4 patients were evaluated retrospectively.

Results: Patient 1: A 49-year old male patient with a history of acute onset of diplopia in 2007. Neurological investigation including MRI at that time showed no abnormalities. Patient was told that there was nothing to be done. In 2012 we saw patient at UMC Utrecht for a re-evaluation of his symptoms. Orthoptic examination showed a large sixth nerve palsy of the left eye. MRI with gadolinium was requested which showed a SOM at the level of the sixth nerve. Patient was treated with stereotactic radiotherapy. After two strabismus corrections there was no diplopia left.

Patient 2: A 57-year old female patient presented in 2003 with diplopia since 2 years. Orthoptic evaluation showed a limitation of abduction, adduction and elevation with proptosis of the left eye. On CT scan slightly enlarged extraocular muscles were seen. Blood test was normal. Diagnosis mild Graves orbitopathy was made. She underwent a strabismus correction. After a few years she presented again with diplopia. MRI with gadolinium was made and showed a meningioma at the location of the cavernous sinus. She underwent stereotactic radiotherapy and 2 additional strabismus corrections. She only complains about diplopia in extreme gaze.

Patient 3: A 46-year old female patient presented in 2010 with decreased vision of the left eye. Ophthalmic investigation showed papilledema of the left eye. On the right eye there were no abnormalities. MRI, lumbar puncture and blood tests showed no abnormalities. The diagnosis of optic neuritis was made and the patient was being treated with a methylprednisolone intravenously. Vision improved to 0.6, however after two weeks it decreased to 0.2 and the visual field worsened. MRI was repeated and showed a SOM with compression of the left optic nerve. She underwent stereotactic radiotherapy. Vision improved to 1.0 and visual field defects disappeared.

Patient 4: A 60-year old female patient with diplopia since 1995. MRI at that time showed no abnormalities. Diagnosis sixth nerve palsy was made. In 2006 a CT scan without contrast showed no abnormalities. She underwent a recession of the right medial rectus, after which she was free of symptoms. In 2010 she began to suffer from diplopia again and her right eye showed a proptosis. She also suffered from tingling in her right lip and the right side of her nose. MRI with gadolinium showed a cavernous sinus meningioma. Patient underwent stereotactic radiotherapy. Currently she only experiences double vision when looking to the right.

Conclusion: These patients illustrate the importance of making a MRI with gadolinium in any patient with unexplained diplopia and/or visual loss in order to rule out a SOM. In case a SOM is diagnosed appropriate treatment can improve visual function or prevent further function loss.
POSTER 28

A rare case of unilateral dilated pupil in infancy

Jean Voller
University Hospitals Leicester NHS Trust
Orthoptic
Leicester, United Kingdom

Jean Voller MSc DBO(D) Mariel Briney B MedSci (Hons)

Abstract

An eight month old baby presented to the Accident and Emergency Department with a history of sudden onset unilateral dilated pupil present for a few hours. A description of the investigations and differential diagnosis is presented along with a discussion of the role of respiratory medications as a causative factor.
POSTER 30

Visual results with the use of prismatic lenses in the treatment of congenital nystagmus – a clinical case

Ilda Maria Poças
Escola Superior de Tecnologia da Saúde de Lisboa De Ciências e Tecnologias de Reabilitação, lote Lisboa, Portugal

Ilda Maria Poças, Pedro Lino

Abstract

Purpose: It is important to establish a differential diagnosis between the different types of nystagmus, in order to give the appropriate clinical approach to every situation and to improve visual acuity. The nystagmus is normally blocked when the eyes are positioned in a particular way. This makes the child adopt a posture of oculor torticollis that reduces the nistagmiformes movements, improving the vision in this position. A way to promote the blocking of the nystagmic movements is by using prismatic lenses with opposite bases, to block or minimize the oscillatory movements. This results in a vision improvement and it reduces the anomalous head position. There is limited research on the visual results in children with nystagmus after using prisms with opposing bases. Our aim is to describe the impact on the visual acuity (VA) of the prescription prism lenses in a nystagmus patient starting at 3 months of age.

Methods: Case report on thirty month old caucasian male infant, with normal growth and development for their age, with an early onset of horizontal nystagmus at 3 months of age. Ophthalmic examination included slit lamp examination, fundus, refractive study, electrophysiological and magnetic resonance tests, measurement of VA over time with the Teller Acuity Cards (TAC) in the distance agreed for the age. At age ten months, the mother noted a persistent turn to the right of the child’s head, which became increasingly more severe along the months. There’s no oscillopcia. At 24 months, an atropine refraction showed the following refractive error: OD: -1,50, OS: -0,50 and prismatic lens adapting OD 8 ∆ nasal base and OE 8 ∆ temporal base.

Results: Thirty month old child, with adequate development for their age, with onset of idiopathic horizontal nystagmus, at 3 months of age. Normal ocular fundus and magnetic resonance without alterations, sub-normal results in electrophysiological tests and VA with values below normal for age. At 6 months OD 20/300; OE 20/400; OU 20/300. At 9 months OD 20/250; OE 20/300; OU 20/150 (TAC a 38 cm). At 18 months OD 20/200; OE 20/100; OU 20/80(TAC at 38 cm), when the head is turned to the right and the eyes in levoversão, the nystagmus decreases in a “neutral” area. At 24 month, with the prismatic glasses, OD 20/200 OE 20/100, OU20/80 (TAC at 54 cm, reference value is 20/30 – 20/100 para OU e 20/40 – 20/100 monocular), there was an increase in the visual acuity. The child did visual stimulation with multimedia devices and using glasses. After adaptation of prisms: at 30 months VA (with Cambridge cards) OD e OE = 6/18. The child improved the VA and reduced the anomalous head position. There is also improvement in mobility and fine motricity.

Conclusion: Prisms with opposing bases, were used in the treatment of idiopathic nystagmus. Said prisms were adapted to reduce the skewed position of the head, and to improve VA and binocular function. Monitoring of visual acuity and visual stimulation was done using electronic devices. Following the use of prismatic, the patient improved significantly VA and the anomalous head position was reduced.
POSTER 31
Orthoptic treatment as part of the management of ocular motility impairment on acquired neuro-ophthalmological cases with diplopia

Sophie Polychroniadou – Scourou
Hygeia Hospital Athens
Ophthalmology
Athens, Greece

Abstract

Purpose: To establish the role of orthoptic treatment, as part of the recovery treatment of the motility of Neuro-ophthalmological cases with diplopia.

Methods: Standardised screening/referral and investigation forms were used to document data, and Orthoptic treatment was employed with the purpose of encouraging the patients to find the field of Binocular vision by adoption of a head posture, as well as improving their fusional reserves. Prisms were rarely used, in order to “force” recovery. As any patient that was referred would be treated in order to assess the orthoptic treatment I also compare patients who were referred early after the onset of diplopia with patients who were referred with a large delay.

Results: It was found that in the cases of IV and VI nerve palsies, recovery of Binocular Single Vision was achieved in a greater number of patients, although the time rate varied, with the above method, but III nerve palsies tended to be the hardest to respond to the treatment, although partial ptosis seems to have responded better as well as convergence. Some cases presented.

Conclusions: It was found that Orthoptic treatment has quite an impressive contribution to the motility treatment of patients suffering with Diplopia, referred by Ophthalmologists, Neurologists, GPs, Neurosurgeons, Heamatologists, Oncologists, Endocrinologists, Surgeons, as well as other specialties.
POSTER 32
Pupil reactions in the orthoptic practice: a “wake up call”

Pascale Cooijmans
Utrecht University Medical Centre
Ophthalmology
Utrecht, the Netherlands

Cooymans P.E.Q.M. orthoptist; van der Linden D.C.P. orthoptist;
Porro G.L. MD Phd ophthalmologist.
Department of Ophthalmology, Utrecht University Medical Center, The Netherlands.

Abstract

Purpose: Rapid afferent pupillary defects (RAPD) or pupil anomalies may represent a sign of optic nerve disease. However the swinging flash light test is not routinely performs during orthoptic assessments.

Methods: Data of three children who showed abnormal RAPD or anisocoria during initial orthoptic assessment are reported.

Results: In all three children optic nerve diseases, such as gliomas or optic nerve hypoplasia, were detected by means of neuroradiological investigation (MRI brain and orbit),

Conclusion: Orthoptists should be aware of the importance of pupil investigation by means of the swinging flash light test as useful tool for early detection of optic nerve diseases.
Wednesday 29 June 2016

Theme block #6: Genetics, Syndromes

RAPID FIRE POSTER PRESENTATION 1 (33)

Orbital xanthogranulomatous disease and eye motility disorders

Eline De Jongh
The Rotterdam Eye Hospital
Orthoptic department
Rotterdam, the Netherlands

E. De Jongh, A.D.A. Paridaens

Abstract

Purpose: Adult orbital xanthogranulomatous disease (AOXGD) is a rare acquired condition classified in 4 subtypes. This poster presents a patient with adult onset asthma and periorcular xanthogranuloma (AAPOX). The clinical presentation of AAPOX consists of uni/bilateral periorcular yellow-brown infiltrates that may mimic xanthelasmata or orbital mass lesions. There is a trend to progressions of these abnormalities causing eyelid disfigurement, dislocation of the bulbus/exophthalmus, eye motility restrictions, diplopia, and rarely optic neuropathy. Treatment can be conservative (immunosuppression/radiotherapy) or surgical (debulking/orbital decompression). The clinical features look like Graves orbitopathy and the aim of this poster is to make orthoptists and ophthalmologists aware of this rare and misdiagnosed condition associated with eye motility disorders.

Methods: A 52-year old man was referred to the Rotterdam Eye Hospital for treatment of the eyelids and proptosis. Swelling of the under eyelids existed for at least 10 years. He was diagnosed with Graves orbitopathy based on the enlarged extraocular muscles on CT. Lab investigation showed that he was euthyroid and had a vitamin-D deficiency. Full ophthalmologic and orthoptic examination was performed including a biopsy and CT scan of the orbits.

Results: Complaints: watery eyes and social discomfort due to his changed appearance. No diplopia. Clinical appearance shows large periorcular swelling, especially of the undereyelids. Furthermore, xanthomatous changes were found of the deep dermis. Bilateral proptosis (Hertel 26.5 – 26.5 – 94). Motility showed a small restriction of the elevation of the right eye (more than left). Biopsy of skin, septum and prolapsing fat revealed inflammation due to xanthogranulomas. CT revealed infiltration of xanthogranulomas in the extraocular muscles. Both inferior rectus muscles were enlarged including the right infraorbital nerve. Orbital decompression and debulking will be considered.

Conclusion: AAPOX is a rare condition which may be associated with eye motility changes. Our case showed a small mechanical restriction of elevation due to an enlarged inferior rectus of the left eye. A CT confirmed the diagnostic suspicion of infiltration of xanthogranuloma in the extraocular muscles. Diplopia occurs when the eye muscles are involved and this condition should be added to the orthoptic diagnostics due to the motility restrictions.
**RAPID FIRE POSTER PRESENTATION 1 (34)**

**An eye diagnostic code for evaluation of ophthalmological abnormalities in fetal alcohol syndrome disorders (FASD)**

Eva Aring  
Neuroscience and Physiology  
Ophthalmology  
Göteborg, Sweden

**Abstract**

**Purpose:** Fetal Alcohol Syndrome Disorders (FASD) are divided into Fetal Alcohol Syndrome (FAS), Partial FAS (PFAS), Static Encephalopathy Alcohol Exposed (SE/AE) and Neurobehavioral Disorder Alcohol Exposed (ND/AE) according to a 4-Digit Diagnostic Code used worldwide. There are no guidelines for ophthalmological examination in individuals with prenatal alcohol exposure. Our purpose was to develop and evaluate an ophthalmological tool (4-Digit Eye Diagnostic Code) serving as a complement to the method described above.

**Methods:** Twenty-five children with FASD, mean 7.6 years (4.9 - 10.4), and 25 age and sex matched controls were evaluated. Four ophthalmological digits were used: Visual acuity (VA), refraction, strabismus/binocular functions, and structural abnormalities. The magnitude of expression of each feature was ranked independently on a 4-point scale with 1 reflecting normal ophthalmological finding and 4 reflecting a strong presence of the most common ophthalmological abnormality found in children with FASD. We also tested the 4-digit code on three other groups of children; 42 children with Attention Deficit Hyperactivity Disorders (ADHD), 78 children born Moderate to Late Preterm (MLP) (gestational age 32-36w) and 18 children with Silver Russell Syndrome (SRS).

**Results:** Children with FAS (n=9) showed a total median score of 10: VA (2); Refraction (2); Strabismus/Binocular function (3); Structural abnormalities (3). The total median score for children with PFAS (n=6) and ND/AE (n=7) was 9, for SE/AE (n=3) 5, ADHD 5, MLP 4, SRS 7.5 and controls 4.

**Conclusion:** Our results are consistent with our hypothesis that children with fully developed FAS have the highest score of ophthalmological abnormalities. This tool, which is based on the most common ophthalmological abnormalities previously found in these children, may serve as a diagnostic help in combination with the 4-digit diagnostic code based on growth deficiency, facial features, central nervous system (CNS) structural and functional abnormalities, and prenatal alcohol exposure.
POSTER 35
Arthrogryposis - an orthoptic and ophthalmic review

Kate Hon
King’s College Hospital NHS Foundation Trust
West Kent Eye Centre Princess Royal University Hospital
Orpington, UK

K. Hon¹, S. Handley², R. Bowman²
¹Princess Royal University Hospital, King’s College Hospital NHS Foundation Trust, UK
²Ormond Street Hospital for Children NHS Foundation Trust, UK

Abstract

**Purpose:** Arthrogryposis describes a genetically heterogeneous disorder of congenital joint contractures without a primary neurologic or muscle disease. It is characterized by clenched fist, overlapping fingers, camptodactyly, ulnar deviation, and positional foot deformities. Arthrogryposis is derived from Greek, literally meaning “curving of joints” There are a number of subtypes, including Arthrogryposis Multiplex Congenita, Distal Arthrogryposis, and syndromes including Arthrogryposis, such as Gordon Syndrome (Arthrogryposis with cleft palate and short stature) and Freeman–Sheldon Syndrome (Arthrogryposis with craniofacial anomalies). We present the orthoptic and ophthalmic findings of 13 patients with Arthrogryposis.

**Methods:** A retrospective case note review was undertaken of 16 patients referred with Arthrogryposis to the ophthalmology department of a tertiary paediatric hospital. 16 patients were identified from clinic reviews and an electronic correspondence search. On review of these, 3 were not suitable for inclusion.

**Results:** Of the 13 patients included, 5 had a manifest strabismus, 3 esotropia and 2 exotropia. 5 had manifest nystagmus. 6 patients had ocular motility deficits, 2 horizontal limitations on ductions, 3 with reduced elevation, and 1 with an apparent inferior oblique over-action. 2 patients were diagnosed with ptosis, 1 bilateral and 1 unilateral. 4 had significant refractive errors; 3 hypermetropia and 1 myopia. 2 patients had lens opacities. 6 patients had optic nerve anomalies (5 bilateral 1 unilateral). 1 patient had microphthalmia Of the 13 patients, 10 had undergone electroretinogram (ERG), flash and pattern visual evoked potential (VEP) testing. ERG responses were normal in all cases. In all 10 cases pattern VEPs were abnormal, showing macula pathway dysfunction; this could be explained by the presence of ophthalmic pathology.

**Conclusions:** We report a spectrum of orthoptic and ophthalmic presentations in this group of children with Arthrogryposis. 10 of the 13 patients had a manifest strabismus or ocular motility disorders and 6 patients had optic nerve anomalies. All patients had abnormal VEP responses indicating macular pathway dysfunction in the presence of normal generalised ERG responses. This was explained by the presence of ophthalmic pathology. We feel patients with Arthrogryposis can benefit from orthoptic and ophthalmic review to identify ophthalmic pathology.
**Wednesday 29 June 2016**

**Theme block #7: Technology in Eye Disease**

**RAPID FIRE POSTER PRESENTATION 1 (36)**

**Feasibility of the saccadometer to detect saccadic performance across different age groups in a normal population**

Jignasa Mehta  
University of Liverpool  
Directorate of Orthoptics and Vision Science Thompson Yates building  
Liverpool, UK  
J. Mehta, D. Newsham

**Abstract**

**Purpose:** Saccades are fast eye movements allowing us to accurately alter our fixation from one object to another, for example we execute small saccadic movements whilst reading and large saccades when altering our gaze in an open environment. Saccadic characteristics such as latency, velocity and accuracy has been shown to be affected by age using lab based video oculography. The aim of the study is to collect normative data for different age groups using the portable saccadometer which can be used clinically to obtain quantifiable saccadic measurements.

**Methods:** Horizontal visually reflexive saccades of an amplitude of 5°, 10°, 15° and 20° were tested using the Saccadometer in adults aged 20-75 years with no known ocular motility defect. Data was collected in 4 age categories; age 20-30 years (n= 20) for the baseline measurement before the ageing process begins, then to quantify the increasing effect of age on saccadic performance in the following age groups: ages 55-60 yrs (n=20), 65-70 yrs (n=20), 75-80 yrs (n=20). Subjects were asked questions regarding their general health (past and present) and medication to rule out any underlying neurological condition. Visual acuity was measured in either eye for near and distance using the gold standard letter logmar charts with refractive correction if worn. Ocular motility was tested to rule out any extraocular muscle defect.

**Results:** Data collection is ongoing and early results suggest that there is an increase in saccadic latency and a decrease in velocity with age.

**Conclusions:** To date, saccadic parameters measured with the saccadometer are in agreement with measurements made using video-oculography. Therefore, this will allow identification of abnormal saccadic behaviour in individuals with pathological conditions, relative to their age, using a portable device that can be used clinically.
RAPID FIRE POSTER PRESENTATION 2 (37)
Perimetry in pediatric age: reliability and limits

Gloria Badin
University of Ferrara,
Department of Biomedical and Specialty Surgical Sciences
School of Medicine
Rovigo, Italy

G. Badin, G. Verzola, Piera P. A. Barducco, F. Borghi, S. Mancioppi

Abstract

Purpose: The possibility of execution and the evaluation of the automated perimetry exam in pediatric patients is still an object of open discussion. Considering that the tool database is built on a model made for adults (Zeiss report), we investigated if it can also be used for children by evaluating whether pediatric patients could execute the task, the reliability of the results and their usefulness for diagnosis.

Methods: We recruited children aged 8 to 18 years. The clinical trial lasted from November 2010 to November 2015. We analyzed and compared the visual fields of two groups of the same sample (136 study eyes): Group 1: 70 tests (eyes) performed by healthy pediatric subjects with normal physical and mental development, in absence of systemic and ocular disorders, with a visual acuity of 10/10 nat or 10/10 obtained with correction between +2.00/-2.00 sf. Group 2: 66 tests (eyes) from the Ferrara Ophthalmologic clinic: 28 of these tests requested for migraine, 20 for visual decline, 18 for family history of glaucoma or suspected glaucoma. We used the "30-2 SITA Fast" strategy with Humphrey perimeter IIi 750-740. We considered the following parameters: patient age, time of testing, foveal threshold, fixation losses, GHT, false positives, false negatives, MD and PSD indices, maps of total deviation and pattern deviation.

Results: In this study we demonstrate that young patients are able to perform this psychophysical test reliably, considering losses of fixation, FP and FN tolerated by the database. The analysis of the Group 1 of healthy subjects is not devoid of alterations, but shows significant deterioration of MD index and relative map of total deviation, classifying the healthy subjects as false positives. In Group 2 of suspected pathological subjects, a few tests did not present a pathological picture, but the majority of this group presents similar alterations of the Group 1.

Conclusions: In conclusion we can say that, considering that children's exams are incorrectly compared with a database made for adults, in case of diagnostic doubt it is important to discern which defects indicated in the visual field exam are due to real visual damage and which are due to processing errors. The exam has high sensitivity and low specificity: it can identify a suspected disease but produces a high number of false positives, and is therefore useful just for the exclusion of serious functional topographical injuries such as functional neurological defects.
POSTER 40
The best perimetric strategy used in chiasmatic pathology

Chiara Farati
Student of Orthoptics and Ophthalmologic Assistance Course, University of Ferrara
Department of Biomedical and Specialty Surgical Sciences
Ferrara, Italy

Abstract

Purpose: The chiasmatic pathologies, such as the pituitary adenoma can create the Bitemporal Etheronim Hemianoptic, that is a typical loss of visual field caused by a damage of crossing fibers. Perimetry is one of the specialistic tests that contribute to diagnosis and follow-up. The study's aim is to highlight the most specific and sensitive perimetric program for the follow-up in patients affected by chiasmatic pathology. This study was conducted since February 2009 until October 2015.

Methods: We have chosen and submitted the cross-section (47 subjects), affected by chiasmatic pathology, on two types of perimetric methods with 740 and 750 HFA perimetry: Method 1: 120 point screening test 3 levels (94 test); Method 2: 30-2 rapid threshold Sita Fast strategy (94 test);

Cross-section inclusion standard: (i) subjects affected by chiasmatic pathology such as: pituitary adenoma, craniopharyngioma, chiasmatic and retrochiasmatic neoplasia; (ii) interdisciplinary team working with the Endocrinology Clinic of St. Anna University Hospital; (iii) both test executions and (iv) test realibility (false-positive, false-negative and fixation losses).

In both exam methods we compared: (i) arithmetic average duration of the test execution and (ii) presence or not of a cluster (at least 3 points defect) in both eyes in the temporal hemifield, expressed by: screening method as relative or absolute defects and Sita method as sensivity drop focused at PSD with a value < 5%.

Results: The average duration of the two methods (188 test) were: Method 1 (Screening) 94 test: 6 mins and 05 seconds; Method 2 (Sita Fast) 94 test: 4 mins and 39 seconds. The parameter was positive in 40 out of 188 tests (10 subjects) with the presence of a cluster (21.3%). In these 40 tests the cluster was highlighted in: 12 screening tests of the 20 performed (Method 1) and in all 20 Sita tests (Method 2). There was an important difference in both parameters.

Conclusions: The results have shown the greater suitability of the Sita Fast test because: (i) the average duration is faster than screening, therefore tests are more reliable and (ii) it is more sensitive to identify absolute and relative defects which emerge on the vertical meridian of visual field and very early it can highlight the perimetric damage.

For these reasons we prefer the Sita Fast test in all subjects affected by chiasmatic patology.
POSTER 41

Different uses of an electronic Goldmann

Tanguy-Loup Bizeau
Ophtalliance
Dr Zanlonghi - Cliniques Jules Verne-Sourdille
Nantes, France

T-L Bizeau, Zanlonghi, A. Armelle, N. Rousseau, C. Bouaud

Abstract

Purpose: MonCVOne from Metrovision (France) is a new polyvalent and full field projection perimeter entirely compatible with the Goldmann standard and modern perimetry standard.

Methods: The MonCVOne allows high resolution static perimetry as well as kinetic perimetry with automated and manual modes. The high definition camera of the MonCVOne and its possibility to record the eye movement during an exam also allows us to look further and think of new kinds of examinations.

Results: One unique feature of MonCVOne is its ability to perform perimetry exams on infants (below the age of 7) and other non cooperative subjects. The operator has a direct control of the stimulus presentation and can record the infant’s eye movement responses thanks to the high quality of the video; the video playback is synchronized with the test presentations allowing the offline analysis of results and their control. Thanks to that direct operator control and video recording, we can also study: (i) the eyes deviation in the nine cardinal positions of gaze, useful for pre-surgery act; (ii) ptosis and its impact on visual field and (iii) binocular visual field fusion.

Conclusion: The MonCVOne is a new instrument that has multiple uses including perimetry and assessment of eye movements.
POSTER 42
A new device to measure abnormal head posture

Nancy La Grange
UZ Gent
Ophthalmology
Gent, Belgium

Abstract

Purpose: To present a new device which allows the measurement of abnormal head postures.

Methods: We discuss the basic concept of this new device, and highlight its use and advantages in relation to similar devices.

Results: This new, low-cost and easy-to-use device, allows measuring the 3 components of abnormal head posture, without cooperation of the patient.

Conclusion: As measuring the abnormal head posture may have a diagnostic, therapeutic and prognostic value, an accurate measurement is essential. Our newly developed ‘torticollimeter’ is a cheap and easy-to-use tool to reach this aim, even in non-cooperative children.
POSTER 43
Visual field perimetry for children using the MonCVOne machine

Jalpa Mashru
University Hospitals of Leicester
Orthoptic Department
Leicester, UK

Abstract

Purpose: Visual Field Perimetry tests in young children can be both difficult and unreliable. For most children, reliability improves after the age of approximately 7-9 years. Our aim was to assess the potential of obtaining accurate visual field results for children under the age of 9 years.

Method: We used the MonCVOne Machine on a manual option to test Kinetic Perimetry, in a way similar to Goldmann Perimetry. The integrated high resolution infrared video sensor is used to monitor the fixation of the patient throughout the test and can also be used to record objective stimulus responses.

Results: The results are presented and compared to Goldmann Visual Fields, which show that a reasonable indication of the visual field can be obtained in a younger child.

Conclusion: The MonCVOne Machine gives reasonably reliable visual field estimates in children under 9 years.
POSTER 44
Comparative synoptophore and gazelab

Dora Fernandez Agrafojo
Teknon Medical Center
INOF Research and Eye Surgery Center
Barcelona, Spain

D. Fernandez Agrafojo, H. Morales Ruiz, P.M Enrile

Abstract

Purpose: In diagnosing and treating binocular vision dysfunctions and ocular imbalances, the Synoptophore (major amblioscope) has been widely used in almost all the world. It has not been until the beginning of XXI century, that any other optometric instrument was able to compete against the classic Synoptophore since its emergence. This is the case of Gazelab©, the last videooculograph model, an instrument with the latest technologies, easy handling, able to measure with high precision, either horizontal and vertical deviations and cyclotorsions, in all positions of gaze. The purpose of our study was to compare the measures found with both instruments in the five positions of gaze (Primary position, dextroversion, levoversion, supraversion and infraversion), and to assess the ease and the speed of its use, and in the obtained mesurements.

Methods: 20 patients diagnosed with strabismus who were assessed with the Synoptophore and Gazelab are presented.

Results: The obtained results in 20 strabismic patients, have statistically no significant differences in the precision of the obtained mesurements between Gazelab and Synoptophore, except in infraversion. Taking into account the comfort and speed for the clinical use, we can say that preparation and positioning of the patient is easier with Synoptophore, even though Gazelab gives us a new perspective in the dynamic evaluation of the strabic patients, and its objective measurement of cyclotorsions.

Conclusion: We consider that Gazelab can be a great instrument for examining strabismic patients, giving a better impression because it implements new technologies in the optometric and ophthalmologic practice.
Wednesday 29 June 2016

Theme block #8: Expanding Orthoptic Practice

RAPID FIRE POSTER PRESENTATION 1 (45)

Listing for strabismus surgery by an orthoptist

Janice Hoole
Leeds Teaching Hospitals
Orthoptic and Children’s Eye Clinic
Leeds, UK

Abstract

Purpose: There is increasing pressure on capacity in NHS ophthalmology clinics. It was felt that an experienced orthoptist, who has worked closely with a consultant ophthalmologist in complex strabismus clinics and who advises trainee ophthalmologists on listing in the absence of the consultant, could under take listing and consenting for strabismus surgery.

Methods: An independent reviewer compared the decisions of an experienced orthoptist and consultant ophthalmologist of 10 patients requesting strabismus surgery. The reviewer examined if the orthoptist and consultant agreed that the patient should be listed for strabismus surgery, and then reviewed the surgical plan of each practitioner to see if they concurred.

Results: No patient was listed by the orthoptist for strabismus surgery that would not have been listed by the consultant. The surgical plan was in agreement in all cases and the consultant would have listed the patient for the same procedure with the same surgical aim.

Conclusion: Where there is a history of a good working relationship and trust between the consultant ophthalmologist and experienced orthoptist it is safe for an orthoptist to list and consent for strabismus surgery without protocol and without reference to the ophthalmologist.
RAPID FIRE POSTER PRESENTATION 2 (46)

Toward child-centered eye care

Heleen Veen-Hellendoorn
Bartiméus Institute for the Visually Impaired Bartiméus Ophthalmological Diagnostics
Zeist, the Netherlands

H. Veen-Hellendoorn, F. Pilon-Kamsteeg

Abstract

Purpose: Patient centered care is known to be a key element of high-quality care. However, patient-centered care differs from child-centered care. The importance of child-centered care is, amongst others, acknowledged in the Conventions on the Rights of the Child and by the European Association for Children in Hospital (EACH). We want to share our knowledge about the ability of children as individuals able to make important decisions regarding their health.

Methods: Health care is patient-centered when patients are involved in their care, being informed, listened to and when the care suits the needs of the patient. Child-centered care refers to care in which the needs of children are respected and taken into account by the medical processes. By the right treatment of children, each on his or her own developmental level, a safe environment for your ophthalmologic examination is achieved. By starting a project on children’s participation, we involved the children by interviewing them about their perspectives and opinions as users of the care.

Results: Child-centered care is shown to reduce anxiety for both the child and the parents and it is associated with faster recovery of the child. By informing the children and giving them control and choices where possible, children are more at ease and experience less distress and fear during ophthalmological examinations.

Conclusions: Listening to children and taking them seriously, is one of the most important lessons we learned. The project really opened our eyes to the needs of the children. We participated in the development of a quality mark for child centered care in polyclinics in the Netherlands, called “the polyclinic smiley”.
Abstract

Purpose: New Zealand (NZ) vision screening is conducted at the age of four and eleven as per Ministry of Health (MOH) guidelines. Screening is conducted by Vision Hearing Technicians (VHT); due to the small NZ Orthoptic workforce we are not able to offer this service as is customary in many other countries. Patients that fail the four year old screening are referred to the hospital eye service. The B4 school screening programme was introduced in 2008 and has not been formally evaluated by the service or MOH since its implementation. An extensive audit conducted by an othoptist showed a high positive referral (FP) rate and low positive predictive value. Previous recommendations given to the MOH by Orthoptists and Paediatric ophthalmologists regarding the screening process have not been implemented. This and the previous audit highlighted shortcomings and resulted in new recommendations.

Methods: Data of all children referred from the vision screening between the age of 4 and 5 and seen at two urban hospital sites was collected for a twelve month period. Data was inputted into a purpose designed database and analysed. The aim of this audit was to identify the FP referral rate. Since this is a retrospective audit and only data from children referred are available no conclusions on false negative referral rate can be made.

Results: The false positive rate was higher than anticipated. Although the literature expects a certain rate it does not identify what the acceptable level is.

Conclusion: The MOH current vision screening programme for 4 year olds in New Zealand is not effective. Although a large number of children with eye conditions are identified the large number of false positives makes it not cost effective. Recommendations made to the MOH such as improving training of current screening staff, using a vision test that is age appropriate and compatible to all children in this age group irrespective of ethnicity, language skill and socio economic status, also more funding from the MOH for further research to create a more robust vision screening service. Regular audits and Orthoptic input would be advantageous. Unfortunately none of the recommendations made to the MOH have been taken on board. Continuing the orthoptic communication with the MOH will hopefully at some stage get these recommendations implemented and improve the vision screening service.
Abstract

Purpose: The paediatric ophthalmology service at Counties Manukau Health receives between 2000 and 2500 referrals each year. A percentage of these come from Plunket nurses. Plunket is New Zealand’s largest provider of support services for the development, health and wellbeing of children under 5. General practitioners and preschool vision screening use a standardized form for their referrals to the Ophthalmology department but Plunket was still using a generic referral form that can be used for referring to any of the hospital services. To improve the grading and triaging process a standardized well child ophthalmology referral form was designed. On the previous referral form the Plunket nurse would write his/her concerns and observations. This could leave vital information out or provide unnecessary details.

Methods: A sample of referrals was reviewed and assessed what information would be required and how this could be put on a form in a format that is easy to fill out but also easy to read for grading and triaging.

Results: A generic paediatric ophthalmology form was designed with easy tick boxes on the conditions most commonly referred by a Plunket nurse, duration of the condition, visual acuity tested and family history also leaving room for additional comments and observations. A draft was reviewed by Plunket management, our paediatric ophthalmologist and colleague Orthoptist before the form was implemented mid 2012.

Conclusion: Since the implementation of the well child ophthalmology referral form, the referral grading and triaging has become more standardized, resulted in a reduction of grading time and children are triaged in order of urgency. Currently the form is only used for Plunket services in the Counties Manukau District Health Board area and improvements to the form are being discussed. In future we hope to be able to use this or a similar form for other well child services and in other district health boards around the country.
POSTER 49
Orthoptist in humanitarian missions

Vanessa Sebag
Private pratice
Orthoptie
Paris, France

Abstract

**Purpose:** Orthoptists have an important part to play in the fight against blindness in the developed countries. According to the Mondial Health Organisation, eighty per cent of blindness is avoidable. As orthoptists we are professionnal experienced screeners. We are also efficient at refractions and amblyopia therapy.

**Method:** A small association, Eye Need View, was developed in 2013 by French orthoptists. Every year volunteer orthoptists go for two weeks in villages in Kenya to provide free vision screenings. The team carries with them refraction material, small orthoptic devices and a pediatric refractor. They go to schools to screen all pupils and in the dispensary for adults were they also perform refractions. Depending on the vision impairment, orthoptists can offer spectacles, treat amblyopia or refer to a local ophtalmologist when needed. They are also involved in a teaching project for the staff of local clinic of the county. Spectacles are given for free; they are provided by France, offered by opticians, partners, other associations or our patients.

**Conclusion:** In three years with four missions, thanks to eleven orthoptist volunteers, 2227 adults have been screened, 1970 spectacles were given in the health center, 389 adults were referred to a local ophthalmologist for further examination or treatment. In schools, 4306 pupils have been screened and about 10% were in need of spectacles, 410 were given spectacles, 5 pupils needed patching therapy for amblyopia and 3 needed surgery for cataract.
POSTER 51
New horizon in the orthoptic practice

Sandra Holgado
Duke University Eye Center
Ophthalmology
Durham, USA

Abstract

**Purpose:** Electrophysiology is a key part in the diagnosis of the retina dystrophies accompanied with other testing. Orthoptists as healthcare providers can incorporate electrophysiology testing into their practice. Electrophysiology testing is mostly available in tertiary care centers, yet this practice can be expanded globally. The trend in the United States is that Orthoptist are using the electrophysiology tests more readily as a part of their work.

**Method:** The International Society of Clinical Electrophysiology and Vision serves as a body that provides courses in electrophysiology, but there still are other institutions that also offer training in electrophysiology.

**Results:** Electrophysiology will be more available in the world, which will allow for a higher comprehensive eye care, and aid treatment for retina dystrophies.

**Conclusion:** The diagnosis of the retinal dystrophies from the electrophysiology testing will serve as the guide to genetic testing for retinal hereditary diseases.
Thursday 30 June 2016

Theme block #9: Screening, Vision, Refractive Error

RAPID FIRE POSTER PRESENTATION 1 (52)
Adverse reactions following routine anticholinergic eye drops in a paediatric population: an observational cohort study

Helena Maria van Minderhout
Medical Centre Haaglanden
Ophthalmology
The Hague, the Netherlands

Helena M. van Minderhout, Maurits V. Joosse, Diana C. Grootendorst, Nicole E. Schalij-Delfos

Abstract

Objectives: To investigate the presence, nature, and relationship to age, sex, ethnicity and body mass index (BMI) of adverse reactions following routine cycloplegic eye drops in children.

Methods: Prospective observational cohort study. Participants were 3 to 14 year old children receiving two drops of cyclopentolate 1% (C+C) or one drop of cyclopentolate 1% and one drop of tropicamide 1% (C+T). Patients were categorised by age (3 to 6, 7 to 10, and 11 to 14 years), sex, ethnicity and BMI (low, normal or high). Outcome measure was rate and nature of adverse reactions reported at 45 minutes following treatment. Crude and adjusted odds ratios (OR) for reporting an adverse reaction using stepwise regression analysis with BMI, age, ethnicity and sex were calculated.

Results: 912 of 915 eligible patients participated (99.7%). Adverse reactions were reported for C+C in 10.3% and in C+T in 4.8% (42/408 and 24/504, p=0.002). Compared to C+T, an increased risk was present in C+C (crude OR 2.3 [1.4 to 3.9], p=0.002). Central effects were present in 95% (C+C) and 92% (C+T) respectively. Severe to moderate drowsiness was the most frequently reported adverse reaction (5.4%) following C+C administration. This adverse reaction was most often present in children aged 3 to 6 years and predominantly present in children with low BMI. Hyperactivity and/or behavioural problems were reported in 1.5%. Reports of severe to moderate drowsiness and excitement, hyperactivity and/or behavioural problems were significantly less often present following C+T administration (1.6% and 0.6% respectively). Regression analysis showed BMI to be a highly significant influencing factor (forward adjustment; OR 3.1 [1.7 to 5.6], p<0.001). In a multivariate model, dose of cyclopentolate remained associated with adverse reactions. Analysis per BMI, age category, and regime indicated associations with low BMI in both interventions (OR C+C 21.4 [6.7 to 67.96], p<0.001; C+T 5.2 [2.1 to 12.8], p<0.001) and young age in C+C (OR 8.1 [2.7 to 24.8], p<0.001).

Conclusions: Adverse reactions were common and almost exclusively involved the central nervous system. Both presence and severity were associated with repeated installation of cyclopentolate 1%, low BMI and young age. In specific paediatric populations a single dose of cyclopentolate must be considered. We recommend a general adjustment of product documentation.
RAPID FIRE POSTER PRESENTATION 2 (53)

Are lea numbers and symbols comparable to the ETDRS using a computerised chart?

Anne Bjerre
University of Sheffield
Academic Unit of Ophthalmology and Orthoptics Faculty of Medicine, Dentistry and Health, Beech Hill Road
Sheffield, UK

Anne Bjerre BSc (Orthoptics) MSc, David Robertson
Academic Unit of Ophthalmology and Orthoptics, University of Sheffield, England

Abstract

Purpose: To validate Lea Symbols and Numbers against ETDRS visual acuity (VA) using the computerised Thomson Test Chart 2000 software in a normative adult sample.

Methods: This prospective study employed a laboratory-based, repeated measures design led by a single experimenter. Twenty adult volunteers without ocular history and manifest strabismus were recruited. Right and left VA was measured using three different logMAR charts: Lea Symbols, Lea Numbers and ETDRS. The optotypes were presented at 4 metres on a computer screen using the Thomson Test Chart 2000 software. Test charts and eye tested were performed in a randomised and counterbalanced order. Participants were assessed unaided to gather a wide range of VAs. Assessment took place over 2 separate visits to evaluate test-retest variability (TRV). Agreement between tests, expressed as 95% limits of agreement was determined.

Results: There was no significant difference between right and left VA for all three tests (F(1,19)=0.35, p=0.56). Therefore only right eye data is discussed. Right mean VA scores at visit 1 and 2 were -0.01±0.40 and -0.07±0.32 logMAR for Lea Symbols, 0.10±0.33 and 0.05±0.31 logMAR for Lea Numbers and -0.02±0.33 and -0.03±0.35 logMAR for ETDRS. There was no significant difference between ETDRS and Lea Symbols (p=0.16), however Lea Symbols had a tendency to overestimate VAs up to 0.04 logMAR. Lea Numbers significantly underestimated VA compared to ETDRS (p<0.00001) and Lea Symbols (p<0.001) up to 0.12 logMAR. TRV of +0.13 logMAR was found with ETDRS and +0.18 logMAR for both Lea Symbols and Numbers. The ETDRS showed agreement of +0.16 and +0.22 logMAR with Lea Numbers and Symbols, respectively. Agreement between Lea Numbers and Symbols were ±0.26 logMAR. Majority (80%) ranked Lea Numbers the hardest and ETDRS the easiest chart to perform.

Conclusions: Lea Numbers significantly underestimated VA compared to both ETDRS and Lea Symbols by just over 1 line. Lea Symbols tended to overestimate by up to 2 optotypes compared to ETDRS. Similar TRV was found for all test charts, although the ETDRS was the most repeatable. Good agreement was found between test charts, with Lea Numbers producing stronger agreement with the ETDRS than Lea Symbols. Clinicians should be aware that VA obtained with the three tests varies and Lea Numbers are likely to underestimate VA in literate adults.
POSTER 54

A comparison of refractive error measurement (REM) made between optometrist & orthoptist, before and after training in refraction given to orthoptist

Javaria Nawaz
University Hospital of Wales, Cardiff
Orthoptics
Cardiff, Wales, UK

Javaria Nawaz¹, Dr Charlotte Codina², Patrick Keating²
¹University Hospital of Wales, Cardiff
²Academic Unit of Ophthalmology & Orthoptics, University of Sheffield

Abstract

Purpose: To compare results of retinoscopy between Optometrist and Orthoptist and investigate if there is a significant difference in refraction between the two professionals. To also compare results in mean time to completed refraction after the Orthoptist has had some training (by an Optometrist) and retinoscopy is repeated (On a different group of patients).

Method: 82 subjects, aged 3-8 years were recruited from the University Hospital of Wales, Cardiff, Orthoptic clinic. Refraction was assessed objectively and the method used was Cycloplegic streak retinoscopy. The procedure involved each participant sitting for refraction twice, once with the Orthoptist and once with the Optometrist. After 41 orthoptist subjects were tested, a period of training took place in which the Orthoptist shadowed the Optometrist. This was equivalent to 12 hours. Once completed, another 41 subjects (different from the first group) were refracted following the same procedure as for the first group. Results between the two professionals were then compared. The time taken to refract was also measured in both groups.

Clinical refractive data in the form of sphere, cylinder and axis were converted into three power vectors M, J0 and J45 (a format ready for analysis).

Results: There were no statistically significant differences in refraction (M, J0, J45 & U) between the Orthoptist and Optometrist, p=0.523, 0.318, 0.462, 0.546 respectively) in Group 1. There was a statistically significant time difference between the two professionals in Group 1. Welch's F (1, 62.065) =63.013, (p<0.005).

There was a decrease in time taken for Orthoptist to refract from Group 1 to Group 2, i.e the trained Orthoptist (Group 2) completed refraction more quickly than in Group 1, but the difference was not statistically different. In Group 1, the mean time taken was 36.07 (95% CI, range 13.5 to 85.6) higher than Group 2, t (80) =1.448, p=0.15.

Conclusion: Refraction performed by the Orthoptist was just as accurate as that of a qualified Optometrist before training was given. This has the potential benefit for patients in the clinical setting, such as shorter waiting times for refraction appointments. Furthermore, the fact that the Orthoptist was no different to the Optometrist before training proves that the training received by the Orthoptist as an undergraduate is sufficient with respect to learning the technique of refraction. The environment of learning as an undergraduate amongst other students learning the same practical skill appears beneficial. Furthermore, muscle memory is quite likely to have played a central role in the abilities of the Orthoptist in this study, wherein the performance of refraction became automatic.
POSTER 55

Effect of astigmatic blur on kinetic visual acuity and eye-hand coordination

Takushi Kawamorita
Kitasato University School of Allied Health Sciences Department of Orthoptics and Visual Science
1-15-1 Kitasato,
Sagamihara, Japan

T. Kawamorita¹, K. Shimizu², M. Ito¹, N. Shoji¹
¹ Department of Orthoptics and Visual Science, Kitasato University School of Allied Health Sciences,
Sagamihara, Kanagawa, Japan
²Department of Ophthalmology, Kitasato University School of Medicine

Abstract

Purpose: Currently there occurs a high number of road traffic deaths worldwide (1.24 million/year) in 2010). It is known that 95% of the traffic accidents are caused by human error; therefore, it is important to approach the research from a physiological optics standpoint. The purpose of this study was to investigate the effect of astigmatic blur on static visual acuity (SVA) / kinetic visual acuity (KVA) and eye-hand coordination (EHC), to indirectly predict the effect of astigmatic correction while driving.

Method: Forty-four eyes from 44 subjects (mean age 36.9 ± 16.7 years) with no ophthalmic disease other than refractive error were enrolled. The SVA, KVA, and EHC were measured with AS-4C (Kowa, Aichi, Japan) and Driver’s Vision (Olympus memory works, Tokyo, Japan). The test eye was decided randomly. After noncycloplegic refraction was corrected, with-the-rule astigmatism of 0.50 diopter (D), 1.00 D, and 2.00 D were produced using trial lenses in each subject.

The tenets of the Declaration of Helsinki were followed in this study and informed consent was obtained from all subjects. The prospective study was approved by the Institutional Review Board at Kitasato University School of Allied Health Sciences.

Results: SVA and KVA were significantly worse with increase in astigmatic blur. The EHC did not change significantly. Performance on all tests, SVA, KVA, and EHC in subjects aged 40 - 69 significantly decreased with astigmatic blur, compared to performance of younger subjects.

Conclusion: Eyes with astigmatism had significantly lower kinetic visual acuity than eyes with no astigmatism. In addition, our results suggest that elderly people and/or long-haul drivers need to correct astigmatism.
POSTER 56

Aniseikonia can obscure a small heterotropia

Veerle Van Bellinghen
UZ Leuven
Eye hospital UZ Leuven
Leuven, Belgium

Dr. M. Dieltiens, Ms. M. Van Lammeren, Ms H. Janssens, Dr. C. Cassiman

Abstract

Purpose: To present two cases of aniseikonia in whom a small hypertropia could be detected only after correction with iseikonic lenses.

Methods: Patient 1 is a 54-year old man with high unilateral myopia who developed visual complaints following cataract surgery on his highly myopic eye. He described one image being larger than the other after surgery. Patient 2 is a 62-year old woman presenting with a blurred unstable image under binocular circumstances. The complaints were non-descript and misleading, such that a neurological investigation was being considered.

Orthoptic examination was performed in both patients. Additional examination was carried out using the Aniseikonia Inspector and iseikonic lenses.

Results: Initial orthoptic examination showed no clinically significant heterotropia and a normal ocular motility. Aniseikonia Inspector revealed an iatrogenic isometropia with aniseikonia in the first patient and a retinal induced aniseikonia caused by an epiretinal membrane in the second patient.

During a trial of iseikonic lenses, both patients noticed a small vertical diplopia which could be quantified using Maddox rod. Patient 1 had good binocular vision following prismatic correction of this small hypertropia and did not need additional iseikonic lenses.

The binocular vision of patient 2 also improved following prismatic correction of the hypertropia. However, to obtain truly comfortable binocular vision, she additionally required correction of the aniseikonia with iseikonic lenses.

Conclusion: Examination of two patients with aniseikonia showed that aniseikonia can obscure a vertical deviation. Sometimes, prismatic correction of the small hypertropia may be sufficient to re-establish comfortable binocular vision. In other cases, iseikonic lenses contribute to the restoration of binocular vision.
POSTER 57
Refraction for children with hypermetropia?

Arinder Channa
Royal Berkshire Hospital Trust
Orthoptics
Reading, Berkshire, UK

Jane Tapley

Abstract

Purpose: There was an impression within the department that hypermetropic prescriptions in children do not change significantly from one annual refraction to the next. An audit was carried out to determine if this impression could be substantiated.

Method: A case note review was carried out to collect refraction data for the first 100 children refracted in 2008 who met the following criteria:
Record of a minimum of 3 cycloplegic refractions
Hypermetropia > +1.50 DS
Astigmatism < 1.00 DS
The results were analysed to establish what changes occurred.

Results: Data was obtained for 200 eyes. Mean hypermetropia found was +4.00±0.45 DS and +4.11±0.45DS for the right and left eye respectively. Age range of the patients was 1 to 8 years with an average age of 3.5±1.5 years.
The mean change in hypermetropia was found to be 0.95 DS and 0.92 for the right and left eye with a median value of 0.75 DS for both eyes.

Conclusions: The results showed that there was not a significant change in hypermetropic prescriptions over time regardless of the severity of the hypermetropia. This suggests that routine annual refractions may not be indicated in hypermetropic children in the absence of other clinical factors.
POSTER 58

Plusoptix photoscreening: a reliable screening option?

Chantal Heiming
University Hospital Brussels
ophthalmology
Brussels, Belgium

Abstract

Purpose: Photoscreening is a vision screening technique used to screen for amblyogenic factors, mainly refractive errors and strabismus. The accuracy of non-cycloplegic photorefraction using the plusoptiX A09 in detecting refractive errors was determined.

Methods: 494 children, visiting the outpatient clinic of a tertiary referral centre, underwent a full ophthalmological and orthoptic assessment including screening with the noncycloplegic photorefractor (plusoptiX A09) and cycloplegic refraction (retinoscopy and/or autorefraction with a Nidek AR-310A). Cycloplegic refractions were subdivided and analysed in five categories: aniso-hyperopia, aniso-astigmatism, hyperopia, astigmatism power and axis.

Results: Cycloplegic refraction revealed a spherical hyperopic anisometropia of 1 diopter (D) or more, in 46 patients. In 3 out of 46 the plusoptiX showed an underestimation of more than 0.5 Diopter and in 12, an overestimation of > 0.5D (sensitivity: 0.87; specificity: 0.94). In 8 patients cycloplegic refraction showed cylindrical hyperopic anisometropia of >= 1D. In 4 out of 8, the plusoptiX underestimated the anisometropia more than 0.5D (sensitivity: 0.25; specificity: 0.9). 101 patients were found to have a hyperopia of the lower meridian in the right eye of more than 2D, 75 of these were underestimated by the plusoptiX by at least 1.5D (sensitivity: 0.21; specificity: 0.97). Astigmatism of 114 right eyes was more than 1.5D. The plusoptiX showed underestimation of more than 1D in 4 and overestimation of more than 1D in 5 eyes. Higher degrees of astigmatism were associated with differences in axes measurements of less than 20 degrees.

Conclusion: The plusoptiX has a high sensitivity and specificity for the detection of spherical hyperopic anisometropia, astigmatism and the axis in larger amounts of astigmatism.
POSTER 59

A novel math-based method to document 20/20 vision in a child with functional visual loss

Virginia Karlsson
Lexington Eye Associates
Pediatric ophthalmology
Lexington, USA

Abstract

**Purpose:** This is a technique for clinicians to document visual acuity in a child with functional visual loss. A normally sighted child who is claiming to have poor vision poses a clinical challenge. This behavior is well known; typically a girl, aged 7-9 years, who will often state that she wants glasses. The clinician must prove that vision is within the normal range.

**Method:** The StimulITM vision testing system is manufactured by the Accomdata Corporation using Apple equipment. It allows the clinician to choose an optotype to be presented singly, but with four bars around it simulating the full line necessary for accurate vision testing (“crowding”). The system can randomly generate optotypes of a single size repeatedly. To prove that a malingering child sees 6/6 (20/20), the clinician uses 6/6-size HOTV letters and “forces” the malingering child to choose which HOTV letter is being shown. This is repeated 20 or more times. The child who is capable of normal acuity but is feigning decreased vision will choose every presentation incorrectly. The malingering child is then fogged with +6 lenses and “forced” to continue to pick a letter. With 20 more presentations of the 20/20 single HOTV optotype, the blurred child will now randomly identify some correctly as there is a 1 in 4 chance of correctly guessing the letter with each presentation.

**Results:** When 25 presentations are made, the chance of a malingering or truly blind child seeing all 25 incorrectly is calculated by 0.7525 which is 0.0007525. Five more presentations are calculated by 0.7530 which is 0.0001786. The probability of a blind child identifying all 25 presentations incorrectly is 1 in 1329. Thirty presentations would reduce that chance to 1 in 5599.

**Conclusion:** Since the likelihood of identifying all 25 presentations incorrectly is so small, these results suggest that reported symptoms of decreased vision may be significantly exaggerated.
POSTER 60
Reliability of orthoptic screening: contribution of a binocular non cycloplegic autorefractometer

Magali Dall’Angelo
Private Practice
77
Lieusaint, France

Abstract

Purpose: Binocular non-cycloplegic autorefractometers provide value when added to our pediatric screening compared to other commonly used tests.

Methods: A population of 50 children under 6 years were examined by an ophthalmologist for the first time. All had an orthoptic examination including a measurement using a binocular non-cycloplegic autorefractometer. All the children will be then examined in second time, using cycloplegia to corroborate screening results.

Results: No false positives or false negatives were revealed with the ophthalmologist examination.

Conclusions: The binocular non-cycloplegic autorefractometer is reliable and accurate.
POSTER 61
Comparison of two binocular non-cycloplegic autorefractometers

Magali Dall’Angelo
Private Practice
77
Lieusaint, France

Abstract

**Purpose:** There are several binocular non-cycloplegic autorefractometers available. I compared the results of the two most commonly used machines in France, the 2win and the plusoptix A12.

**Methods:** Subjects included a population of 75 children under 6 years of age who consulted an ophthalmologist for vision screening. All patients received three measures: the first two measures with each of the binocular non-cycloplegic autorefractometers, and the third with the ophthalmologist after cycloplegia.

**Results:** There was no significant difference between the two compared machines. However, the astigmatism measured using either machine is slightly increased compared to that found with cycloplegia, and the sphere is underestimated.

**Conclusions:** There is no significant difference between the two binocular non-cycloplegic autorefractometers.
Thursday 30 June 2016

Theme block #10: Amblyopia

RAPID FIRE POSTER PRESENTATION 1 (62)
Relative afferent pupillary defect: Pathology or amblyopia?

Gerdien Holtslag
University of Applied Sciences
Orthoptics
Utrecht, the Netherlands

S. van Gemert1, 2, G. Holtslag2, 3
1Canisius, Orthoptic department, Nijmegen; 2University of Applied Science, Orthoptic department, Utrecht
3ErasmusMC, Orthoptic department, Rotterdam

Abstract

Purpose: Amblyopia is the most common cause of reduced visual acuity (VA) in children, it is rarely caused by ophthalmic pathology. Pupillary responses, specifically the Swinging Flashlight Test (SFLT) can be used to determine whether the optic nerve is affected by pathology. The purpose is to determine how the Swinging Flashlight Test (SFLT) can be used to distinguish between amblyopia and ophthalmic pathology as possible causes of decreased VA in children.

Methods: Pubmed was searched to identify articles describing the relationship between RAPD and amblyopia. Search terms included amblyopia, RAPD, pupillary reactions and SFLT. The reference lists of each article were reviewed in detail to find additional articles. A case of a child with a RAPD was retrospectively selected.

Results: A RAPD is present in 9% to 93% of amblyopic patients. RAPD is measured in log units, using neural density filters, or pupillary contraction amplitude, calculated as the difference in contraction between both pupils. In normal subjects a RAPD up to 0.3 log units or a difference up to 0.25 mm contraction amplitude can be found. In amblyopic patients with a RAPD the RAPD measured 0.3-0.6 log units. The contraction amplitude in amblyopic patients is not significantly different from that of normal subjects.

A 5 year old boy was referred to us by his general practitioner with a constant exotropia of his Left Eye (LE). During orthoptic examination there was normal visual acuity in the Right Eye (RE) but he was not able to fixate with his LE and only light perception was present. The Swinging Flashlight Test (SFLT) revealed a dense relative afferent pupillary defect (RAPD) of the LE. According to the literature ophthalmic pathology is the most likely diagnosis in this case. Cycloplegic refraction showed a anisohyperopia of S+0.75 in the RE and S+3.25 in the LE. The presumed diagnosis was confirmed by funduscopic examination: the RE showed no abnormalities and a pale optic disc was seen in his LE.

Conclusion: The literature shows that amblyopia may cause a subtle RAPD, which is very close to the range in normal subjects. Different instruments were used to obtain these results. Therefore it is questionable whether a subtle RAPD is detectable in every day practice. The patient in the case showed a marked RAPD, which is much more likely to be caused by pathology than amblyopia. The diagnosis of pathology was confirmed by funduscopic examination.
POSTER 63
Diplopia following short treatment for moderate amblyopia

Janice Hoole
Leeds Teaching Hospitals
Orthoptic and Children’s Eye Clinic
Leeds, UK

Abstract

Purpose: Diplopia following occlusion is rarely reported. Emerging evidence suggests it is safe to offer occlusion to children older than previously carried out routinely. There is little concrete evidence about the efficacy of the use of sbiza bar to detect cases that may be more susceptible to anti-suppression and diplopia. This case report contributes to the knowledge base.

Method: A case report of a 7 year old child who reported diplopia following just 2 hours occlusion per day for 6 weeks for strabismic /anisometropic amblyopia. There was a history of known long-standing reduced uniocular acuity without treatment.

Results: Intractable diplopia occurred following a relatively short period of occlusion for moderate amblyopia resulting in the need to occlude the amblyopic eye so the patient could function. It took 6 months to gradually wean the patient off increasingly less opaque occlusion.

Conclusion: Diplopia can occur after short periods of occlusion in moderate amblyopia in older children. Further research is required in to the efficacy of the sbiza bar in determining at risk cases.

Key words: Amblyopia, diplopia, occlusion, sbiza bar
VisioPercept - quantification of visual competency

Dagmar Verlohr
Outpatient Eyesore & Orthoptic Unit
Orthoptics
Hamburg, Germany

Dagmar I. Verlohr, Fritz Dannheim
Outpatient Eyecare & Orthoptic Unit, 21218 Seevetal, Germany

Abstract

Introduction: Acquired binocular defects in the central visual field can cause deficits in orientation and reading as presented at the XII. IOC in Toronto, Canada, 2012. The results of an evidence-based study* showed the effectiveness of saccadic training and the ability of the patients to apply the newly learnt strategies to everyday life, regaining a higher quality of life. But is a compensational saccadic training for every patient with acquired hemianopic defects indicated?

Aim: To validate an additional diagnostic tool that reveals those patients who have already adapted themselves to their visual handicap and to measure the effect of compensational search saccade training.

Methods: We developed a computer programme, VisioPercept®, to measure the time required to visually recognize randomized appearing objects within the binocular visual field of 30-40°. While fixating a scenic view binocularly, the Lea-Numbers® 5, 6, 8 and 9 are presented in 11 positions in random order within a visual angle of about 30° to both sides. After an optional trial run, 2 sequences are performed for a total of 22 presentations. The aim for the patient is to search the screen with eye movements after the central fixation marker (smiley) disappears to find, recognize, and name the respective number as fast as possible. Locating the number is confirmed by pressing the space bar.

Another part of the program is the Line Dissection Test which is used to differentiate between a purely cerebral visual pathway lesion (homonymous hemianopia / quadranopia) and an additional visual perceptional defect, such as hemineglect.

Results: This program proved to be useful for the quantification of visual competency in patients with visual field defects of both eyes. It not only allows the measurement of perception and visual resolution, but also assesses hemianopic asymmetries and short-term fluctuation as an indicator for further specific cerebral disabilities e.g. alertness. Furthermore the registration of the short- and long-term training effects within the course of a visual rehabilitation is possible.

Conclusions: VisioPercept® is a simple program to evaluate the reaction time in the paracentral visual field. It enables the specialists to distinguish reliably between those patients who need compensational search saccade training and those who show a spontaneous adaption to the visual field deficits. In particular, carefully selected cases it served as proof of virtually unlimited ability for orientation in binocular visual field defects. For some of these patients it was then possible, with an additional neuropsychological examination and driving performance testing, by means of a special permit, to participate in street traffic again.

* Neurology® 2009; 72:324-331; www.neurology.or
POSTER 65
Bilateral amblyopia treatment in a population of 8 children presenting refractive amblyopia with normal retinal correspondence

Christelle Gorgé-Puissant
Private Practice
Orthoptie
Brest, France

Gorgé-Puissant Christelle (Brest, France)

Abstract

**Purpose:** When meeting a child with strabismic amblyopia, we do not hesitate to use all therapy methods to treat it: patching, penalized eye-glasses or Bangerter occlusion foils. But in case of normality of sensoriality, bilateral amblyopia is usually treated with consistent, early glasses with follow up a long period of time.

**Methods:** We consider refractive amblyopia in the presence of large amount of refractive error. We define “large” refractive error as hyperopia > 4 D, astigmatism > 2 D, and myopia > 6 D. To confirm the presence of amblyopia, the refractive error must be determined with cycloplegic refraction, and the full error must be prescribed.

In order to verify if an active treatment can be beneficial in these cases, we evaluated the average visual acuity of 4 children who did not have any prior treatment of amblyopia, and compared this to the visual acuity of 4 children who had an active treatment by alternating patching.

**Conclusion:** contrary to popular beliefs, active treatment of bilateral refractive amblyopia with alternate patching yields better visual acuity with few weeks of treatment than glasses alone.
POSTER 66
Visuospatial function assessment after long amblyopia treatment by full time patching
the-author-assesses-the-visuo

Christelle Gorgé-Puissant
Private Practice
Orthoptist
Brest, France

Abstract

Purpose: The visuo-spatial function and visuo-perception of children requiring longterm, full time patching treatment for deep amblyopia, with long stabilization treatment, were assessed.

Methods: The study evaluates ten children with an average of 4,8 months of full time patching to treat strabismic amblyopia, and refractive amblyopia treated with optical penalization for 23 months. The study uses the NEPSY: NEuro PSYchological assessment tests and its subset “visuo-spatial function”.

Results: The 3 subtests (Arrows, block constructions, orientations), appraise the ability to judge position, directionality, copying of 2 dimensional designs, and reconstruction of 3 dimensional designs.

Conclusion: The study confirms that children who had benefit of full time patching treatment can achieve the same test score as children without amblyopia treatment. Full time patching treatment in amblyopia does not create perceptive disorder.
POSTER 67
Improving patching compliance and recording an app

Deirdre Garland
Mater Health Services
Ophthalmology
South Brisbane, Australia

Abstract

Purpose: Orthoptists are held accountable for the patching treatment of children with amblyopia. The purpose of this presentation is to introduce the application “Patching Pirate” designed to increase compliance with occlusion.

Methods: This presentation includes a literature review of evidence-based patching. The author developed the app “Patching Pirate” at the suggestion of a parent of an amblyopic child, to record the number of hours of occlusion a child receives and ultimately improve compliance.

Results: Patching outcomes will be presented. Also discussed will be the use of 21st Century computer technology in the effort to improve compliance.
Thursday 30 June 2016

Theme block #11: Strabismus

POSTER 68
Orthoptic intensive training in XT after surgery

Roberta Delle Site
Hospital of Rovereto
Rovereto TN, Italy

Roberta Delle Site Mrs., Elisabetta Racano Dr., Federica Romanelli Dr., Jenny Frapporti Mrs.
Hospital of Rovereto

Abstract

Purpose: To suggest an intensive Orthoptic training in paediatric patients with symptomatic residual or recurrent XT (exodeviation, with or without convergence insufficiency, following surgery.

Methods: 7 young patients aged between 7 and 15 years with a history of surgery for exodeviation, binocular single vision, no heterophoria or heterotropia greater than 18 prism diopters of exodeviation post-operatively, stereopsis of at least 400” on Titmus test, and Visual Acuity of at least 20/25 wearing optical correction for at least two weeks when necessary were included. Patients were provided with instructions on how to perform both free space orthoptic exercises and the CVS computer software program (Computerized Vergence System by HTS.Inc). Training was conducted over a three month period, and was carried out daily at home and once a week at the Hospital to collect the data. Subjects were asked to complete a pre- and post-training questionnaire as an assessment of their symptoms. A full orthoptic evaluation took place before and after the three month training period.

Results: All patients were considered to have a successful outcome. Data have been recorded using video of convergence and orthoptic examination pre- and post-treatment. Intermittent Diplopia, Fusional Amplitude, Convergence, Accommodative Amplitude and Angle of squinting were all improved. Changes in symptoms were noted by means of a questionnaire.

Conclusions: There is supporting evidence that post-operative home based intensive orthoptic exercises with weekly support at the Hospital for 3 months are effective and useful for symptomatic residual or recurrent XT, with or without convergence insufficiency, provided that patients have some levels of fusion and stereoaucuity at the commencement of training. Moreover, software technology is user-friendly and captivating, allowing a better compliance with the program in young patients. All treatment costs were affordable.
RAPID FIRE POSTER PRESENTATION 1 (69)
An atypical unilateral vertical gaze restriction

Ms Roisin Buckels
University of Liverpool
Moorfields Eye Hospital
London, United Kingdom

Roisin Buckels (orthoptist), Gill Adams (consultant strabismus and paediatric ophthalmic surgeon)

Abstract

Purpose: We report on a uniocular vertical gaze restriction with ptosis and globe retraction on attempted downgaze, giving an overview of the investigation and potential differential diagnosis with supporting literature.

Method: Retrospective case report with photographs

Results: A 42-yr old woman presented to a tertiary eye hospital complaining of a worsening childhood-onset ptosis. A moderate right ptosis, chin up head posture, latent nystagmus & good binocularity in primary position were noted. Motility revealed an A pattern, marked restriction of elevation and a small restriction of depression of the right eye accompanied by globe and lid retraction on downgaze. The findings were suggestive of a congenital cranial dysinnervation disorder and not a superior rectus weakness alone which is commonly associated with congenital ptosis.

Conclusions: There are only half a dozen cases in literature with similar motility findings. Undertaking a full investigation in such cases helps reduce the need for unnecessary neurological work ups. Complex cases such as these should be seen by a strabismologist.
RAPID FIRE POSTER PRESENTATION 2 (71)
A case of bilateral sequential Brown’s syndrome

Victoria Wilson
Moorfields Eye Hospital NHS Foundation Trust Orthoptic Department
London, United Kingdom

Abstract

Purpose: To report a case of suspected bilateral sequential Brown’s syndrome in a young child.

Method: Retrospective case report

Results: A six year old child with an infantile esotropia presented with signs of a newly acquired left Brown’s syndrome following bilateral medial rectus resections. Four months after a subsequent left superior oblique tenotomy, the motility remained unchanged but there were signs of slight Brown’s syndrome developing in the right eye. By seven months post-operatively the left motility deficit had almost completely resolved yet the motility of the right eye had deteriorated. By 13 months post-operatively, left motility had fully resolved, right motility was improving without intervention but signs of a left ptosis were noted. No injury or change in general health was reported and tests for anti-acetylcholine receptor antibodies were negative.

Conclusion: Bilateral sequential Brown’s syndrome has rarely been reported in the literature (1, 2). No underlying cause for the syndrome has been found in this case and it is presumed to be idiopathic, suggesting conservative management may prove effective in some cases.
POSTER 72
The partial occlusion test - What does it evaluate?

Ms Helen Collett
Ramsay Healthcare
Outpatients
Chelmsford, United Kingdom

Abstract

Purpose: To discuss clinical applications of the partial occlusion test and neurological processes of ocular alignment.

Methods: The cover test with a partial translucent occluder is recognised in the examination of strabismus, nystagmus and dissociated vergences. The partial occlusion test incorporates photography of the position of each eye with binocular and monocular viewing.

Results: Photographs of ocular misalignment can improve the patients’ understanding of strabismus and enable patients to decide on treatment. Patients with asthenopic symptoms of blurred and double vision may be unaware that they are controlling an underlying latent strabismus until they see the deviation of the covered eye. In cases of intermittent exotropia the eyes initially appear to be straight but diverge under a partial occluder; a manifest divergent squint may be pictured if the control breaks down. In cases of constant esotropia either eye is seen to converge under occlusion which can illustrate the mechanics of alternate manifest strabismus and alternate fixation; the desired effect of occlusion therapy. Conversely in pseudo-strabismus straight eyes are shown with either eye occluded.

What visual processes are influenced by the partial occlusion test? Ocular alignment to fixate and perceive a single stabilized image and the surrounding binocular visual field is controlled by a combination of visual sensory and motor neurological pathways between the eyes, brain, extraocular muscles and other parts of the body. When one eye is covered by a partial occluder there is disruption of binocular co-ordination; accommodative and fusional vergences and binocular fixation. Optical defocus with reduced luminance, contrast and form is induced which leads to physiological confusion of retinal correspondence and suppression of the occluded eye. The fixation and position stability are disturbed in the absence of binocular summation to cause ocular drift and decompensation of any latent component of strabismus. Tonic innervation of the extraocular muscles due to Hering's law may cause the occluded eye to deviate. The dorsal light reflex is stimulated by asymmetrical luminance whilst the vestibular ocular reflex, optokinetic reflex, saccadic and pursuit systems are directed by the fixating eye.

Conclusions: The partial occlusion test gives a qualitative assessment of strabismus and is a valuable educational aid to improve understanding and provide evidence of ocular alignment.
POSTER 73
The psychological link in the decompensation of some ocular motility disturbances

Clotilde Sevestre
Private Practice
Herault
Balaruc Les Bains, France

Abstract

Purpose: To demonstrate the effect of extreme psychological states on the sudden appearance of an ocular motility disturbance or physical findings.

Methods: Cases of decompensation or acute onset horizontal strabismus and their relationship to emotional trauma, high stress, and depression will be presented.

Conclusions: We should not neglect the psychological aspect in favour of the functional, but treat them with equal importance in the appearance of strabismus.
Thursday 30 June 2016

Theme block #12: Strabismus Management

RAPID FIRE POSTER PRESENTATION 1 (74)

The effect of prism and foil therapy on the quality of life in adult patients with diplopia

Clare Field
Moorfields Eye Hospital NHS Foundation Trust Orthoptic
London, UK

Vicortia Wilson BMedSci Orthoptics, Emma Smyth BMedSci Orthoptics,
Kelly A MacKenzie MSc, BSc (Hons), AdvCertEd

Abstract

Purpose: Prism therapy and the use of Bangerter foils have long been used in the management of binocular diplopia. As traditional clinical measures of health are increasingly being accompanied by Patient Reported Outcome Measures (PROMS), this study aimed to assess the impact of orthoptic treatment on our patients’ quality of life.

Methods: Forty-six adult patients with recently acquired diplopia (mean age 55, SD 13, 61% male) completed the Adult Strabismus questionnaire (AS-20) before treatment and at the first follow-up visit after treatment had been administered. The higher the overall, psychosocial and functional score (100-0) the better the quality of life.

Results: 45 questionnaires were available for analysis. The overall score, psychosocial, and functional scores all improved after prisms or foils had been administered (scores improved from 62 to 70, 62 to 77.5 \( P=0.50 \) and 46 to 62 \( P=0.03 \), respectively).

Conclusion: Successful Orthoptic treatment indicates significant improvement in patients functional gains, with overall improvement in quality of life, comparable to that of other interventions i.e. botulinum toxin therapy (score 72) and strabismus surgery (score 70).
RAPID FIRE POSTER PRESENTATION 2 (75)
The development of mobile application MyEyeGym as an orthoptic stereogram exercise

Yi Ling Tan
Singapore National Eye Centre
Ophthalmology
Singapore, Malaysia

Abstract

Purpose: Over the last few years there has been a widespread increase in the use of smartphones worldwide. Smartphones have become so common that it is now considered unusual for one to be seen without it. In a study conducted amongst Southeast Asian countries, 98% of adults allow their children to use mobile devices. In recent years, there has also been an increasing trend globally in the use of mobile applications (apps) in healthcare. Healthcare professionals are now complementing their clinical skills with various medical software apps.

In Singapore, the Cats stereogram exercise has often been prescribed as treatment for patients with intermittent exotropia (IXT) in the clinical orthoptics setting. This traditional stereogram exercise has been shown to be effective in its management of IXT. The Cats stereogram card can easily be lost or damaged. In light of the above-mentioned increasing trend of apps in healthcare, as well as the increase in smartphone usage in Singapore, a mobile application for stereogram exercise – MyEyeGym – was developed.

Methods: MyEyeGym App stereogram exercise was developed with the aim of improving compliance through the easy access to the exercise in their smartphones, and increasing interest in doing the exercises. As a result, it may help patients achieve better control over their IXT. MyEyeGym runs on both Apple iOS 6 onwards and Android OS version 4 and higher. It consists of three levels of exercises, a summary report to track activity, an exercise reminder alarm, and games as incentives for children to complete their exercise. These features of MyEyeGym complement stereogram exercise through encouraging patients to perform the exercise, and allowing clinicians to monitor and track the patients’ progress.

A qualitative survey of 32 patients was done to obtain information on their preferences in doing MyEyeGym exercise over the Cats stereogram exercise.

Results: 62.5% of patients who were interviewed stated that they preferred the MyEyeGym app exercise to the Cats stereogram card. Demonstrating improvements in compliance or effectiveness of the app in the control of IXT will further require an ethics-approved research study of sufficient duration.

Conclusion: The survey results show a positive response in the use of mobile application – MyEyeGym –adapted as an Orthoptic exercise, indicating its feasibility and potential effectiveness.
POSTER 76

Comparative study of surgical treatment of congenital and acquired superior oblique palsy

Veronica Cardoso
AZ Monica
Ophthalmology
Deurne, Antwerp, Belgium

Cardoso V1, Godts D1,2, Prinsen S1
1Department of Ophthalmology AZ Monica, Deurne Antwerp, Belgium
2Antwerp University Hospital, Edegem, Belgium

Abstract

Purpose: To evaluate the results of non-adjustable suture surgery in patients with unilateral congenital and acquired superior oblique palsy.

Methods: The records of 27 patients who underwent strabismus surgery in the past 3 years for unilateral congenital or acquired superior oblique palsy were reviewed. All patients underwent a complete orthoptic and ophthalmologic examination. Data regarding preoperative and postoperative alignment and ocular motility were compared. The preferred surgical strategy included weakening procedures on the inferior oblique muscle of the ipsilateral eye only (16 patients), or in combination of weakening of the contralateral inferior rectus muscle (2 patients). In 9 patients, horizontal surgery was simultaneously performed.

Results: The vertical deviation improved in 16 patients to 0 ± 6 prism diopter (PD) in patients with one muscle surgery (inferior oblique muscle recession) and to 0 ± 4 PD in 2 patients with 2-muscle surgery (inferior oblique muscle recession + inferior rectus recession). In all patients the vertical deviation in lateral gaze improved.

Conclusion: Recession of the inferior oblique muscle alone is effective in small vertical deviations due to unilateral congenital and acquired superior oblique palsy. Combining this technique with a recession of the contralateral inferior rectus muscle is indicated in larger vertical deviations. None of our patients had immediate or late overcorrections. Only 3 patients needed a second operation due to undercorrection.
**POSTER 77**

**Strabismus surgery in a patient with bilateral INO**

**Eline De Jongh**  
The Rotterdam Eye Hospital  
Orthoptic Department  
Rotterdam, the Netherlands

**D. Goes, CO; M. Tjon-Fo-Sang, MD, PhD,**  
The Rotterdam Eye Hospital

**Abstract**

**Purpose:** Strabismus surgery is rarely advocated in Multiple Sclerosis (MS) with bilateral internuclear ophthalmoplegia (INO) due to the uncertain course of the disease. Roper-Hall et al. (2002) reported recess or recess-resect procedures for INO only in cases of a vascular or traumatic cause. By contrast, Adams et al. (2009) concluded that strabismus surgery was effective and should be offered to many more patients with INO, because alignment improved quality of life by reducing symptoms of diplopia. Because there are few data on strabismus surgery for INO, we present our case.

**Methods:** A 48-year old male with bilateral INO and MS was referred to the Rotterdam Eye Hospital for strabismus surgery. Up until then, a Fresnel prism had been helpful, but eventually diplopia could only be resolved with occlusion of one eye. Ophthalmologic and orthoptic examination were performed. Ocular ductions could not be quantified because the patient could not be seated behind the synoptophore.

**Results:** There was a large exotropia of the right eye (near 70 PD, distance 58 PD) and large bilateral restriction of adduction with abducting nystagmus in right and left gaze. Convergence was absent. Surgery was performed twice. The first procedure was a 6 mm recession of the left lateral rectus in combination with a total transposition of the right superior and inferior rectus nasally. Due to a residual angle, additional surgery was performed: a 7 mm recession of the right lateral rectus in combination with a total transposition of the vertical recti nasally (including Foster augmentation sutures). Two weeks postoperatively there was a slight exophoria (XP) (near 6 PD, distance 4 PD) and the patient was free of diplopia. Two months later the angle increased to 25 PD XP near and distance, but patient only noticed diplopia with fatigue.

**Conclusion:** Transposition surgery for patients with INO has not been described before. Alignment improved significantly in primary position, although there is a residual restriction of adduction. Foster sutures seem to have an augmented effect on the ocular ductions, but we could not quantify this. It is hard to predict the result of strabismus surgery in patients with bilateral INO. It is therefore very important that the patient has realistic expectations. Surgery may aid in decreasing diplopia, especially in patients where some binocular function is present, but multiple procedures may be necessary.
POSTER 78
Are medial rectus resections effective in intermittent exotropia of the convergence insufficiency type?

Elly Merckel-Timmer
University of Amsterdam
Ophthalmology
Amsterdam, the Netherlands

H.M. Jellema and C.A.M. Bennebroek

Abstract

Purpose: Surgical correction in patients with a convergence insufficiency –intermittent exotropia (CI-IXT) is not always successful. In our university clinic we propose to resect the medial rectus muscle(s) in these patients.

Methods: We performed a retrospective case review on resections of the medial rectus muscle on CI-IXT patients operated by one surgeon (CB) over the last two years. The target of surgery was a postoperative esophoria/tropia (E(T)) of 5-7^.

Data regarding diagnosis, vision, binocular vision, eye motility and squint angle (at near and distance) were collected. A successful surgical alignment was defined as a distance angle between ≤ 10 prism diopters (PD) of exophoria/tropia X(T) and 5 PD of E(T). Patients with anisometropia greater than 2.5 D, BCVA < 0.5 co-existing vertical deviation of >5 PD, A or V patterns, or additional neurological disorders were excluded.

Results: 7 patients were included, 2 male and 5 female. 4 patients were primary surgeries, 2 residual and 1 was secondary squint due to vitreous surgery. Operation was performed unilaterally in 3 cases and bilateral in 4. The total median amount of resection was 4 mm [3 – 8] mm. The preoperative angle, measured with the prism and cover test, changed from 27^ [14 – 35^]X(T) to 6^ [6E(T) - 18X(T)] X(T) at near, 6 weeks postoperatively (p=0.018). At distance the deviation changed from 12^ [10 – 18]^X(T) to 2^ [10^E(T) -8X(T)] E(T)(p=0.028). At 3 – 6 months postoperatively, no significant changes in squint angle were observed (near p=0.713;distance p=0.416). One patient developed a slight adduction deficit. All but one patient had stereoscopic vision preoperatively, with a median of 60' [140' – 40']. Postoperatively, all patients perceived stereopsis. Success rate was found to be 60%.

Conclusion: In the literature, different surgical options have been described to correct an intermittent exotropia of the convergence insufficiency type. These include bilateral lateral rectus recession, bilateral medial rectus resection with or without a slanting procedure, medial rectus resection with adjustable suture and a unilateral recession-resection procedure. A wide variation in success (18-95%) is mentioned in these studies. Our case review has shown that resection of the medial rectus muscle(s) could be successful in patients with this type of exotropia. However prospective studies with a larger number of patients and a longer period of follow up need to be done to confirm our results.
POSTER 79

Reversed function of the superior oblique muscle after prior extraocular surgery

Saskia van Hulst-Ginjaar
LUMC
Ophthalmology (J3S)
Leiden, the Netherlands

(S.P.A. van Hulst-Ginjaar, orthoptist), C.B. Dames-Knol, orthoptist, M.J. Brink, orthoptist,
M. Swart-van den Berg, ophthalmologist, N.E. Schalij-Delfos, ophthalmologist,
Leiden University Medical Center

Abstract

Purpose: To demonstrate the effect on ocular motility of reversed function of the superior oblique muscle as a result of surgery. Recognition of the clinical picture facilitates accurate planning of reoperation for strabismus and diplopia.

Method: Data on eye alignment, ocular motility, observation of retraction of the globe and Hess charts of all patients following surgery in the superior orbital region with plaque therapy for choroidal melanoma, who needed strabismus surgery because of diplopia were reviewed retrospectively. Surgical reports were evaluated.

Results: Eight patients were included. In all patients the superior oblique and superior rectus muscle had been involved. All patients had limitation of depression in abduction, hypertropia or hyperphoria up to 7 degrees in primary position and an overaction of the contralateral superior oblique muscle. In six patients a V-pattern was found. Six patients had retraction of the globe on attempted depression in abduction.

During strabismus surgery the superior region was inspected. In all of these patients the superior oblique muscle was found anterior to the equator. Extensive scar formation between the superior oblique muscle and superior rectus muscle and/or anterior adhesions of the superior oblique muscle were found.

Conclusions: In this retrospective study, the cause of limitation of depression in abduction after previous orbital or ocular surgery was due to superior oblique muscle attachment anterior to the equator. When the superior oblique muscle adheres anterior to the equator, or both superior muscles are scarred together, the superior oblique muscle no longer acts as a depressor in adduction. It now functions as an elevator in abduction, resulting in a limitation of depression in abduction, a V-pattern and often a retraction of the globe.

A clinical picture of limitation of depression in abduction may be misdiagnosed as a shortening of the superior rectus muscle or a limitation of the inferior rectus muscle. By recognition of the clinical picture of an anterior position of the superior oblique muscle to the equator, subsequent strabismus surgery can be planned more accurately. To be successful a thorough inspection of the superior region and restoration of anatomic proportions should be part of the procedure.
POSTER 80

Surgical outcomes of consecutive exotropia with limited adduction after former surgery for esotropia.

Marike Heuveling
Meander Medisch Centrum
Baarn
Amersfoort, the Netherlands

M.A. van den Tweel, H.L. van Andel

Abstract

Purpose: To present postoperative outcomes of 4 patients with consecutive exotropia and limited adduction after prior surgery for esotropia.

Methods: We retrospectively reviewed medical records of our patients diagnosed with consecutive exotropia who underwent strabismus surgery between 2013 and 2015. All patients showing limitation of adduction were included. Patients were divided in two sub-groups: 3 patients with moderate to normal vision in the nonfixing eye and 2 patients with an amblyopic eye.

One patient was excluded due to the fact that limitation of adduction was intraoperatively found not to be caused by former strabismus surgery. All patients underwent full orthoptic and ophthalmic examination including prism adaptation. Measurement of the deviation was done with prism cover test at near and distance. The last examination was performed one week preoperatively. Surgery was planned based on the distance deviation. The intra-operative findings on the medial rectus determined the amount of muscle strengthening of the medial rectus and weakening of the lateral muscle.

In patients with moderate to normal vision in the nonfixing eye, an advancement of the medial rectus muscle to the original muscle insertion was made in combination with a recession of the lateral muscle(s). In patients with an amblyopic eye, an advancement of the medial rectus to the original muscle insertion combined with a 3mm resection was made in combination with a recession of the lateral muscle of the same eye. In each patient we used sodium hyaluronate during surgery.

Results: A total of 4 patients were included. All but one patient were operated by the same surgeon. The mean age at surgery was 54.25 ± 12.81 years (range 40-75). Mean preoperative distance exodeviation was 40.5Δ ± 6.58Δ (range 30-47). Postoperative examinations were done at 1 week and 3 months. Mean distance deviation was 6.25ΔBO ± 5.93Δ (range 0Δ - 16ΔBO) at 1 week and 1.00Δ ± 2.55Δ (range 2ΔBI - 5ΔBO) at 3 months. Adduction deficits were improved in all of our patients. Successful surgical outcomes were defined as alignment within 8ΔBI at distance at the 3 month postoperative examination. Successful outcome was found in all of our patients.

Conclusion: The results of this study showed a favourable outcome in patients with consecutive exotropia and limitation of adduction by replacing the medial rectus back to the original muscle insertion in combination with a recession of the lateral rectus in one or two eyes. In the case of a severely amblyopic eye, we correct the nonfixing eye by a combination of MR advancement to the original muscle insertion with resection, and a recession of the lateral rectus of the same eye. Reducing the deficit of adduction is the key to a successful outcome.
POSTER 81

Botulinum toxin as adjuvant to rectus muscle surgery in the treatment of long-standing consecutive strabismus

Gerdien Holtslag
ErasmusMC University Medical Center Rotterdam
Department of Ophthalmology
Rotterdam, the Netherlands

G. Holtslag1,2, H.J. Simonsz1, S.E. Loudon1
1Departments of Ophthalmology Erasmus MC Rotterdam, the Netherlands
2Orthoptic department University of Applied Sciences Utrecht, the Netherlands

Abstract

Purpose: Initial treatment for long-standing consecutive strabismus is advancement of the previous recessed rectus muscle. Success rates are often low due to contraction of the ipsilateral antagonist, and additionally in the case of consecutive exotropia, the strong exotropic drift of the eyes with age. It is well recognized that patients presenting with a long-standing sixth nerve palsy, giving Botulinum Toxin (BTX) in the medial rectus prior to the surgery will increase its success and long-term stability. To date, little is known about BTX injection as adjuvant in the treatment of consecutive strabismus. This study describes two patients, one with long-standing consecutive exotropia and one with long-standing hypertropia, with extreme contraction of the ipsilateral antagonist muscle in whom BTX was given prior to the rectus muscle advancement.

Methods: Two patients presented to our clinic with persistent consecutive strabismus after advancement of the formerly recessed rectus muscles. Both patients had strabismus surgery at a young age for infantile esotropia (both medial recti recessed) and at least one (failed) surgery at a later age to correct for the consecutive exotropia. Both patients showed extreme contraction of the ipsilateral antagonist: abduction was possible to 70 degrees (140Pd), elevation was possible to 50 degrees (93Pd), respectively. It was postulated that this was due to a muscle contracture. Therefore, 2 weeks prior to the surgical advancement of the previously recessed muscle, 2.5 units BTX were injected in the contracted rectus muscle, lateral rectus in the first patient, and superior rectus in the second.

Results: Initially, the first patient had an exotropia of 20 degrees (36PD) which decreased to an exotropia of 7 degrees (12PD) 5 weeks post-op. After 3.5 months follow-up the angle was 2 degrees (3.5PD). The second patient had an exotropia of 12 degrees (21PD) and a hypertropia of 10 degrees (18PD). 5 weeks post-operatively the hypertropia had decreased to an hypotropia of 1 degree (2PD) and an exotropia of 8 degrees (14PD).

Conclusion: BTX should be considered as adjuvant to strabismus surgery in patients with long-standing consecutive strabismus with extreme function of the ipsilateral antagonist muscle displaying a muscle contracture.
POSTER 82
The occurrence of limitation of adduction after medial rectus muscle re-recession

Patricia Does
UMC Utrecht
Ophthalmology
Utrecht, the Netherlands

van der Does P. orthoptist; Belhaj A. orthoptist; Ebbeling M.B. MD PhD ophthalmologist; Voskuil-Kerkhof E.S.M. MD PhD ophthalmologist

Abstract

To investigate the occurrence of postoperative limitation of adduction after medial rectus muscle re-recession.

Methods: Retrospective evaluation of the records of patients with recurrent or residual esotropia following bilateral medial rectus muscle recessions, who underwent a unilateral or bilateral medial rectus muscle re-recession in our clinic. The outcome was considered successful if the patient had a deviation less than 10 prism diopters and no limitation of adduction, or a slight limitation of adduction without functional complaints at last follow-up. All patients were followed for at least 1 year postoperatively.

Results: From January 2003 to December 2013, 37 patients (46 eyes) underwent a medial rectus muscle re-recession. Mean follow-up period was 56 months. No limitation of adduction was seen in 30% of the eyes, a slight limitation in 28%, a small limitation in 39% and a moderate limitation of adduction in 2%.

Successful outcomes were achieved in 10 of 37 patients (27%) treated with medial rectus muscle re-recession. 11 patients (30%) needed additional surgery for consecutive exotropia and/or limitation of adduction, 4 patients (11%) underwent additional surgery for residual esotropia. 12 patients (32%) had no additional surgery though they still manifested a strabismus more than 10 prism diopters and/or a few functional complaints.

Conclusions: Re-recession of the medial rectus muscle is one of the surgical means to treat recurrent or residual esotropia, but can lead to limitation of adduction, exotropia and diplopia.
POSTER 83

Posterior fixation sutures as a treatment for fourth nerve palsy

Wendy Hordijk-Noordhuizen
The Rotterdam Eye Hospital
Orthoptic Department
Rotterdam, the Netherlands

Ingrid Dekker CO, Willemijn Duifhuizen-Visscher CO, Lieke Gouma CO,
Martha Tjon-Fo-Sang MD, PhD
The Rotterdam Eye Hospital, The Netherlands

Abstract

Purpose: Fourth nerve palsies are usually treated with a weakening of the ipsilateral inferior oblique muscle. The operation can be combined with a recession of the contralateral inferior rectus muscle when there is a large deviation in primary position. However when there is a very small deviation in primary position with double vision only in downgaze, posterior fixation sutures on the contralateral inferior rectus muscle may be considered. The aim of this case report was to evaluate the postoperative result of posterior fixation sutures as optional treatment of fourth nerve palsy.

Methods: We report a 21-year-old male with a right fourth nerve palsy secondary to cerebral contusion due to a car accident, who was treated with posterior fixation suture on the contralateral inferior rectus muscle. Full orthoptic examination was performed before and after surgery.

Results: Preoperatively there was a slight right hyperphoria in primary position with double vision in downgaze. The vertical deviation increased in downgaze because of limited depression of the right eye. Postoperatively the right hyperphoria was almost equal to the preoperative measurement. Complaints of double vision in downgaze decreased, the Hess screen showed a more concomitant motility.

Conclusion: This case demonstrates that posterior fixation sutures may be a good option in patients with fourth nerve palsy when there is a very small deviation in primary position with incomitance in downgaze. Posterior fixation sutures on the contralateral inferior rectus muscle can decrease double vision in downgaze without worsening primary position. One can consider this surgical technique.
POSTER 84

Binarimeter and stereometer: Universal methods to eliminate esotropia and train binocular vision

Igor Rabichev
Center of Investigation and Vision Correction ‘Perception’
Department of Investigation and Vision Correction Yaroslavskaya
Moscow, Russian Federation

Rabichev Igor¹, Vrubliauskas Mecislovas²
¹Center of Investigation and Vision Correction ‘Perception’, Moscow, Russian Federation. The department of anatomy and physiology of humans and animals, Moscow State Pedagogical.

Abstract

Purpose: Present methods neither allow us to eliminate constant horizontal and vertical diplopia, nor train fusion, binocular and stereo-vision effectively. We have invented complementary methods and devices, the binarimeter and the stereometer-stereotrainer Visus-4D, for forming and training binocular and stereo-vision.

Methods: The binarimeter features a precise controlled mechanism to fuse dual binocular images. The distance between dual images can be changed within limits (2 – 12 cm) and the distance between images and eyes of a trainee can be changed within limits (5 – 120 cm). In case of physiological diplopia, training includes conscious watching and fusing dual images in three-dimensional space without separating visual fields.

With the help of polarizers separating visual fields on the screen of a personal computer, the stereotrainer Visus-4d allows effective elimination of esotropia, formation and training of stereovision with integral feedback between vision and coordinated movement of eyes and a hand. The parameters of the basic static and dynamic virtual objects in space and time are managed by software, and the test objects are controlled by a trainee. The software changes, records and displays the results of fusion and vision in virtual three-dimensional space with great precision and comfort. Because of different approach and impact on the visual system, both methods complement each other to allow faster and more effective training of fusion, stereovision and visual acuity.

The quantity of exercises was dependant upon the sensorimotor integrity and psychophysiological state of a trainee, and continued between 0.6 – 1.5 years by doing 30 – 60 training sessions with the binarimeter and 25 – 80 with the stereo-trainer. Each session lasted for 30 – 60 minutes.

Results: Over the period of 1.8 years, 128 preschool, school-aged, and adult aged trainees participated in the research, each of them training for an average of eight months. A set of exercises with both devices were used. By doing exercises, 20 trainees have succeeded in eliminating diplopia, forming and training fusion; 11 continue their training. The remaining 97 trainees were doing exercises to form and train stereovision. Out of these, 72 persons have fully trained depth and binocular perception as well as improved visual and stereo-visual acuity. Three trainees eliminated strabismus, but have not succeeded in gaining stereovision; 22 trainees continue training to improve stereo-visual acuity. The research shows that results of training do not depend on age, but are rather dependent on interaction and quality of sensorimotor components of binocular vision.

Conclusions: Joint usage of both the binarimeter and the stereometer-stereotrainer Visus-4D is very effective and enables us to eliminate esotropia, even its complex forms, train fusion, depth perception and stereovision as well as increase visual acuity.
<table>
<thead>
<tr>
<th>Family name, First name, Theme Block #, number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adinanto, Felicia, #11, 1</td>
</tr>
<tr>
<td>Anketell, Pamela, #6, 5</td>
</tr>
<tr>
<td>Aring, Eva, #6, 2</td>
</tr>
<tr>
<td>Bals, Irmgard, EF workshop 2</td>
</tr>
<tr>
<td>Bjerre, Anne, EF 2</td>
</tr>
<tr>
<td>Boyle, Jessica, #8, 1</td>
</tr>
<tr>
<td>Bregman, Rhöde, EF 1</td>
</tr>
<tr>
<td>Brouwer-van der Gun, Lian, #7, 6</td>
</tr>
<tr>
<td>Bruce, Alison, #6, 6</td>
</tr>
<tr>
<td>Burgess, Marianne, #9, 2</td>
</tr>
<tr>
<td>Burggraaf, Fenna, #10, 2</td>
</tr>
<tr>
<td>Chiu, Wai Ling, #12, 7</td>
</tr>
<tr>
<td>Colpa, Linda, #2, 3</td>
</tr>
<tr>
<td>Curtin, Kathleen, #11, 2</td>
</tr>
<tr>
<td>Davis, Helen, #9, 5</td>
</tr>
<tr>
<td>Ehrt, Oliver, #12, 3</td>
</tr>
<tr>
<td>Flodin, Sara, #11, 6</td>
</tr>
<tr>
<td>Fray, Katherine, #1, 5</td>
</tr>
<tr>
<td>French, Amanda, EF 2</td>
</tr>
<tr>
<td>Gamboa, Silvia, #2, 6</td>
</tr>
<tr>
<td>Godts, Daisy, #1, 3</td>
</tr>
<tr>
<td>Guinard, Amandine, #5, 5</td>
</tr>
<tr>
<td>Gusek-Schneider, Gabrielle, #11, 4</td>
</tr>
<tr>
<td>Hanna, Kerry, #4, 5</td>
</tr>
<tr>
<td>Haven, Daniel, EF 1</td>
</tr>
<tr>
<td>Hellgren, Kerstin, EF workshop 2</td>
</tr>
<tr>
<td>Hepworth, Lauren, #4, 4</td>
</tr>
<tr>
<td>Hesgaard, Helena, #2, 1</td>
</tr>
<tr>
<td>Holmes, Jonathan M., #1, 7</td>
</tr>
<tr>
<td>Houtman, Anne Cees, #1, 1</td>
</tr>
<tr>
<td>Janssens, Hilde, #11, 5</td>
</tr>
<tr>
<td>Kaamil-Sayedi, Madina, #3, 5</td>
</tr>
<tr>
<td>Klaver, Caroline, #3, 2</td>
</tr>
<tr>
<td>Klein Hesselink, Tessa, #5, 1</td>
</tr>
<tr>
<td>Koevoets, Greetje, #4, 6</td>
</tr>
<tr>
<td>Kooiker, Marlo, #4, 1</td>
</tr>
<tr>
<td>Lambert, Jennifer, #6, 1</td>
</tr>
<tr>
<td>Lança, Carla, EF 2, #1, 2</td>
</tr>
<tr>
<td>Langenhorst, Anne-Marie, #12, 1</td>
</tr>
<tr>
<td>Langeslag-Smith, Miriam, #10, 6</td>
</tr>
<tr>
<td>Loudon, Sjoukje, #5, 2</td>
</tr>
<tr>
<td>Ludden, Siobhan, #9, 4</td>
</tr>
<tr>
<td>Luijten, Marijke, EF 2</td>
</tr>
<tr>
<td>Lyons, Deborah, #10, 1</td>
</tr>
<tr>
<td>MacKenzie, Kelly, #12, 5</td>
</tr>
<tr>
<td>MacKinnon, Sarah, #11, 3</td>
</tr>
<tr>
<td>MacNeill, Katelyn, #2, 2</td>
</tr>
<tr>
<td>Maconachie, Gail, #7, 5, #10, 4</td>
</tr>
<tr>
<td>McAuley, Samantha, #10, 3</td>
</tr>
<tr>
<td>McMahon, Karen, EF workshop 1</td>
</tr>
<tr>
<td>McNamara, Rowena, EF workshop 1</td>
</tr>
<tr>
<td>Mezer, Eedy, #10, 5</td>
</tr>
<tr>
<td>Morad, Yair, #3, 7</td>
</tr>
<tr>
<td>Murray, Craig, #7, 2</td>
</tr>
<tr>
<td>Newsham, David, #1, 6</td>
</tr>
<tr>
<td>North, Lorraine, #8, 5</td>
</tr>
<tr>
<td>Northway, Nadia, EF 2</td>
</tr>
<tr>
<td>O’Connor, Anna, EF 1, , EF 2, , #9, 3</td>
</tr>
<tr>
<td>Oystrech, Darren, #6, 4</td>
</tr>
<tr>
<td>Parkinson, Joan, EF workshop 1</td>
</tr>
<tr>
<td>Pel, Johan JM, #7, 1</td>
</tr>
<tr>
<td>Pilon, Florine, EF workshop 2, #8, 6</td>
</tr>
<tr>
<td>Polling, Jan Roelof, #3, 4</td>
</tr>
<tr>
<td>Pott, Jan Willem, #5, 4</td>
</tr>
<tr>
<td>Rabbani, Tanzeela, #8, 2</td>
</tr>
<tr>
<td>Roper-Hall, Gill, #5, 3</td>
</tr>
<tr>
<td>Rose, Kathryn, #3, 3</td>
</tr>
<tr>
<td>Rousseau, Benoît, #2, 5</td>
</tr>
<tr>
<td>Rowe, Fiona, #8, 3, #12, 6</td>
</tr>
<tr>
<td>Rydberg, Agneta, EF 1</td>
</tr>
<tr>
<td>Saito, Aya, #9, 6</td>
</tr>
<tr>
<td>Scheetz, Jane, #8, 4</td>
</tr>
<tr>
<td>Sheth, Viral, #6, 3</td>
</tr>
<tr>
<td>Silveira, Sue, #4, 3</td>
</tr>
<tr>
<td>Sloot, Frea, #9, 1</td>
</tr>
<tr>
<td>Studley Scott, Claire, #8, 7</td>
</tr>
<tr>
<td>Tailor, Vijay, #7, 4</td>
</tr>
<tr>
<td>Tellemann, Marieke, #1, 4</td>
</tr>
<tr>
<td>Tideman, Willem, #3, 1</td>
</tr>
<tr>
<td>Van de Ven, Stéphanie, #3, 6</td>
</tr>
<tr>
<td>Van Genderen, Mies, EF workshop 2</td>
</tr>
<tr>
<td>Van Lammeren, Maria, #12, 2</td>
</tr>
<tr>
<td>van Lammeren, Mirjam, EF workshop 1</td>
</tr>
<tr>
<td>van Rijn, Laurentius, #12, 4</td>
</tr>
<tr>
<td>Vancleef, Kathleen, #2, 4</td>
</tr>
<tr>
<td>Verbunt-Brattinga, Hélène, #4, 2</td>
</tr>
<tr>
<td>Whitecross, Sarah, #5, 6</td>
</tr>
</tbody>
</table>
SPEAKERS
POSTER PRESENTATIONS

Family name, First name, Theme Block #, number

Adeoye, Joanne, EF, E
Airey, Annie, #5, 26
Arblaster, Gemma, EF, F
Aring, Eva, #6, 34
Badin, Gloria, #7, 37
Barducco, Anna, #2, 9
Bizeau, Tanguy-Loup, #7, 41
Bjerre, Anne, #9, 53
Braaksma-Besselink, Yvette, #3, 10
Brooks, Rhiannon, #5, 24
Bruining, Janna, EF, D
Buckels, Roisin, #11, 69
Cardoso, Veronica, #12, 76
Channa, Arinder, #9, 57
Collett, Helen, #11, 72
Cooijmans, Pascale, #5, 32
Dall’Angelo, Magali, #9, 60, #9, 61
De Jongh, Eline, #6, 33, #12, 77
Delle Sitr, Roberta, #11, 68
Dillon, Annette, #4, 18
Dillon, Angela, #5, 22
Does, Patricia, #12, 82
Earl, Jennifer, #4, 16
Farati, Chiara, #7, 40
Fernandez Agrafojo, Dora, #7, 44
Field, Clare, #12, 74
Garland, Deidre, #10, 67
Gorge-Puissant, Christelle, #10, 65, #10, 66
Griffiths, Helen, EF, B
Groenveld, Alinda, #5, 23
Heiming, Chantal, #9, 58
Heuveling, Marike, #12, 80
Holt slag, Gerdien, #10, 62, #12, 81
Hon, Kate, #6, 35
Hoole, Janice, #8, 45, #10, 63
Hordijk-Noordhuizen, Wendy, #12, 83
Itto, Misae, #3, 12
Karls son, Virginia, #9, 59
Kawamorita, Takushi, #9, 55
La Grange, Nancy, #7, 42
Lafferty, Chloe, #1, 5
Langeslag-Smith, Miriam, #8, 47, #8, 48
Liria, Céline, #3, 13
Mashru, Jalpa, #7, 43
Mehta, Jignasa, #7, 36
Merckel-Timmer, Elly, #12, 78
Murray, Craig, #5, 25
Nawaz, Javaria, #9, 54
Newsham, David, EF, G
Northway, Nadia, #1, 6
O’Connor, Anna, #1, 4
Piano, Marianne, #1, 2
Piantanida, Andrea C., #1, 3
Pilon, Florine, #4, 19
Poças, Ilda Maria, #2, 8, #5, 30
Polychroniadou – Scourou, Sophie, #5, 31
Rabichev, Igor, #12, 84
Ristoldo, Federica, #1, 1
Roper-Hall, Gill, #5, 20
Rousseau, Benoit, #2, 7
Ryderberg, Agnete, #5, 21
Sandra, Holgado, #8, 51
Sebag, Vanessa, #3, 11, #8, 49
Sevestre, Clotilde, #11, 73
Tan, Yi Ling, #12, 75
Van Bellinghen, Veerle, #9, 56
Van Drunen, Diny, EF, C
Van Hulst-Ginjaar, Saskia, #12, 79
Van Minderhout, Helena Maria, #9, 52
Van Schoot, Edith, #4, 17
Vancleef, Kathleen, #4, 15
Veen-Hellendoorn, Heleen, #8, 46
Veenman, Meike, #5, 27
Verlohr, Dagmar, #10, 64
Voller, Jean, #5, 28
Voskuil-Kerkhof, Elsbeth, #3, 14
Wahl, Birgit, EF, H
Waldbauser, Karin, EF, A
Wilson, Victoria, #11, 71
SPONSORS

The organizers gratefully acknowledge the support by the following companies:

PLATINUM SPONSOR: ORTOPAD

GOLD SPONSOR: 3M

SILVER SPONSORS: BARTIMEUS, nine

EXHIBITORS:

Kay Pictures
International Orthoptic Association
Medical Workshop
Haag-Streit
Bcni nova
SR Research
Metrovision
Vidi Smart Glasses
Miraflex Glasses
OPS Eyewear