The 35th Meeting of the European Strabismological Association

2-5 September 2012, Bucharest, Romania

PROGRAMME and ABSTRACTS

www.esa2012.org
Dear esteemed colleagues from all over the Globe,

Firstly, I would like to thank you for responding to the ESA board’s invitation and subsequently to my invitation. Also, by seeing the large number of participating countries (48 countries), I realize that strabismology is not only our passion but it is something that unites us all, from every corner of the world.

I must begin by saying that it is my greatest pleasure to welcome you in Bucharest for the 35th edition of the European Strabismological Association congress. The Meeting will be held in the Auditorium Hall of the National Art Museum.

The enriched science programme provides: the ESA Lecture, 2 Symposiums, 2 Courses, 2 Round Tables, the already traditional John Lee Rapid Fire Poster Presentation, a Difficult Cases Session and a large number of oral presentations and posters. I hope that this program will be a scientific delight in which the dialogue will play the essential role in becoming better for our patients and in building new bridges between us.

We have also prepared an interesting and varied social program in which we invite you to participate keeping in mind that this Meeting's slogan: "Unity in diversity" will change Bucharest in an international strabismology capital and also an international capital of cultural exchange and friendship.

I would also like to thank in a very special way a few people who helped me a lot and without which this Meeting would have been impossible: The Scientific Board of the ESA- Prof. Schworm and Prof. Stancović, Mrs. President, Rosario Gomez- de- Liaño who was always looking over my shoulder, Paris Vincent and Marlene Verlaeckt who gave me plenty of advice from their experience and also my colleagues at Oftapro Clinic, my family and the Romanian Strabismology Society’s board that have always been there for me. I would also like to thank Paloma Tours and their colaborants who gave their logistic support in organizing this Meeting.

In the name of the ESA and Romania I thank you again for participating and I wish you a memorable stay in Bucharest.

Cordially,

Daniela Cioplean

I dedicate the success of getting together so many people in the name of Strabismology to my Mentor, Professor and Greatest Friend, Professor Eugene M. Helveston.
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ESA Committees

ESA EXECUTIVE COMMITTEE

PRESIDENT
ROSARIO GOMEZ-DE-LIAÑO, Spain

VICE-PRESIDENTS
ALEXANDROS DAMANAKIS, Greece
HERMANN SCHWORM, Germany

SECRETARY-TREASURER
COSTANTINO SCHIAVI, Italy

COUNCILORS
DOMINIQUE THOUVENIN, France
VINCENT PARIS, Belgium
BRANISLAV STANCOVIĆ, Serbia

ESA 2012 SCIENTIFIC COMMITTEE

PRESIDENT SCIENTIFIC COMMITTEE ESA
HERMANN SCHWORM, Germany

COUNCILOR
BRANISLAV STANCOVIĆ, Serbia

PRESIDENT ESA
ROSARIO GOMEZ-DE-LIAÑO, Spain

ESA 2012 LOCAL ORGANIZER
DANIELA CIOPLEA, Romania
General Information about ESA 2012

DATE
September 2-5, 2012

VENUE
The congress will take place in the Auditorium Hall of the National Art Museum, Strada Stirbei Voda nr.1, Bucuresti, Romania.

CONGRESS OFFICE
Paloma Tours
Adresa: Str. Vasile Lucaci nr. 60
Sector 3, cod postal
Bucuresti, 030695
Romania
Telefon/Fax: +40-21 314 66 47
info@esa2012.org
www.esa2012.org

REGISTRATION
Everyone attending the Meeting -whether or not an ESA member, invited speaker, presenter, participant or accompanying person- must register and pay the registration fee.
On-site registration will be open on Sunday, September 02, 12.00.

REGISTRATION FEES ON SITE
ESA Member Ophthalmologist 450 Euro
ESA Member Orthoptist/Resident 270 Euro
Non Member Ophthalmologist 560 Euro
Non Member Orthoptist/Resident 340 Euro
Accompanying Person 80 Euro

Registration as an accompanying person allows only participation in the social programme on September 02 and 03, the lunches and coffee breaks. They are not allowed to attend the sessions.

BADGES
Please remember to wear your badge throughout the duration of the congress. In case of loss of the name badge, a fee of 15 Euro will be charged for a duplicate.

SCIENTIFIC SECRETARIAT
Daniela Cioplean
+40212525201
office@esa2012.org

OFFICIAL LANGUAGE
English
PAPER UP-LOAD
We kindly ask to all the speakers to upload the papers at least two hours before the presentation. The uploading will be done in the Speaker Ready Room (where they also have the possibility to make changes in the papers) but no later than three hours before the presentation. Please mention to the Congress Desk when you want to upload your paper and the person in charge will assist you. For the speakers who have the papers in the first two sessions on Monday, the presentations should be up-loaded on the previous day.

POSTERS EXHIBIT
The posters will be exposed in the designated place and all the presenters will receive assistance if requested. Please check before the number of your poster in the printed programme.

CME CREDITS
The European Accreditation Council for continuing Medical Education Institution of the UEMS, EACCME has granted 15 European CME credits (ECMEC) to the ESA 2012 Meeting on September 02-05 in Bucharest, Romania

COMMERCIAL EXHIBITION
The exhibition will be open during all the congress in the “Rotonda Hall” near the Meeting Room.
General Information about ESA 2012

SOCIAL PROGRAMME

Sunday, September 02, 18.30-20.00- Get Together Reception the National Art Museum, Auditorium Hall- the lobby. This event is included in the registration fee.

Monday, September 03, 20.00-23.00- Welcome Reception at the Parliament Palace, “Rustic Restaurant”. The Reception includes an attractive musical event. The transportation will be provided by the organizers and it will be guided. The participants should be present at 19.30 at the Venue for buses departure. For return, the buses will leave the Reception Place at 23.00. This event is included in the registration fee.

Tuesday, September 04, “Romanian afternoon and Party”. You are invited to be the ambassador of your country in the afternoon and evening of “Unity in diversity”.
15.00-18.00 - Guided tour to the Romanian Village Museum including a panflute outdoor concert. You are invited for this event to wear your traditional clothes or at least one item of it.
18.00 – Departure to the Stirbey Domain from the Village Museum
19.00-23.30 – Traditional Romanian Barbecue and out-door Party. A beautiful evening with good food, music, dance, show, surprises. We remind you to wear at least a traditional item from your country or better, your national traditional costume. If you can not, just were comfortable clothes for barbecue and dance.

This event is not included in the registration fee. If you didn’t subscribe on the website, please ask to the Congress Desk if some more places are available. According to the places number limitation you can register for this event no later than September 02, 20.00. The total price of this event is 95 Euro.
The buses will leave for this event from the Venue at 15.00.

Wednesday, September 05, for those who will spend the next days in Romania
22.00 Optional Clubbing Evening in the Old Historical Center
Ask to the Congress Desk for details.

CANCELLATION POLICY
Refunds up to 70% of the advance registration fee will be granted for cancellation received in writing prior to August 02, 2012. Refunds will not be granted for later cancellation or absence.

CONGRESS HOTEL
Hotel Radisson Blu
Calea Victoriei 63-81
Sector 1
Bucuresti, 010065
Tel: +40 21 31 19 000
Fax: +40 21 31 39 000
e-mail : infoBucharest@Radissonblu.com
The Venue Location - National Art Museum
The Venue plan - first floor
Bucharest- A Brief Introduction

Unlike plenty other European capitals, Bucharest does not boast of a millenniums-long history. The first historical reference to this city under the name of Bucharest dates back to the Middle Ages, in 1459.

The story goes, however, that Bucharest was founded several centuries earlier, by a controversial and rather legendary character named Bucur (which translates as „joy”, from where the name of the city is said to derive). What is certain is the area on which nowadays Bucharest stretches has been inhabited since ancient times.

As said, the city was first mentioned in 1459, in a document issued by the court of Prince Vlad the Impaler, the prince („voievod” in Romanian) who allegedly inspired the creation of the world renowned character of Dracula. It was in those times that Bucharest started to grow as an important economic and political center of Wallachia. The Old Princely Court is the most important architectural complex which reminds of those times.

During the interbellum period, Bucharest experienced a strong cultural and economical boost, therefore being named „Little Paris” The interwar period will remain in history as a real golden age, reflected in thousands of pages of diary, photographs, paintings, films, etc. The Romanian society fulfills their dream of generations of territorial reunification and shows his great appetite for new and modern. Now meet the best tradition and modernity, old and new, innovation and conservatism. The period between the two world wars was exceptionally favorable to Bucharest. It was precisely then that the city experienced its cultural heydays.

During the interbellum period, Bucharest experienced a strong cultural and economical boost, therefore being named „Little Paris” The interwar period will remain in history as a real golden age, reflected in thousands of pages of diary, photographs, paintings, films, etc. The Romanian society fulfills their dream of generations of territorial reunification and shows his great appetite for new and modern. Now meet the best tradition and modernity, old and new, innovation and conservatism. The period between the two world wars was exceptionally favorable to Bucharest. It was precisely then that the city experienced its cultural heydays.

The megalomaniac projects of Nicolae Ceaușescu raised to the ground most of the historical landmarks of the city, not to mention his unfortunate contribution was complemented by the tragic earthquake in 1977, when Bucharest suffered further damage, and not only with respect to the city layout and architectural patrimony, but also to its population. About 13,000 fell victims of the terrible earthquake and about 35,000 building were damaged some of them just shaken others completely demolished (33 large buildings collapsed). The Parliament Palace (otherwise known as the People’s House, Casa Poporului in Romanian) is the best example which illustrates the artistic vision of the regime. For a deeper insight into the communist heritage, tourists need to look no further than the monotonous apartment buildings built in a dull Communist style which populate most of the city.

Nowadays, the city despite its tumultuous past is slowly making progress in finding its true lost identity, little part of which depends on you, our honored guests.

The ESA Meeting 2012 is hosted at The National Art Museum (the former Royal Palace) located on Calea Victoriei, the main artery of the city thus providing many important turistic sights at walking distance such as: The Athenaeum (built in 1888), The Memorial House of George Enescu, Casa Capșa (The Capșa House, Cismigiu Park, The University of Bucharest (founded in 1865), The National Museum of Natural History „Grigore Antipa” (founded in 1834), The University of Architecture and Urbanism (founded in 1892), The National Museum of Romanian History (built in 1900), The „Caru cu Bere” Brewery&Restaurant („The Beer Wagon”) (founded in 1879), The National Theatre etc.

The Old Historical Center of Bucharest, the main source of entertainment provided by the Lipscani District (which dates from the 1400’s) and also the Old Court and Church which can be visited (dating form 1500’s) are also waiting for you for memorable moments (walking distance).

For people who like to shop we recommend the „Unirea Shopping Center”, very close to the Old Historical Center.
## Programme at a Glance

### Sunday, September 2nd, 2012
- 12:00 Registration, Poster set up, Paper up-load, Exhibit Installation
- 18:30 Get Together in Bucharest at The National Art Museum

### Monday, September 3rd, 2012
- 08:00 Registration, Poster set-up, Paper up-load
- 08:30 Opening ceremony
- 08:45 Free Paper Session 1 – Amblyopia, Screening, Visual Function
- 09:40 ESA Lecture – Adventures of a Strabologist
- 10:40 Break/ Poster Session 1
- 11:10 Free Paper Session 2 – Neuroophthalmology, Visual Function
- 12:10 Round Table: Surgery for inferior Oblique Overaction / Superior Oblique palsy – Different approaches leading to the same goal
- 13:10 Lunch / Lunch box
- 14:10 Free Paper Session 3 – Particular Types of Strabismus
- 15:15 Symposium: Imaging in Strabismus Surgery
- 16:15 Break / Poster Session 2
- 16:45 Free Paper Session 4 – Strabismus Surgery part 1
- 17:55 End of the Scientific Day
- 19:30 Departure for the Welcome Reception at The Parliament Palace

### Tuesday, September 4th, 2012
- 08:00 Early Morning Orthoptic course: The Eye in Focus: Accommodation and Vergence Dynamics and Anomalies
- 09:00 Free Papers Session 5 – Binocular Vision
- 09:45 Round Table: Management of Intermittent Exotropia
- 10:45 Break / Poster Session 3
- 11:10 Free Paper Session 6 – Strabismus Assessment & Binocular Vision
- 12:00 The John Lee Rapid Fire Poster Presentation
- 13:00 End of The Scientific Day
- 15:00 Departure for the “Romanian Afternoon”
- 15:30 Visit at The Village Museum/ Concert
- 18:00 Departure from The Village Museum to Stirbey Domain
- 19:00 Romanian Traditional Barbecue Dinner and Party at Stirbey Domain

### Wednesday, September 5th
- 08:30 Early Course: IIIrd Nerve Palsy
- 09:30 Free Paper Session 7 – Strabismus Surgery Part 2
- 10:35 Break / Poster Session 4
- 11:05 Free Paper Session 8 – Strabismus Overview
- 12:10 ESA Business Meeting
- 12:40 Lunch / Lunch Box
- 13:40 Difficult Case Presentation: “I Wish I Didn’t do That …”
- 14:40 Free Paper Session 9 – Vertical Strabismus
- 15:30 Break / Poster Session 5
- 16:00 Symposium: Re-operations in Strabismus Surgery
- 17:15 About 2013 ESA Meeting, , Marseille
- 17:30 Closing Ceremony
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:45</td>
<td>01. Which Amblyopes do we miss with non-cycloplegic Refraction Screening?</td>
<td>Ehrt O (Germany)</td>
</tr>
<tr>
<td>08:56</td>
<td>02. Incidence of Strabismus and Amblyopia in Preverbal Children Previously Diagnosed with Pseudoesotropia</td>
<td>Silbert D, Matta N (USA)</td>
</tr>
<tr>
<td>09:07</td>
<td>03. Flip Chart Acuity Screening Compared to the plusoptiX S09 Photoscreener Performed by a Lay Screener</td>
<td>Matta N, Silbert D (USA)</td>
</tr>
<tr>
<td>09:18</td>
<td>04. Visual results and Strabismus Outcomes in Congenital Cataract Surgery</td>
<td>Aziz A, Toesca E (France)</td>
</tr>
<tr>
<td>09:29</td>
<td>05. Group Training: a solution to improve compliance and efficiency in Amblyopia Therapy</td>
<td>Vladutiu C, Sevan S (Romania)</td>
</tr>
</tbody>
</table>

**09:40-10:40**

**ESA LECTURE** by Jan-Tjeerd de Faber (Netherlands) – “ADVENTURES OF A STRABOLOGIST”
Introduced by Daniela Cioplean (Romania)

**10:40-11:10**

**POSTER SESSION 1 POSTERS 1-13**
COFFEE BREAK

**11:10-12:10**

**FREE PAPERS SESSION 2 NEUROOPHTHALMOLOGY & THE VISUAL FUNCTION**
MODERATORS: Francisco Reich-D’Almeida (Portugal), John Sloper (UK)

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>11:10</td>
<td>06. Gaze dysfunction following stroke</td>
<td>Rowe F (UK)</td>
</tr>
<tr>
<td>11:21</td>
<td>07. The Accessory Optic System: The Fugitive Visual Control System in Infantile</td>
<td>Brodsky M (USA)</td>
</tr>
<tr>
<td>11:43</td>
<td>09. Accommodation in Intermittent Exotropia</td>
<td>Horwood A, Riddell P (UK)</td>
</tr>
<tr>
<td>11:54</td>
<td>10. Symptoms of stroke-related visual impairment</td>
<td>Rowe F (UK)</td>
</tr>
</tbody>
</table>
### Detailed programme

**Monday, September 03, 2012**

#### 12.10 - 13.10

**ROUND TABLE: SURGERY FOR INFERIOR OBLIQUE OVERACTION/ SUPERIOR OBLIQUE PALSY - DIFFERENT APPROACHES LEADING TO THE SAME GOAL**

**MODERATOR:** Hermann Schworm (*Germany*)

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:10</td>
<td>Factors influencing choice of procedure for apparent SO Palsy</td>
<td>Holmes J (<em>USA</em>)</td>
</tr>
<tr>
<td>12:20</td>
<td>When Inferior Oblique weakening is not enough for Superior Oblique Palsy</td>
<td>Molinari A (<em>Ecuador</em>)</td>
</tr>
<tr>
<td>12:30</td>
<td>Single or combined Oblique Muscle surgery in Superior Oblique Palsy</td>
<td>Kaeser PF (<em>Switzerland</em>)</td>
</tr>
<tr>
<td>12:40</td>
<td>Intra-operative adjustment of the Obliques surgery</td>
<td>Paris V (<em>Belgium</em>)</td>
</tr>
<tr>
<td>12:50</td>
<td>Different techniques for Inferior Oblique Overaction and Superior Oblique Palsy</td>
<td>Schworm HD (<em>Germany</em>)</td>
</tr>
</tbody>
</table>

#### DISCUSSIONS

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Speaker</th>
</tr>
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<tbody>
<tr>
<td>13:10-14:10</td>
<td><strong>LUNCH</strong></td>
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</table>

#### 14:10-15:15

**FREE PAPERS SESSION 3 PARTICULAR TYPES OF STRABISMUS**

**MODERATORS:** Mauro Goldschmidt (*Brazil*), Miho Sato (*Japan*)

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:10</td>
<td>11. Congenital Fibrosis of the Extra Ocular Muscles: diagnosis by magnetic resonance imaging and surgical treatment</td>
<td>Pilar Merino M, Gómez-de-Liaño R (<em>Spain</em>)</td>
</tr>
<tr>
<td>14:21</td>
<td>12. MR Imaging in Strabismology: Technique, Indications and Results</td>
<td>Roth A, Cabanis E (<em>Switzerland</em>)</td>
</tr>
<tr>
<td>14:32</td>
<td>13. Type IV Duane Syndrome</td>
<td>Sprunger D, Helveston EM, (USA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cioplean D, Teodorescu L (<em>Romania</em>)</td>
</tr>
<tr>
<td>14:43</td>
<td>14. Duane Retraction Syndrome associated with ocular coloboma</td>
<td>Denis D, Cousin M (<em>France</em>)</td>
</tr>
<tr>
<td>14:54</td>
<td>15. Is there a new Strabismus entity in myopic patients?</td>
<td>Marcon GB, Pittino R (<em>Italy</em>)</td>
</tr>
</tbody>
</table>
### Detailed programme

#### Monday, September 03, 2012

**15:15-16:15**  
**SYMPOSIUM: IMAGING IN STRABISMUS SURGERY**  
**MODERATOR: Rosario Gomez-de-Liaño (Spain)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:15</td>
<td>Imaging in Superior Oblique Palsy</td>
<td>Sato M (Japan)</td>
</tr>
<tr>
<td>15:25</td>
<td>Clinical and Image Correlation in Thyroid Strabismus</td>
<td>Bok-Beaube C (France)</td>
</tr>
<tr>
<td>15:35</td>
<td>Imaging in Highly Myopic Restrictive Strabismus</td>
<td>Gomez de Liaño P (Spain)</td>
</tr>
<tr>
<td>15:45</td>
<td>Imaging in Consecutive Exotropia</td>
<td>Negishi T (Japan)</td>
</tr>
<tr>
<td>15:55</td>
<td>Imaging in Injured Muscles</td>
<td>Velez F (USA)</td>
</tr>
</tbody>
</table>

**DISCUSSIONS**

#### 16:15: 16:45

**POSTER SESSION 2 POSTERS 15-27**

**COFFEE BREAK**

#### 16:45-17.50

**FREE PAPERS SESSION 4 STRABISMUS SURGERY, PART 1**  
**MODERATORS: Michael Gräf (Germany), Giovanni B. Marcon (Italy)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:45</td>
<td>17. Strabismus Surgery Outcome in patients with Amblyopia</td>
<td>Goberville M, Sebag V  (France)</td>
</tr>
<tr>
<td>16:56</td>
<td>18. What did we learn from the BOSU study into severe Complications of Strabismus Surgery</td>
<td>Bradbury J, Taylor R (UK)</td>
</tr>
<tr>
<td>17:07</td>
<td>19. Reoperations in Duane Retraction Syndrome: Intraoperative Findings and Postoperative Results</td>
<td>Ciubotaru A, Popescu L (Romania)</td>
</tr>
<tr>
<td>17:40</td>
<td>46. The Natural Course of Anterior Segment Ischemia after Disinsertion of Extraocular Rectus Muscles in an Animal Model</td>
<td>Bagheri A, Tavakoli M, Eshaghi M (Iran)</td>
</tr>
</tbody>
</table>

**End of the Scientific Programme Day 1**
**08:00-09:00**

**EARLY MORNING ORTHOPTIC COURSE “THE EYE IN FOCUS: ACCOMMODATION AND VERGENCE AND DYNAMICS ANOMALIES”**

**MODERATOR:** Karen McMain (Canada)

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter and Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00</td>
<td>Accommodative and Vergence Anomalies</td>
<td>Rydberg A (Sweden)</td>
</tr>
<tr>
<td>8:15</td>
<td>Vergence adaptation – Clinical uses of a Physiological Phenomenon</td>
<td>Stephenson G (UK)</td>
</tr>
<tr>
<td>8:30</td>
<td>Convergence Accommodation trumps Accommodative Convergence</td>
<td>Horwood A (UK)</td>
</tr>
</tbody>
</table>

**DISCUSSIONS**

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**09:00-09:45**

**FREE PAPERS SESSION 5 BINOCULAR VISION**

**MODERATORS:** Alain Spielmann (France), Andrea Molinari (Ecuador)

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter and Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00</td>
<td>22. Binocular Vision in Chronic Fatigue Syndrome</td>
<td>Godts D (Belgium)</td>
</tr>
<tr>
<td>9:11</td>
<td>23. Dichoptic Contrast masking during relative Convergence Training</td>
<td>Dostalek M, Betlachova P (Czech Republic)</td>
</tr>
<tr>
<td>9:33</td>
<td>25. Stereoacuity in prism-induced Divergence Stress</td>
<td>Davis H, Bibi M (UK)</td>
</tr>
</tbody>
</table>

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**09:45-10:45**

**ROUND TABLE: MANAGEMENT OF INTERMITTENT EXTROPIA**

**MODERATOR:** Branislav Stancevic (Serbia)

**PANELISTS:** Mohney B (USA), Romanchuk K (Canada), Sloper J (UK), Steffen H (Germany), Farzavi S (Singapore), Hwang JM (Korea)

**DISCUSSIONS**

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**10:45-11:15**

**POSTER SESSION 3 POSTERS 28-38**

**COFFEE BREAK**

**11:15-12:00**

**FREE PAPERS SESSION 6 STRABISMUS ASSESSMENT & BINOCULAR VISION**

**MODERATORS:** Oliver Ehrt (Germany), Luminita Teodorescu (Romania)

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter and Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:15</td>
<td>26. The near clinical AC/A ratio actually estimates the CA/C ratio.</td>
<td>Horwood A, Riddell P (UK)</td>
</tr>
<tr>
<td>11:26</td>
<td>27. Classifying Congenital Superior Oblique Paresis using an objective measure of Vertical Fusional Vergence</td>
<td>Irsch K, Guyton D (USA)</td>
</tr>
<tr>
<td>11:37</td>
<td>28. MP4 Player attached to the forehead for Strabismus Assessment</td>
<td>Hajjo S (Syria)</td>
</tr>
<tr>
<td>11:48</td>
<td>29. How far can we trust the Cover Test?</td>
<td>Paris V (Belgium)</td>
</tr>
<tr>
<td>Time</td>
<td>Poster</td>
<td>Title</td>
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</tr>
<tr>
<td>12:00</td>
<td>P27</td>
<td>Anterior Segment Ischemia - a case report</td>
</tr>
<tr>
<td>12:05</td>
<td>P52</td>
<td>Iatrogenic Ciclotorsional Diplopia in Aquired Traumatic Bilateral Third Nerve Palsy: How we can manage it?</td>
</tr>
<tr>
<td>12:10</td>
<td>P14</td>
<td>Can the PlusoptiX replace the need for a cycloplegic examination in select pediatric ophthalmology patients?</td>
</tr>
<tr>
<td>12:15</td>
<td>P46</td>
<td>Transposition Surgery for damage of Abducens Nerve: optimal strabismological portrait of patients to get the best outcome</td>
</tr>
<tr>
<td>12:20</td>
<td>P50</td>
<td>Unilateral Enopthalmos with limited motility and shortening of the optic nerve. Case report</td>
</tr>
<tr>
<td>12:25</td>
<td>P26</td>
<td>Similarity between Bacteriae in Nose and on Reattached Muscle points to reflux from Lacrimal Puncta</td>
</tr>
<tr>
<td>12:30</td>
<td>P49</td>
<td>Anterior and Nasal Transposition of Inferior Obliques in Crouzons Syndrome</td>
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<tr>
<td>12:35</td>
<td>P34</td>
<td>Predictable factors of the improvement in Distance Stereoacuity following Surgery for Intermittent Exotropia</td>
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<tr>
<td>12:40</td>
<td>P30</td>
<td>The change of Accommodational Ability influencing Asthenopia with viewing 3D display</td>
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<tr>
<td>12:45</td>
<td>P54</td>
<td>Whiplash Injury and Diplopia</td>
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<td>12:50</td>
<td>P56</td>
<td>Comparison of methods of double Maddox rod test in unilateral Superior Oblique Muscle palsy</td>
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**13:00**
End of the Scientific Programme Day 2
08:30-09:30
EARLY COURSE: THE III rd NERVE PALSY
MODERATOR: Costantino Schiavi (*Italy*)

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>8:30</td>
<td>Neuro-Imaging in IIIrd Nerve Palsy</td>
<td>Marcon GB (<em>Italy</em>)</td>
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<tr>
<td>8:45</td>
<td>Synkinesia in IIIrd Nerve Palsy</td>
<td>Spielmann A (<em>France</em>)</td>
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<tr>
<td>9:00</td>
<td>Problems and Solutions in Surgical Treatment of Third Nerve Palsy</td>
<td>Özkan SB (<em>Turkey</em>)</td>
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<tr>
<td>9:15</td>
<td>Transposition Surgery for IIIrd Nerve Palsy</td>
<td>Gräf M (<em>Germany</em>)</td>
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DISCUSSIONS

09:30-10:35
FREE PAPERS SESSION 7 STRABISMUS SURGERY PART 2
MODERATORS: Dominique Thouvenin (*France*), Sherwin Isenberg (*USA*)

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<tr>
<th>Time</th>
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<tr>
<td>9:30</td>
<td>30. An effective modification of Rectus Muscle Tucking Surgery Technique</td>
<td>Gokygit B, Akar S (<em>Turkey</em>)</td>
</tr>
<tr>
<td>9:41</td>
<td>31. Bilateral Medial Rectus Recession with Posterior Fixation Suture for large infantile Esotropia</td>
<td>Gräf M, Borchert O (<em>Germany</em>)</td>
</tr>
<tr>
<td>9:52</td>
<td>32. Transposition Surgery for the treatment of Paralitic Exotropia</td>
<td>Schiavi C, Fresina M (<em>Italy</em>)</td>
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<tr>
<td>10:03</td>
<td>33. Bupivacaine Treatment of Strabismus</td>
<td>Scott A, Miller J (<em>USA</em>)</td>
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<tr>
<td>10:14</td>
<td>34. Neurologic Exotropia: Do We Need to Decrease Surgical Dosing?</td>
<td>Brodsky M, Bang C (<em>USA</em>)</td>
</tr>
<tr>
<td>10:25</td>
<td>35. Effectiveness of Split Lateral Rectus Transposition to Medial Rectus Area in III. Cranial Nerve Palsy and Mis-innervation Syndrome</td>
<td>Gokygit B, Akar S (<em>Turkey</em>)</td>
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### 11:05-12:10
FREE PAPERS SESSION 8 STRABISMUS OVERVIEW
MODERATORS: Vincent Paris (Belgium), Alexandros Damanakis (Greece)

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<thead>
<tr>
<th>Time</th>
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<th>Authors</th>
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<tr>
<td>11:05</td>
<td>36. 20 Year Follow-Up Study on Adult Strabismus Surgery</td>
<td>Gomez-de-Liano R, Diaz E (Spain)</td>
</tr>
<tr>
<td>11:16</td>
<td>37. Comparison of the workload between Pediatric and Adult Ophthalmologic Examinations</td>
<td>Chang JH, Park SH (Korea)</td>
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<tr>
<td>11:27</td>
<td>38. Long term Outcome of Single Stage Intra-operative Adjustable Strabismus Surgery (SSAS) under Topical Anesthesia</td>
<td>Farzavandi S, Lim Z (Singapore)</td>
</tr>
<tr>
<td>11:38</td>
<td>39. Quality of life comparison of New Adult Strabismus patients and those receiving repeated injection of Botulinum Toxin to maintain ocular alignment</td>
<td>MacKenzie K, Hancox J (UK)</td>
</tr>
<tr>
<td>11:49</td>
<td>40. The association of Stage of Retinopathy of Prematurity with Strabismus, its Management and Refraction</td>
<td>Gursoy H, Basmak H (Turkey)</td>
</tr>
<tr>
<td>12:00</td>
<td>41. Recruitment issues in a pilot RCT of Surgery for Intermittent Exotropia</td>
<td>Sloper J (UK)</td>
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### 12:40-13:40
LUNCH

### 13:40-14:40
DIFFICULT CASE PRESENTATION: “I WISH I DIDN’T DO THAT…”
MODERATOR: Olav Haugen (Norway)
PANELISTS: Yuksel D (Belgium), Reich-D’Almeida F (Portugal), Ehrt O (Germany), Ansons A (UK)

### 14:40-15:30
FREE PAPERS SESSION 9 VERTICAL STRABISMUS
MODERATORS: Alain Péchereau (France), Seyhan Özkan (Turkey)

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>14:40</td>
<td>42. Rectus Muscle Resection in Graves Ophthalmopathy</td>
<td>Velez F, Yoo S (USA)</td>
</tr>
<tr>
<td>14:51</td>
<td>43. Superior Oblique Palsy; Different Presentations</td>
<td>Eladawy I (Egypt)</td>
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<tr>
<td>15:02</td>
<td>44. Differences in Surgical Management of Symmetric and Asymmetric Dissociated Vertical Deviation</td>
<td>Gamio S (Argentina)</td>
</tr>
<tr>
<td>15:13</td>
<td>45. Surgical Dose-Response Curve of Inferior Rectus Recession for Thyroid Ophthalmopathy</td>
<td>Neely D, Sturges A, Wang J (USA)</td>
</tr>
</tbody>
</table>
16:00-16:50
SYMPOSIUM: RE-OPERATIONS IN STRABISMUS SURGERY
MODERATOR: Daniela Cioplean (Romania)

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<thead>
<tr>
<th>Time</th>
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<tr>
<td>16:00</td>
<td>Re-operations in Thyroid Orbitopathy</td>
<td>Sprunger D (USA)</td>
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<tr>
<td>16:10</td>
<td>Re-operations on the MRM after Faden</td>
<td>Thouvenin D (France)</td>
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<tr>
<td>16:20</td>
<td>Re-operations on the Oblique’s Muscles in Strabismus</td>
<td>Olitsky SE (USA)</td>
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<td>16:30</td>
<td>Re-operations for Residual DVD</td>
<td>Teodorescu L (Romania)</td>
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<td>16:40</td>
<td>Re-operation for Lost MRM After Multiple Surgeries for Strabismus</td>
<td>Cioplean D (Romania)</td>
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<tr>
<td>16:50</td>
<td>Vicious Scarring after Multiple Strabismus Surgery</td>
<td>Özkan SB (Turkey)</td>
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</table>

DISCUSSIONS

17:15
About 2013 ESA Meeting

17:30
Closing Ceremony
Free Paper Abstracts
01. Which Amblyopes do we miss with Non-Cycloplegic Refraction Screening?

EHRT O
Dept. Ophthalmology, Ludwig-Maximilians-University, Munich, Germany

PURPOSE: The binocular video-refractometer PlusoptiX A09/S09 is suitable for early detection of potentially amblyogenic refractive errors and reaches 80-90% sensitivity and 90-80% specificity respectively. The purpose of this study was to analyse which patients are missed by non-cycloplegic screening.

METHODS: 4 studies with the PlusoptiX from 2005 - 2011 including 764 children aged 0.5 to 7 years were analysed. All were orthotropic or had strabismus <10PD. Amblyogenic refractive error was defined as hyperopia >3dpt, astigmatism >1dpt or anisometropia >1dpt in cycloplegic retinoscopy. Thresholds in the PlusoptiX were set at >2dpt, >0.75dpt and >1dpt respectively for high specificity (94%). Sensitivity was 80%.

RESULTS: Overall performance was similar in all 4 studies. Of 88 hyperopes > +3dpt 65 were detected as true positives and 23 were missed on screening (26%). Of those 9 had severe hyperopia of > +4dpt.
Of 151 children with astigmatism >1dpt, 115 were detected as true positive. 36 children were missed (24%). Of those only 2 had severe astigmatism of >2dpt.
Of 43 children with anisometropia > 1dpt, 38 were detected as true positive. 5 children were missed (11%). Of those two had anisometropia of > 2dpt.

CONCLUSION: We estimate that 2-3 cases of amblyopia due to severe refractive errors will be missed when screening a community population of 1000 children. Most children missed by non-cycloplegic screening were very young and had moderate refractive errors. So a sensitivity of 80% is acceptable because most will have mild amblyopia - if any - and can be treated later when it is picked up with visual acuity testing at a later age.
02. Incidence of Strabismus and Amblyopia in Preverbal Children Previously Diagnosed with Pseudoesotropia

SILBERT D, MATTA N
Family Eye Group, Lancaster, Pennsylvania, United States of America

PURPOSE: To determine how frequently children diagnosed with pseudoesotropia under age 3 are later found to have true strabismus or amblyopia.

METHODS: A retrospective medical record review was conducted on all patients presenting to one pediatric ophthalmologist between January 1, 2001, and February 26, 2010. Patients were included in the analysis if they were examined to rule out esotropia but were documented to have a normal exam and diagnosed with pseudoesotropia.

RESULTS: 306 patients were diagnosed with pseudoesotropia with no significant refractive error on initial exam. All children had been advised to have a follow-up exam and 201 children did. The average age children were first seen was 13 months (range 2–33), and the average age of follow-up was 33 months (range 4–120). 20 children were later found to have strabismus (10%) and additionally 5 children were later found to have significant refractive error and mild refractive amblyopia (2%). Of the 20 children found to have strabismus, 15 had esodeviation, 3 exodeviation, 1 child Duane syndrome, and 1 Prader Willi syndrome with esotropia.

CONCLUSION: 12% of children under age 3 who returned for follow-up and were initially diagnosed with pseudoesotropia were later found to have strabismus or mild refractive amblyopia. In contrast to what one might expect, the incidence of eventual strabismus or amblyopia was higher in children diagnosed with pseudoesotropia than would be expected in the general population. Preverbal children diagnosed with pseudoesotropia may benefit from a follow-up exam to rule out strabismus and amblyopia.
03. Flip Chart Acuity Screening Compared to the PlusoptiX S09 Photoscreener Performed by a Lay Screener

MATT A N, SILBERT D
Family Eye Group, Lancaster, Pennsylvania, United States of America

PURPOSE: To determine the reliability of lay visual acuity screening compared to the PlusoptiX S09 Photoscreener for the detection of amblyopia risk factors in children.

METHODS: One lay screener received basic training in how to use a 10 foot Patti Pics single crowded flip chart with patched acuity, and the PlusoptiX S09 Photoscreener. Lay screening was done on children age 3 to 10. All children had the lay screening done immediately before a pediatric ophthalmology examination.

RESULTS: 72 children were screened in total ranging from age 3 to 10 years old (average 5 years). The flip chart was found to have a sensitivity of 83%, specificity of 47%, false positive rate of 53% and false negative rate of 17%. The PlusoptiX S09 was found to have a sensitivity of 92%, specificity of 88%, false positive rate of 11% and false negative rate of 8%.

CONCLUSION: Photoscreening was found to perform better than flip chart acuity screening by a lay screener in the same cohort of children. The poor specificity of the flip chart would lead to vast over-referral of children in a screening environment. The PlusoptiX S09 Photoscreener operated by a lay screener is an effective method to screen for amblyopia risk factors.
04. Visual Results and Strabismus Outcomes in Congenital Cataract Surgery

AZIZ A, TOESCA E
Hospital Nord, Marseille, France

PURPOSE: To present visual results and strabismus analysis in congenital cataract operated.

METHODS: A retrospective review of charts of 44 consecutive pediatric patients that underwent cataract extraction was performed between 2000 and 2011. Exclusion criteria were traumatic cataract and absence or moderated compliance to re-education of amblyopia.

RESULTS: A total of 66 eyes of 44 infants with childhood cataract were included in this study (N=44). 22 of 44 children (50%) had unilateral cataract and 22 (50%) with bilateral cataracts. 30 eyes had primary IOL implantation, 14 secondary IOL implantation and 22 had aphakia with contact lens wear. Median age at surgery was 10.4 months (8.8 for unilateral and 12 for bilateral); median follow-up was 66.6 months. The mean best-corrected visual acuity (BCVA) was 0.56 logMar, 0.78 logMar, 0.35 logMar, for all eyes, unilateral and bilateral cases respectively at the last follow-up. The mean BCVA of all eyes with IOL was 0.50 logMar with 0.67 logMar and 0.35 logMar for all eyes, unilateral and bilateral cases respectively at the last appointment. The mean BCVA with contact lens was 0.8 logMar for all eyes with 1.18 logMar and 0.42 logMar for unilateral and bilateral cases respectively at the last follow-up. Strabismus was present in 73% of all cases with 95.5% of unilateral and 50% of bilateral cases. The mean BCVA was 0.61 logMar, 0.61 logMar, 0.77 logMar for all eyes with strabismus and bilateral and unilateral cases respectively at the end.

CONCLUSION: The predictors of good BCVA included bilateral cataract, intraocular lens implantation and absence of strabismus. Amblyopia was the cause of visual deficit and the strabismus increase the amblyopia by the functional part added to the organic part which was due to cataract.
05. Group Training: a solution to improve compliance and efficiency in Amblyopia Therapy

VLADUTIU C (1), SEVAN S (2)
(1) University of Medicine “Iuliu Hatieganu”, Cluj-Napoca, Romania
(2) Clinica Iris, Cluj-Napoca, Romania

PURPOSE: Group therapy was used as a solution to overcome lack of compliance in the treatment of amblyopia.

METHODS: A total of 538 children with various types of amblyopia were included in the study. According to their preferences, they chose between two protocols of therapy:
- Collective approach, in groups of 7-10 children, consisting of 7-day series of intensive treatment (full-time occlusion, and vision stimulating exercises); the series were repeated every 3 to 4 weeks (to a maximum of 8 series); the children continued full-occlusion between the series (282 children);
- Individual approach, at home, with check-ups every 3 to 4 weeks (256 children).

RESULTS: From the 282 children attending group therapy, 34% had strabismic, 44.6% anisometropic, 17.7% mixed, and 3.1% ametropic amblyopia. Isoacuity was attained in 70.9% of the children belonging to this group; the difference was less than 2/10 in 15.6%, there was no result in 13.5%. There were no statistically significant differences, such as visual acuity recovery, between the four types of amblyopia. The best recovery was noticed in children 3 to 6 years old (p<0.05). The majority of the children treated in this way recovered fast, during 2-3 series (mean: 8 weeks). From the 256 children of the second group, only 138 (53.9%) followed regular check-ups. Among these, only 15% respected full-time occlusion, the mean recovery time being 11 weeks. For those who admitted having respected only part-time occlusion, the mean recovery time was 25 weeks.

CONCLUSION: Group treatment helps full-time occlusion, enhances compliance, and accelerates vision recovery - enough reasons to find concrete local possibilities to attend group therapy.
06. Gaze Dysfunction following Stroke

ROWE F, VIS GROUP UK
University of Liverpool, Liverpool, UK

PURPOSE: Evaluate the profile of ocular gaze abnormalities after stroke. Design: Prospective multi-centre cohort study (Vision in Stroke [VIS]) in accordance with Declaration of Helsinki.

METHODS: Standardised referral/investigation protocol with detailed assessment of visual acuity, ocular alignment/motility, visual field and visual perception.

RESULTS: 915 patients recruited with mean age of 69.18 years (SD 14.19). 498 patients (54%) diagnosed with ocular motility abnormalities. 207 patients had gaze abnormalities including impaired gaze holding (46), complete gaze palsy (23), horizontal (16) or vertical (17) gaze palsy, Parinauds syndrome (8), INO (20), 1½ syndrome (3), saccadic (28) or smooth pursuit (46) palsy. The involved area of brain was frequently the cerebellum, brainstem and diencephalic areas. However, strokes causing gaze dysfunction also involved cortical areas. 37 patients were discharged, 29 referred to other ophthalmic services and 141 offered review appointments. 107 patients showed full recovery (4%), partial improvement (66%) and static gaze dysfunction (30%).

CONCLUSION: Gaze dysfunction is common following stroke occurring in 23% of stroke patients and accounting for 41.5% of all ocular motility abnormalities. Two thirds show some improvement in ocular motility. However, one third do not recover from gaze dysfunction.
Free Paper Abstracts

07. The Accessory Optic System: The Fugitive Visual Control System in Infantile

BRODSKY M
Mayo Clinic, Rochester, USA

PURPOSE: To anatomize infantile strabismus by examining the role of the accessory optic system (AOS) in generating dissociated visuo-vestibular eye movements that characterize this condition.

METHODS: Analysis of the innervational and neurophysiological properties of the AOS with reference to the latent nystagmus, dissociated vertical divergence, and primary oblique overaction that accompany infantile strabismus.

RESULTS: The AOS is an atavistic visual system that is present in lower animals and evolutionarily-retained in mammals. It is a subcortical motion detection system that subserves slowly-moving, full-field optokinetic stimuli. The AOS provides the intrinsic, head-referenced optokinetic reference frame whose axes have a spatial orientation similar to the best response axes of the semicircular canals. It provides the visual analog of the vestibular motion detection system and explains the prominent torsional component of dissociated eye movements as viewed from the frontal plane.

CONCLUSION: The AOS may provide a subcortical neuroanatomical substrate for the dissociated visuo-vestibular eye movements that accompany infantile strabismus.
08. Deficits in Eye-Hand Co-ordination in Children with Strabismus and Amblyopia change with age

SLOPER J (1), SUITTE C (2), CONWAY M (2), MELMOTH D (2), GRANT S (2)
(1) Strabismus and Paediatric Service, Moorfields Eye Hospital, London EC1V 2PD
(2) Department of Optometry & Visual Science, City University, Northampton Square, London EC1V 0HB, UK

PURPOSE: We have examined the development of eye-hand coordination in children with different degrees of amblyopia and binocular impairment between 5 and 8 years of age.

METHODS: Reaching and grasping movements were recorded under binocular and monocular viewing conditions using a 3D motion-capture video system. Twenty-nine children aged 5-6 years and twenty-one aged 7-8 year-old children with strabismic and/or anisometropic amblyopia and reduced or absent stereopsis were compared to 11 normal children in each age group. Movement parameters and error rates were compared within and between groups using repeat measures analysis of variance.

RESULTS: The younger amblyopic children were significantly slower than matched controls in their final approach to the objects using their amblyopic or fellow eyes alone and with both eyes open (P<0.05). In contrast, amblyopic children aged 7-8 did not show an increased approach time, but contacted the object for significantly longer before lifting it than their matched controls (P<0.05).

CONCLUSION: Amblyopic children aged 5-6 years try to compensate for their impaired stereoscopic data for movement planning, by making a slower, more careful approach to objects. Children with amblyopia aged 7-8 rather use non-visual feedback obtained from object contact to monitor their grip precision.

Supported by the Wellcome Trust (grants 066282, 079766) and the Special Trustees of Moorfields Eye Hospital.
09. Accommodation in Intermittent Exotropia

HORWOOD A, RIDDELL P
University of Reading, Reading, UK

PURPOSE: Although accommodative convergence is often considered to drive much of the vergence response for near, there is increasing evidence that the response to binocular disparity drives the large majority of both convergence AND accommodation. In intermittent exodeviations there is excessive convergence demand in order to control a large angle to binocular single vision, so large effects on accommodation would be predicted.

METHODS: Using a naturalistic laboratory photorefraction method we studied simultaneous convergence and accommodation responses during control and after decompensation on 19 children with distance exotropia and compared them to a group of non-exophoric age-matched controls.

RESULTS: During control of the deviation, the intermittent exotropes accommodated significantly more for near than matched controls (p=0.02). On decompensation the accommodation for near in the exotropes reduced dramatically (p<0.0001), with resultant mean under-accommodation of 2.33 D at 33 cm in this group.

CONCLUSION: Awareness of how accommodation acts in intermittent exotropia helps us to be more aware of why symptoms occur and how common treatments act. Decompensation for near risks under-accommodation as well as loss of binocularity. Minus lenses may correct over-accommodation caused by excessive convergence demand, and not drive accommodative convergence. The occasional finding of post-operative convergence excess esotropia may be due to still needing to converge to drive accommodation.
10. Symptoms of Stroke-Related Visual Impairment

ROWE F, VIS GROUP UK
University of Liverpool, Liverpool, UK

PURPOSE: Investigate the frequency and type of visual symptoms following stroke. Design: Prospective multi-centre cohort study (Vision in Stroke [VIS]) in accordance with Declaration of Helsinki.

METHODS: Standardised referral/investigation protocol with detailed assessment of visual acuity, ocular alignment/ motility, visual field and visual perception, plus quality of life score.

RESULTS: 915 patients recruited with mean age of 69.18 years (SD 14.19). Reported symptoms included diplopia, blurred vision, reading difficulty, field loss, perceptual difficulty and oscillopsia. 16% (149) had no visual symptoms: 22 patients had normal eye examinations and 127 had diagnoses of central/peripheral visual loss, ocular motility or perceptual abnormalities. 84% had visual symptoms but 50 patients had normal eye examinations. No significant difference for type of symptom and quality of life score. Treatment included refraction, prisms, occlusion, orthoptic exercises, low vision aids and advice.

CONCLUSION: 15% of those with no visual symptoms had objectively measured visual impairment. Conversely, 6.5% of those with visual symptoms had normal eye examinations. Thus the presence or absence of visual symptoms does not infer absence or presence of visual impairment and may relate to recovery of visual impairment, cognitive or communication impairment.
11. Congenital Fibrosis of the Extraocular Muscles: Diagnosis by Magnetic Resonance Imaging and Surgical Treatment


*Universitary General Hospital Gregorio Marañón, Madrid, Spain*

**PURPOSE:** We analyzed findings of orbital and cranial Magnetic Resonance Imaging (MRI) in patients with congenital fibrosis of the extraocular muscles (CFEOM) to establish diagnostic criteria of probability and certainty. We described surgery and its outcome.

**METHODS:** Nine out of ten patients with clinical findings of CFEOM underwent orbital and cranial MRI. We defined diagnosis as probable if clinical findings were compatible with CFEOM and as certain if MRI demonstrated aplasia or hypoplasia of the third or fourth cranial nerves and/or atrophy of at least 1 of the muscles supplied by those nerves. Surgery was indicated to resolve strabismus. Outcome was considered favorable if the final deviation was <10 PD in the primary position without head turn.

**RESULTS:** In 8 cases (6 males, 5 unilateral [3 left eye]), MRI revealed atrophy of at least 1 of the extraocular muscles supplied by the third nerve. Five patients had third nerve aplasia or hypoplasia. Clinical findings were compatible with a probable diagnosis of CFEOM in all 10 patients. Four patients underwent ptosis surgery before being diagnosed with CFEOM. Four patients underwent surgery to correct strabismus and, of these, 2 required multiple interventions (1 needed 4 interventions). Outcome was successful in only 2 cases.

**CONCLUSION:** Orbital and cranial MRI enables us to make a certain diagnosis of CFEOM, while clinical findings only provide a probable diagnosis. Surgery must be performed on an individual basis; the number of reoperations is high. The outcome of surgery was favorable in half of the cases.
12. MR Imaging in Strabismology: Technique, Indications and Results

ROTH A (1), CABANIS E (2), IBA-ZIZEN M-T
(1) Medical School of Geneva, Geneva, Suisse
(2) French Academy of Medicine, Paris, France

PURPOSE: MR Imaging of the orbits and retro-orbital spaces is today a useful tool to elucidate some clinical pictures (besides central nervous diseases) provided it is carried out according to a rigorous protocol.

METHODS: The standard protocol of exploration of the orbits and retro-orbital spaces by means of MRI is based on the horizontal cephalic system of references and includes axial and sagittal oblique sections in the neuro-ocular plans (NOP) (i.e. the reference plan for the axial NOP crossing at the same time the middle of both lenses and both optic canals, for the right and the left sagittal NOP parallel to the optic nerve), coronal standard and oblique sections (the latter being perpendicular to the right and the left optic nerve).

Standard T1-weighted or fat-free T1-weighted sections are used as routine techniques. T2-weighted may also be useful. Intravenous Gadolinium injections reinforce the T1 signal of the muscles, differentiating the tendinous from the muscular tissue and revealing any inhomogeneity of the latter.

RESULTS: MRI was performed with a 1.5 or 3 Tesla apparatus on 55 patients in cases of comitant and incomitant strabismus (recurrence of esotropia after posterior fixation sutures, consecutive exotropia, lost or slipped muscle, A or V pattern strabismus, high myopia, Duane syndrome, endocrine orbitopathy, myositis, muscular or/and orbital trauma).

CONCLUSION: MRI provides a precise descriptive static anatomy of the orbital structures. Sections taken in different directions of gaze also provide dynamic images of the muscles. MRI cannot, however, exclude a precise clinical examination. Images of the orbits and retro-orbital spaces enter into the context of global neuro-imaging and not in isolation.
13. Type IV Duane Syndrome

SPRUNGER D, HELVESTON E (1), CIOPLEAN D (2), TEODORESCU L (3)
(1) Indiana University School of Medicine, Indianapolis, Indiana, USA
(2) Oftapro - Ophthalmology Clinic, Bucharest, Romania
(3) Oftalmix Clinic, Bucharest

PURPOSE: Duane Syndrome encompasses a wide spectrum of strabismus entities which have in common mis-innervation of extraocular muscles and co-contraction of extraocular muscles with resultant palpebral fissure narrowing. Type IV is less commonly encountered and reported than types I, II and III. This paper reports the demographic and clinical characteristics of Duane Syndrome, with particular emphasis on type IV (simultaneous divergence), from an e-consultative source.

METHODS: The records of all patients with Duane Syndrome diagnoses, including excellent standardized eye position photographs, from the E-Consultation program of Cyber-Sight, Orbis International were analysed.

RESULTS: 328 Duane syndrome cases were identified with 167 (51%) Type I, 75 (23%) Type II, 66 (20%) Type III and 20 (6%) Type IV. 118 (36%) were OD, 187 (57%) OS and 23 (7%) bilateral.

CONCLUSION: Because of the telemedicine process, a larger number of cases than typical was analysed which resulted in a relative disproportionate number of type IV Duane Syndrome cases. We hypothesize that since it is more difficult to diagnose an entity that one is not familiar with, type IV Duane Syndrome is probably under-diagnosed in a typical strabismus practice.
14. Duane Retraction Syndrome associated with Ocular Coloboma

DENIS D, COUSIN M  
Hopital Nord, Marseille, France

PURPOSE: To report a patient with bilateral Duane retraction syndrome (DRS) type III and congenital ocular coloboma, association that has never been described.

METHODS: We report the case of a four year old boy without any history of disease referred for ocular motility disorder.

RESULTS: Visual acuity on both eyes were 1.0 with emmetropia, ocular motility examination reveals a bilateral typical Duane retraction syndrome type III and fundus appearance shows bilateral infrapapillary chorioretinal coloboma. On the right eye the coloboma is rudimentary, there is only a pigmentary trail situated in the direction of the foetal fissure (Ida Mann classification number 7) and on the left eye doubling of the optic disc produced by infrapapillary chorioretinal coloboma (Ida Mann classification number 5 ). Cerebral MRI was performed and shows a 6th nerve agenesis on the right eye and a hypoplasia on the left eye with hypertrophia of III left nerve. Morphological extraocular muscles abnormalities involving lateral and medial recti were also found.

CONCLUSION: This association appears unexpected suggesting an embryological disorder which occurs in the early weeks of pregnancy while forebrain neurectoderm differentiation. Genes were identified as being associated with DRS. Genes were also identified with optic nerve coloboma. This interesting association suggests a link between those two developmental anomalies. In the future, genetics studies would give us a better understanding of oculomotor and cerebral development.
### 15. Is there a New Strabismus entity in Myopic Patients?

**MARCON G (1), PITTINO R (2)**  
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**PURPOSE:** To describe clinical features and surgical results of esotropic myopic patients with intermediate characteristics between Bielschowsky and Hugonnier-Magnard types.

**METHODS:** We retrospectively evaluated the clinical records of 80 esotropic myopic patients. 14 presented clinical features of Hugonnier-Magnard eso-hypotropia, 30 of Bielschowsky esotropia, 29 had intermediate characteristics: high myopia with mild hypotropia and/or deficit of abduction. Degree of myopia, biometry, angle of deviation and motility pre- and post-surgery were considered. MRI was performed to assess degree of globe dislocation and size of extraocular muscles. Patients were operated by uni- (4 cases) or bilateral (10) medial rectus recession, lateral rectus resection and uni/bilateral medial rectus recession (15). Surgical results were evaluated as satisfactory alignment (<10PD of residual deviation) and disappearance of diplopia 6 months or more after surgery.

**RESULTS:** Mean age was 47 years (range 25-68). Mean degree of myopia was -17 sf. Mean axial length was 28 mm. Mean ET was 39 PD (range 16-90, SD 19), vertical deviation 4 PD (range 2-12, SD 3). Mean angle of globe dislocation on MRI was 118° (range 105°-136°, SD 13). Mean postoperative residual angle was 7 PD of ET (range 0-20PD; SD 8PD). Satisfactory alignment was obtained in 17 cases (59%) with disappearance of diplopia. In the remaining 12, residual vertical angle was corrected with prisms: no diplopia was assessed in 10.

**CONCLUSION:** Lateral rectus resection was frequently necessary in addition to medial rectus recession to obtain realignment. Minimal vertical deviation persisted unchanged after surgery. This particular subgroup of patients may represent an early Hugonnier-Magnard esotropia or a different type of myopic esotropia.
16. Physiology of Extraocular Rectus Muscles evaluated by Dynamic Magnetic Resonance

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Magnetic Resonance Imaging (MRI) is utilized in strabismology more and more often. It especially finds application in paretic or traumatic cases and congenital anomalies. The standard examination is static in nature and conclusions about the function of the extraocular muscles (EOM) are drawn indirectly. Dynamic MRI however, provides many images acquired in different gaze directions enabling the assessment of EOMs while they act.

PURPOSE: To evaluate the physiological function of extraocular rectus muscles in normal subjects by means of dynamic MRI.

METHODS: Twelve eyes of 6 healthy subjects were examined with use of dynamic MRI. A standard protocol was performed in each case. Fixation targets were placed in 10° intervals ranging up to 30° in four gaze directions. Each one of four rectus muscles was visualized in 7 gaze positions in respect to its field of action. The acquired images were analyzed by means of an image processing software.

RESULTS: Contraction of the extraocular rectus muscle is represented in dynamic MRI by an increase in its cross section area and change of its shape. The muscular tonus can be estimated on the basis of muscle circularity and increases in the field of its action. A posterior shift of the maximal cross section area on contraction can be visualized in all four rectus muscles. The contraction of the extraocular muscles appears to be rather compartmental than continuous.

CONCLUSION: Dynamic MRI provides a unique insight into the action of the extraocular muscles. The awareness of physiological changes in a contracting muscle, may be of a great value when compared to pathology.
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17. Strabismus Surgery Outcome in Patients with Amblyopia

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PURPOSE: Strabismus surgery is usually discussed when amblyopia has been correctly treated. Unfortunately, in some cases we see patients with severe amblyopia because the treatment they were given was either unsuccessful or insufficient. Is it beneficial to operate these patients? Will the long term outcome remain satisfactory? This study aim is to evaluate the effectiveness of strabismus surgery in patients with severe amblyopia.

METHODS: A retrospective analysis was made on the charts of 45 patients with horizontal strabismus and severe amblyopia, operated on between 1994 and 2007. Twenty eight patients who had a post-operative follow up of more than 5 years were selected. All patients had a visual acuity of less than 0.3 in one eye, no binocular vision and a form of horizontal strabismus: 11 had esotropia and 17 exotropia. The study compared the deviation measured in primary position at both distant and near fixation using the corneal light reflex test (Krimsky test). The measurements were made prior to the surgery, 1 month after and five years later. The satisfaction of the patient was also taken into account.

RESULTS: No significant variation between immediate post-surgery deviation and long-term results was found. Patients with pre-operative esotropia (11 cases) had a one month and 5 years post-operative deviation less than 10 prism diopters in all cases. In the group of patients with exotropia (17 cases), 15 had a one month post-operative deviation less than 10 diopters and 12 after 5 years.

CONCLUSION: Strabismus surgery seems to be efficient in patients with severe amblyopia. After 5 years follow up, 90% of the patients were very satisfied with the results because of the obvious aesthetic and social benefits gained through the correction of strabismus.
18. What did we learn from the BOSU Study into Severe Complications of Strabismus Surgery?

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Overall incidence 3 per 1000 operations. Poor or very poor outcome incidence 1 in 2400 operations. The incidence is similar in both adults and children.

RESULTS: Globe perforation: 2 cases out of 19 reported did this lead to significant problems one adult developing a retinal detachment and 1 child who developed a severe infection had an evisceration.
Slipped muscle: 18 cases all required surgery 3 had persistent diplopia.
Infection: 14 cases 3 resulted in slipped muscles.
Lost muscle: all adults, 1 had a poor outcome.
Scleritis: 6 cases all adult 3 had a poor or very poor outcome, early referral to a colleague with an in uveitis is recommended.
19. Reoperations in Duane Retraction Syndrome: Intraoperative Findings and Postoperative Results

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PURPOSE: Even has been a recognized clinical entity for nearly a century, Duane’s retraction syndrome (DRS) is sometime mistaken for EIE or abducens paralysis.

METHODS: We retrospectively evaluated 11 patients undergoing surgery for esotropia 4 to 22 years ago in other eye clinics. All patients were referred to us for the misalignment in primary position and abnormal head position. After the previous operation, 7 patients developed a consecutive exotropia (Group 1) and 4 of them were still esotropic in primary position (Group 2). Angle of strabismus in primary position, head posture, abduction and adduction of the affected eye were measured before and after surgery in our clinic. Photos from childhood were reviewed and the diagnosis for all was DRS.

RESULTS: 8 patients have first heard about DRS. In Group 1, the intraoperative findings showed a previous medial rectus recession (in the affected eye) in 5 cases and a contralateral medial rectus recession (in the “normal” eye) in 2 cases. The mean deviation in primary position decreased from 28 prism diopters (PD) exotropia preoperatively to 8 PD exotropia postoperatively. In Group 2, the intraoperative findings showed in the affected eye a previous medial rectus recession in 2 cases and lateral rectus resection in 2 cases. The mean deviation in primary position decreased after reoperation from 25 PD esotropia preoperatively to 10 PD esotropia postoperatively. All patients improved their abnormal head posture after reoperation.

CONCLUSION: Although the clinical findings and the surgical approach in DRS are very clear, in medical practice from Romania we meet even today misinterpreted forms of DRS requiring reoperation.
20. Risk factors for Reoperation in Infantile Esotropia

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PURPOSE: To evaluate clinical factors that differentiate children with infantile esotropia who need one operation or more.

METHODS: Retrospective, comparative, consecutive case series of children with infantile esotropia who underwent horizontal extraocular muscle surgery at a tertiary pediatric medical center from 1995 to 2007 and were followed at least 9 months. Main outcome measures included age, distance and near angle of deviation, refractive error, amblyopia, nystagmus, dissociated vertical deviation (DVD), inferior oblique overaction (IOOA), accommodative convergence/accommodation (AC/A) ratio.

RESULTS: The study sample included 83 children (39 male, 44 female) of mean age 2.1±2.5 months at presentation. Fifty patients had one operation (group A) and 33 required at least two (group B). Mean number of surgeries was 1.5±0.7. Mean age was 19±6.9 months at the first surgery and 48±19.5 months at the second. Mean angle of deviation before the first surgery was significantly higher in group B. After the first surgery, the rates of residual near angle of deviation, AC/A ratio, amblyopia, DVD, and IOOA were significantly higher in group B. Postoperative AC/A ratio and residual near angle of deviation were found to be significant predictors for a second surgery. The need for further surgery increased twofold with every 10 PD increase in AC/A ratio and threefold with every 10 PD increase in residual near angle of deviation.

CONCLUSIONS: Primary versus residual near angle of deviation, amblyopia and AC/A ratio appear to be significant predictors for more than one strabismus surgery in children with infantile esotropia.
21. Topical Anesthesia in Strabismus Re-operation: A Case Series

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PURPOSE: To assess the postoperative results of residual or consecutive horizontal strabismus surgery under topical anesthesia.

METHODS: In this case series, we evaluated 9 patients with history of once or more strabismus surgery for horizontal deviations. The patients had strabismus re-operation and intraoperative adjustment under topical anesthesia with tetracaine 0.5% eye drops. All patients had ocular alignment examinations using alternate prism cover test at distance and near pre- and post-operatively.

RESULTS: Mean age of the patient was 25.7 years (15-48 years) and 55.5% were female. All patients had more than 15 prism diopter (PD) deviation; residual esotropia in 4, consecutive esotropia in 1, residual exotropia in 3 and consecutive exotropia in 1 patient. After surgery with at least 9 months of follow up, the angle of deviation in all patients decreased to a range between orthophoria up to 10 PD.

CONCLUSION: Topical anesthesia for intraoperative adjustment could be an effective technique for strabismus reoperation so that multiple surgeries can be avoided.
22. Binocular Vision in Chronic Fatigue Syndrome

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PURPOSE: To describe binocular vision measurements in patients with Chronic Fatigue Syndrome (CFS) compared to measurements in a healthy control group.

METHODS: Forty-one patients diagnosed with CFS by a team of specialists of the CFS Centre in the Antwerp University Hospital, underwent a complete orthoptic examination. Forty healthy persons matched for age and sex underwent a similar examination. Data of near and distance fusion amplitude, accommodation and convergence were compared.

RESULTS: Patients with CFS showed smaller fusion amplitudes, reduced convergence capacity and a smaller accommodation range than the control group.

CONCLUSION: In patients with CFS binocular vision, convergence and accommodation should be routinely examined. Patients with CFS will benefit from reading glasses with or without prism correction in an earlier stage than their healthy peers. Convergence exercises may be beneficial for CFS patients, despite the fact that they might be very tiring.
23. Dichoptic Contrast masking during Relative Convergence Training

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PURPOSE: The main goal of the relative convergence training in exophoric patients is the strengthening of the fusion control of orthotropia. No standardised objective psychophysical method is available for quantitative measurement of the sensory binocular fusion’s power.

METHODS: Dichoptic contrast masking is the physiological mechanism eliminating low contrast visual information from the binocular percept. Full contrast image stimulating one eye can suppress (mask) lower contrast visual information perceived by the second eye and consequently breaks binocular fusion. Vice versa, robust fusion succeeds to protect more deteriorated image from suppression, according to our hypothesis. We have standardised the method of Fusion Cover Testing (FCT): during binocular fixation of far or near target, the diffusion filter is placed in front of one eye. The graded detractive of contrast from one retinal image determines the threshold of the dichoptic contrast masking. If the contrast detraction is above masking threshold, monocular suppression is activated; fusion is broken and the eye drifts to exophoric position. For CFT we use custom made bar equipped with the set of diffusion filters with increasing diffusibility.

RESULTS: In exophoric children, we have documented the lowering of masking threshold (i.e. smaller contrast detraction needed for suppression of non-dominant eye) immediately after training if compared to pre-training measurements. It was probably due to fusion fatigue related to training strain and it was correlated to higher efficiency of the relative convergence workout.

CONCLUSION: FCT based on dichoptic contrast masking is promising objective approach to quantitative measurement of binocular fusion strength changes during orthoptic training.
24. Analysis of Binocular Vision quality in patients with Aphakic Artisan Intraocular Lens

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Silmalaser Eye Clinic, Tallinn, Estonia

PURPOSE: To evaluate quality of binocular vision and satisfaction in patients with aphakic Artisan intraocular lens (IOL).

METHODS: The postoperative charts of 10 adult patients with aphakia through various causes and secondary iris claw Artisan IOL implantation were reviewed. All patients underwent complete ophthalmic and orthoptic examination, video and still digital imaging of the anterior eye segment. The binocular function quality assessed by synoptophore, Titmus and TNO stereotest was compared to the degree of irido- and pseudophakodonesis.

RESULTS: A total of 11 eyes of 10 patients were examined: 8 patients with anterior chamber and 2 with retropupillary iris-fixation Artisan IOL(s). No complications occurred during surgery. All patients achieved excellent anatomic and visual outcome. Various degrees of combined irido- and pseudophakodonesis were observed in all operated eyes. 6 patients were asymptomatic, 3 including a patient with sensory nystagmus experienced image trembling with eye movements or blinking and stabilizing after the eyes stopped moving but were tolerant of the condition. Bothersome image trembling leading to fusion difficulties occurred in one patient. All patients demonstrated near fusion ability: 5 without stereopsis, 5 with stereoacuity of 800-30” of arc.

CONCLUSION: Despite pseudophakodonesis, majority of patients were satisfied to the quality of binocular vision: they were asymptomatic or adapted to the constant motion of image. Only one patient experienced postoperative fusion difficulties caused by image trembling.
25. Stereoacuity in Prism-Induced Divergence Stress

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PURPOSE: A reduction in distance stereoacuity by inducing convergence stress using a base out prism has previously been reported. This reduction occurred earlier using a real depth test. This study uses base in (BI) prisms to induce divergence stress and tests stereoacuity to ascertain if a similar reduction occurs. This study also tests near stereopsis to establish if there is an effect and if so if the reduction is similar for near. This study will quantify any change in stereoacuity using both random dot and real depth presentation.

METHODS: This was a repeated measures design. Students with visual acuity (VA) 0.2 logMar and intraocular VA difference 0.1 logMar were recruited to the study. Increasing BI prisms from 2 to 8 prism dioptres were introduced to produce divergence stress. Stereoacuity was tested using the Near Frisby (NF); Near Randot (NR); Frisby-Davis Distance (FD2) and the Distance Randot (DR) stereotests in a counter-balanced order.

RESULTS: 24 female Orthoptic students aged 18-23 years old were recruited. 14 participants were unaided and 15 had corrected myopia with contact lenses A statistical difference P<0.05 was found with increasing BI prism strengths, whereby stereoacuity reduced on all 4 stereotests; P<0.01.

CONCLUSION: Increasing BI prism strengths induced divergence stress that impacted on the binocular functions and disrupted stereopsis. Increasing BI prisms significantly reduced stereopsis on the NF, NR, FD2 and the DR, but no significant difference in reduced stereoacuity was found between the stereotests.
26. The Near Clinical AC/A Ratio actually estimates the CA/C ratio.

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PURPOSE: Response to disparity drives much of convergence AND accommodation. In our laboratory brief occlusion dramatically reduces accommodation even in normals, and in exodeviations dissociation of the deviation is also accompanied by this loss of accommodation. Both clinical AC/A ratios correlated very poorly with each other ($r^2 = 0.08, p=0.03$). Neither clinical AC/A ratio correlated significantly with the true (response) AC/A ratio, but the near clinical AC/A ratio correlated most strongly with the laboratory response CA/C ratio ($r^2=0.14; p=0.004$).

METHODS: Using a laboratory photorefractive method that can measure simultaneous vergence and accommodation we studied response AC/A and CA/A ratios in 27 controls, 17 near exotropes and 19 distance exotropes, and compared the ratios with clinical near and distance gradient (stimulus) AC/A ratios.

RESULTS: Both clinical AC/A ratios correlated very poorly with each other ($r^2 = 0.08, p=0.03$). Neither clinical AC/A ratio correlated significantly with the true (response) AC/A ratio, but the near clinical AC/A ratio correlated most strongly with the laboratory response CA/C ratio ($r^2=0.14; p=0.004$).

CONCLUSION: We suggest that convergence is generally recruited to drive accommodation rather than vice versa. During the clinical near AC/A ratio clear near vision is stressed throughout the test, so convergence cannot relax too far on occlusion if blur is to be avoided. The plus lenses of the near gradient AC/A ratio allow clear vision without accommodation, so remove the need for convergence to be used to drive accommodation, so more divergence can occur. A high near AC/A ratio shows that accommodation is strongly linked to convergence, but we suggest it shows that dissociation causes a loss of accommodation (CA/C), rather than accommodation causing convergence (AC/A). This may explain why near and distance clinical “AC/A” ratios correlate so poorly.
27. Objective Analysis of the Mechanism of Vertical Fusional Vergence to classify “Congenital Superior Oblique Paresis” and guide Surgical Approach

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PURPOSE: To classify patients diagnosed with congenital superior oblique paresis (SOP) via the mechanism used for vertical fusional vergence.

METHODS: In seven patients diagnosed with congenital unilateral SOP, we analyzed mechanisms of vertical fusional vergence with our haploscopic eye tracking apparatus, intraoperative findings, Lancaster red-green testing, types of strabismus surgery, and postoperative results.

RESULTS: Five of the seven patients used primarily their vertical rectus muscles (VRMs) for vertical fusional vergence. Of these five: four showed an inverted Brown pattern on Lancaster red-green testing and had a tight inferior oblique muscle (IOM) at surgery, one underwent IOM denervation/extirpation, three had a large IOM myectomy, and two of the latter had additional superior rectus recession (the only ones requiring further surgery for overcorrection).

The other two patients used primarily and partly the oblique muscles (OMs), showed spread of comitance, and one of these had an abnormally lax superior oblique muscle (SOM), requiring only an ipsilateral IOM recession.

CONCLUSION: The vertical fusional vergence mechanism, in combination with forced ductions at surgery and Lancaster red-green testing, may help classify “congenital SOP”. In the patients with inverted Brown pattern and fusion using the VRMs, the pattern of SOP appears to be due more to a tight IOM than to a lax SOM. The patient using the OMs to fuse and having a lax SOM may represent a pure paretic mechanism. The fusional mechanism on its own might be sufficient to guide optimal surgical approaches. In patients using the VRMs to fuse, VRM surgery might be avoided in favor of a large IOM weakening procedure. The patients using primarily or partly the OMs to fuse required less IOM weakening.
28. MP4 Player attached to the forehead for strabismus assessment

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PURPOSE: In strabismus assessment, physicians need to catch a fixation target and prisms and also must perform alternate occlusion. It seems sometimes that physicians need more than two hands. Furthermore fixation toys aren’t always as good as to attract kids attention sufficiently.

METHODS: Classic MP4 player of 1.2 inch display attached to the forehead by an elastic band, this simple and low cost design helps in attracting the kids attention by playing animating pictures, kids songs, and cartoons and moreover near visual acuity and some binocular vision tests (as near 4-dots test) and even optokinetic nystagmus test

RESULTS & CONCLUSION: This is a very effective and helpful technique that may largely decrease many difficulties in strabismus assessment.
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29. How far can we trust the Cover Test?

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PURPOSE: Cover Test (CT) is often an estimate in Strabismology. This study demonstrates that CT can even be normal or not relevant in latent but symptomatic deviations which require a treatment.

METHODS: Over a period of 6 years we have conducted a prospective study including 6 populations suffering for asthenopia. Group 1: 40 Exophoria < 10D Group 2: 65 Esophoria < 5D Group 3: 13 horizontal phoria with amplitude of fusion < 4D Group 4: 3 patients having no change of deviation after surgery Group 5: 15 torsional cases (4 incyclo, 12 excyclo) and no vertical deviation in any position of gaze, Group 6: 6 patients with a preop deviation < 10D. We performed CT, fixation disparity, Maddox wing and red glass localization for phoria; subjective method of Weiss + Maddox and objective observation of the fundus to assess torsion. All patients were treated by prisms or surgery or both.

RESULTS: In group 1, 2 and 3, CT was respectively normal in 12.5%, 38% and 100%. Maddox wing and red glass method was positive in 100%. Discrepancies reached 15D in 36% in esophoria. All patients were successfully treated by prisms. Despite no change after surgery all patients of group 4 improved their symptoms. In group 5, torsional clues included Fundus in 88%, Weiss Method in 80%, Small V pattern for excyclo in 27% and Maddox in 13%. Surgery led to perfect result in all but one. In group 6 half part were operated bilaterally and half part had to wear prisms to maintain the good result.

CONCLUSION: All these patients could be (and are) considered as hypochondriac if we trust mainly the CT. We need to listen to what the patients describe as loss of fusion and look for it and the cause of it. Normal or very small CT means nothing else than a tonic effort of stability in these cases.
30. An Effective Modification of Rectus Muscle Plication Surgery Technique

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PURPOSE: To introduce the modified technique of rectus muscle plication operation and its effectiveness.

METHODS: The technique was performed in 8 eyes of 8 patients. Patients’ gender was 4 women and 4 men and their ages were between 7 and 62 y. For different diagnosis, plication between 4 - 14 mm was applied on muscles of 4 lateral, 3 medial and 1 inferior rectus. During the surgery, desired amount of muscle folded under the remaining portion of rectus muscle and 5/0 non-absorbable suture was used for the operation. There were no visible parts of muscle beyond the insertion.

RESULTS: The effectiveness of the operation was little higher than the resection used as conventional strengthened technique. In the first week, our results show us median 3.6 pd. (between 2 and 5.5 pd) decrease of squint for per mm of plicated muscle and 3.3 pd decrease per mm in first and third month follow up. There is no visible swelling in any of the cases due to the plication under the conjunktiva.

CONCLUSION: Hiding the plicated muscle under the rectus muscle during the operation is an effective procedure. Protecting the anterior segmental blood supply and the having cosmetically good results are the other positive additional factors. However, the real effectiveness of this method will be found out after having more case results and longer follow-ups.
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31. Bilateral Medial Rectus Recession with Posterior Fixation Suture for large Infantile Esotropia

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PURPOSE: Surgery for infantile large angle esotropia is not uniform. Bilateral medial rectus recession, combined resect and resect surgery, also combined with contralateral medial rectus recession or with other procedures are common procedures. Bilateral medial rectus recession with posterior fixation suture (BMRF) may also be used. We analysed the effect of BMRF for this specific indication.

METHODS: Retrospective evaluation of squint angles in simultaneous (S) and alternating (A) prism cover test before and 3 months after BMRF with and without additional oblique muscle surgery performed in the department of ophthalmology Giessen between 1997 and 2009 as an initial surgery for esotropia 20, as well as the rate of second procedures.

RESULTS: Sixty-one children (0.5% of all patients who received eye muscle surgery between 1997 and 2009) were included. Medians (10%- and 90%-quantiles): Age 48.4 months (23.6; 76.0). Refraction 2.25 dpt (0.25; 5.50). Posterior fixation 5.5 mm + 13.0 mm (12.5; 13.0) from limbus. Recession 5.0 mm (4.0; 5.0). Inferior oblique recession in 29 cases. Preoperative squint angles at 5 m S/A 29° (20; 40), at 0.3 m S/A 35° (24; 45); postoperative at 5 m S 0° (-6; 10), A 2° (-6; 11), at 0.3 m S 1° (-5; 12), A 3.5° (-5; 13), S 5° in 70.2% at 5 m and 60.3% at 0.3 m. Exotropia 6-10° and >10° in 6.9% and 3.4% at 5 m and 10.3% and 1.7% at 0.3 m. Esotropia 6-10° and >10° in 10.3% and 8.6% at 5 m and 15.5% and 8.6% at 0.3 m. Ten children were re-operated for esotropia, one for exotropia.

CONCLUSION: Bimedial rectus recession with retroequatorial myopexy (Cüppers-procedure) is an effective one step procedure for large infantile esotropia. In roughly two thirds of cases, the squint angle was corrected within ±5° with one surgery.
32. Transposition Surgery for the Treatment of Paralytic Exotropia

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PURPOSE: The purpose of this study was to evaluate the surgical and functional results of muscle transposition in patients with paralytic exotropia (XT) due to partial or complete 3rd nerve palsy or lost or injured medial rectus muscle (MR).

METHODS: The charts of 24 consecutive patients undergone transposition surgery between 2000 and 2010 for paralytic XT were reviewed. Fifteen patients underwent transposition of the vertical recti to the MR: 10 patients for MR paralysis, and 5 for ruptured or injured MR following orbital trauma or endoscopic sinus surgery. Nine patients underwent transposition of the superior oblique (SO) tendon to the MR or superior rectus (SR) in one or both eyes for unilateral or bilateral total 3rd nerve palsy. Patients received weakening procedures on one or both lateral rectus muscle/s, depending on the size of the deviation. Preoperative, surgical and postoperative data are reported.

RESULTS: Preoperative deviations in primary position ranged from 25-90 prism diopters (D) of XT (mean: 55.5 D) and from 0-20 D of hypotropia (mean: 5.5 D). Postoperative horizontal deviations in the primary gaze position ranged from 0-20 D of XT. Postoperative vertical deviations in primary position ranged from 2 D of hypertropia to 8 D of hypotropia.

CONCLUSION: Transposition surgery seems to be a suitable procedure for the treatment of paralytic XT without any function of the MR. Depending on the presence or absence of vertical rectus muscles function, transposition of the vertical recti or the SO tendon respectively to the MR is the treatment of choice. In cases of complete 3rd nerve palsy without hypotropia, transposition of the SO tendon to the SR prevents postoperative hypertropia.
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33. Bupivacaine Treatment of Strabismus

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PURPOSE: We describe the technique and results of injecting eye muscles with bupivacaine alone or with added botulinum toxin to the antagonist to treat non-paralytic strabismus.

METHODS: Bupivacaine in concentrations of 0.75% to 3.0% was injected with an EMG guided electrode needle into horizontal rectus muscles of 29 adult patients to treat comitant esotropia or exotropia of 10 to 60 prism diopters. Botox® 1.0 to 4.0 Units was injected into the antagonist muscle in half of the cases.

RESULTS: The existing deviations were reduced by 70% at 1 year after injection (averages). The muscle injected with bupivacaine was enlarged 7%, especially in its posterior third. No penetration of the eye or loss of vision occurred.
34. Neurologic Exotropia: do we need to decrease Surgical Dosing?

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PURPOSE: Strabismus surgeons traditionally reduce the amount of medial rectus recession when treating children with neurologic esotropia due to the risk of overcorrection. Our goal was to determine whether the dose of lateral rectus recession should be reduced for neurologic exotropia.

METHODS: We performed a retrospective review of patients who underwent strabismus surgery for neurologic exotropia from 2008-2011.

RESULTS: Patients ranged from 15 months to 17 years old. Bilateral lateral rectus recessions were performed according to the Parks surgical planning tables for small exodeviations (30 prism diopters), reduced by 1 mm for intermediate exodeviations (30-60 prism diopters), and reduced to 10-12 mm to correct larger exodeviations (60-90 prism diopters).
35. Effectiveness of Split Lateral Rectus Transposition to Medial Rectus area in complete III. Cranial Nerve Palsy and Mis-innervation Syndrome

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PURPOSE: To investigate the effectiveness of transposition of lateral rectus (LR) to medial rectus (MR) area with Y split and evaluation of this new surgical technique

Materials: We included 11 patients. Except for 1 case with misinervation syndrome, all had complete cranial nerve (CN)3rd. palsy. Deviations were between 45-90 prism diopter (pd) in primary position.

METHODS: Transposition operation was performed as follows: After removing the LR from its insertion and splitting it equally into 2 parts, superior arm were passed under the superior rectus - superior oblique complex; and inferior arm were passed under the inferior rectus and inferior oblique. Than they were sutured 1 mm near the MR superior and inferior pole in front of the equator. We assessed differentiation pre and post-operative deviation in primary position after first month.

RESULTS: Patients post-operative deviations ranged from 0 to 30pd in primary position. In 7 patients, deviations were equal or less than 10pd. In follow up, 9 patients results were stable. In 2 patients whose LR were seriously fibrotic, post-operation success diminished in three months.

CONCLUSION: Transposition of split LR to MR area can achieve an acceptable aesthetic result in complete CN3rd palsy and misinnervation cases. This technique enables the attainment of orthophoria in primary position via one muscle operation in many cases with the stable results in long-term follow up and the eye is mobile and offers advantages over current practices.
36. Twenty year follow-up study on adult strabismus surgery

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PURPOSE: To compare initial motor results of adult strabismus surgery with long term results.

METHODS: Study covering all consecutive adult patients (above 18 years) with concomitant horizontal strabismus operated between 1987 and 1992. A telephone survey was carried out, where pictures were requested and a new appointment at the clinic arranged, in order to determine possible modifications of the deviation. We compared long-term results with the motility deviation at a follow-up visit six months after surgery.

RESULTS: There were 128 patients, (65 ET and 63 XT). Initial good motor results (within 8 PD) of the whole series were obtained in 89% of the patients. 20-25 years after we could evaluate 28% of all operated patients. Subjective satisfaction was as high as 94%, and only 6.25% had had a new surgery. There was an important decrease of the success ratio along the years, which was greater among XT. There was a fair correlation among satisfaction and motor alignment.

CONCLUSION: Success of adult strabismus surgery decreases over the years, nevertheless patient satisfaction is very high and only a small percentage goes for a new surgery.
Free Paper Abstracts

37. Comparison of the workload between Pediatric and Adult Ophthalmologic Examinations

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PURPOSE: Ophthalmologists workload is assessed to be equal in pediatric and adult patients despite the greater time and effort required in children. This study was designed to compare the workload of pediatric and adult ophthalmologic examinations.

METHODS: Slit lamp examinations and refraction (manifest/cycloplegic) tests were performed in normal children aging from 3 to 7 and adults aging from 20 years old. The workload estimation was done in 6 ophthalmology resident. The time required for each examination and subjective workload of the physicians (magnitude estimate) was recorded. The subjective workload (magnitude estimate) was presented numerically as a multiple of the effort needed when the effort needed for a standard adult was considered as 1.

RESULTS: A total of 123 children and 135 adults were enrolled in the study. The time required for refraction test was 1.73 times longer in children, recording 474 seconds in children and 274 seconds in adults. The subjective workload in children was a 2.02 times greater than that of adults (1.93 vs. 1.05, p<0.01). Even though slit lamp examination took 60 seconds in children and 70 seconds in adults (p=0.26), the subjective workload was greater in children compared to adults (1.67 vs. 0.96, p<0.01).

CONCLUSION: The amount of workload is higher in pediatric ophthalmology examination. Ophthalmologists feel more difficulty in the examinations of children but it does not always correlate with the time required.
38. Long term Outcome of Single Stage intra-operative Adjustable Strabismus Surgery (SSASS) under Topical Anesthesia

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**PURPOSE:** To report the stability of single stage intra-operative adjustable strabismus surgery (SSASS) under topical anesthesia.

**METHODS:** A retrospective study of 114 adult patients with exotropia at two institutions over a 10 year period. All patients underwent SSASS under topical anesthesia for rectus muscle recession and resection by one surgeon. Surgical success was defined as angle of deviation <10 prism diopters post-operatively and achievement or enhancement of binocular function. Angle of deviation at post-operative 1-2 weeks, 6-8 weeks, 6-8 months, 3 years and at last follow-up visit were recorded for statistical analysis.

**RESULTS:** The success rate at post-operative 1-2 weeks was 80.9% with one surgery. McNemar paired tests were used to evaluate and compare the alignment at post-operative few weeks versus alignment at months, years and last follow-up visit. The alignment did not change significantly for all three comparison groups (all p>0.05). The patients with a small consecutive esotropia were also compared with respect to alignment in the post-operative few weeks versus alignment at months, years and last follow-up visit. They qualified for surgical success and the comparisons also did not change significantly (all p>0.05).

**CONCLUSION:** Reports on intra-operative suture adjustments have limited data with either small patient numbers or short follow-up. Our study concludes that patients with successful alignment following SSASS remained stable over the follow-up period of more than 3 years.
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39. Quality of Life Comparison of New Adult Strabismus Patients and those receiving Repeated Injection of Botulinum Toxin to maintain Ocular Alignment

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PURPOSE: To assess QoL scores, using the AS-20, of new patients presenting to adult strabismus clinics and compare these with patients whose ocular deviation is controlled by repeated injections of Botulinum Toxin A.

METHODS: New patients presenting to Adult strabismus clinics were asked to complete the Adult Strabismus Questionnaire (AS-20) to assess their QoL. These results were compared to patients in whom good long-term ocular alignment was maintained with repeated injections of Botulinum Toxin A. Patient demographics including age, sex, aetiology of squint, size of deviation, visual acuity and co-existing ocular conditions were recorded.

RESULTS: There was a large variation in the self reported QoL in new patients, with those who had childhood squints scoring considerably lower on the psychosocial subscales than those with recent onset of squint in adulthood and considerable heterogeneity in aetiology. By far the majority of the toxin group were being treated for exodeviations. The QoL value in the toxin group was significantly higher than the new, untreated patients and compared favourably with published data for normal controls and post squint surgery.

CONCLUSION: Strabismus causes significant impairment to a persons quality of life and this would appear to be especially detrimental in psychosocial terms if occurring since childhood. Correction of strabismus has been shown to improve quality of life and where appropriate this can be achieved with repeated injections of botulinum toxin. The cost effectiveness of this in terms of improvement in Quality of Life will be discussed.
40. The Association of Stage of Retinopathy of Prematurity with Strabismus, its Management and Refraction

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PURPOSE: To investigate the affects of ROP severity on the occurrence of refractive errors and strabismus.

METHODS: Infants born 32 w. of gestation were evaluated. The inclusion criteria were: at least stage 1 ROP and follow-up time > 6 months. Cases were allocated into three groups. Group 1 included stage 1 ROP, group 2 stage 2 and 3 but without indication for therapy and group 3 included cases who received laser and/or surgical therapy for their severe ROP. The incidence of strabismus, its management, the incidence of amblyopia and refractive disorders were analyzed.

RESULTS: Sixty-six infants (group 1=21, group 2=22 and group 3=23) were included. The mean gestational age was older in group 1 compared to other two groups; being 30.5±2.2, 28.8±2.3 and 28.0 w in group 1, 2 and 3, respectively (p<0.05). The mean gestational weight was 1531.4±79.6, 1289.0±80.6 and 1141.3±81.3 g in group 1, 2 and 3, respectively (p<0.05 between group 1 and 3). Strabismus developed in 7 (33.3%), 6 (27.3%) and 10 (43.5%) cases in group 1, 2 and 3, respectively (p>0.05). Ten of these 23 strabismus cases were surgically managed and consecutive deviation occurred in two of these postoperatively. Eighteen of these were esotropia (78%), while the others were exotropia. Alternate occlusion for amblyopia was applied in 10 cases; 8 of them having associated strabismus. Both eyes were more myopic in group 2 and 3, but only reached a significant level between group 1 and 3.

CONCLUSION: Severe ROP cases were associated with refractive disorders. Although the difference failed to reach a statistical significance, strabismus developed more frequently in severe ROP cases. Esotropia was the most frequent pathology. Orthophoria was achieved with spectacles alone or with surgery in most of the cases.
41. Recruitment issues in a pilot RCT of Surgery for Intermittent Exotropia

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On behalf of the SAMEXO study group

PURPOSE: The evidence base for the treatment of intermittent exotropia is poor. We propose conducting a randomised controlled trial comparing surgery with active monitoring of this condition. The initial phase of this study consists of a pilot RCT which is assessing the feasibility of, and pilot procedures for, a full trial.

METHODS: The parents of children with intermittent exotropia fulfilling the proposed eligibility criteria for an RCT of surgery vs active monitoring were approached for consent to participate in a pilot RCT. Consented children were randomised to either eye muscle surgery within 3 months of randomisation, or active monitoring. Outcomes will be assessed at 9 months post recruitment.

RESULTS: Between September 2011 and March 2012, 183 children with intermittent exotropia were screened in 4 centres. Of those, 117(64%) were eligible for the study and of those 29 (25%) were recruited. Qualitative interviews suggested that the lower than expected proportion of eligible children recruited appeared mainly due to parents having a preference for one sort of treatment against another, usually in favour of no surgery, but with 10-20% wanting surgery. A number of patients said that they were reluctant to commit to a trial because of the absence of evidence that surgery works, again indicating the need for a trial.

CONCLUSION: It appears likely that a full RCT of surgery vs active monitoring in intermittent exotropia will require the participation at least 10 centres and should incorporate a preference arm to capture the majority of children with this condition.
42. Rectus Muscle Resection in Graves Ophthalmopathy

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PURPOSE: Rectus muscle resections are generally avoided in patients with Graves’ ophthalmopathy due to concern for worsening inflammation or restriction. In rare cases, such as patients with large angle strabismus or in patients with residual strabismus after maximal recession surgery, rectus muscle resection may be considered. This study reports a series of eight patients with Graves’ ophthalmopathy in whom rectus muscle resections were performed.

METHODS: The records of 269 patients with Graves’ ophthalmopathy who underwent strabismus surgery were reviewed. Data from subjects who had undergone rectus muscle resections were collected.

RESULTS: Eight patients with a mean age of 51.5 +/-16.3 years were identified. Six patients were female. Preoperatively, three patients had a horizontal deviation and five patients had both horizontal and vertical deviations in primary gaze. Mean preoperative horizontal deviation was 22 +/-12 prism diopters (PD) and mean vertical deviation was 6.6 +/-4.8 PD. At the last available postoperative examination, six patients were orthotropic in primary gaze, and one patient who was initially orthotropic in primary gaze, had a small recurrence of the deviation. One patient resulted in a larger deviation from slippage due to a broken suture within the first postoperative week. None of the patients resulted in overcorrection or developed atypical inflammation.

CONCLUSION: In rare circumstances, extraocular muscle resection may be considered for patients with Graves’ ophthalmopathy if other surgical options have been exhausted. Although not found in this series, Graves’ disease patients should be counseled on the hypothetical risks of worsening inflammation or restriction following extraocular muscle resections.
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43. Superior Oblique Palsy-Different Presentations

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Cases of superior oblique palsy (SOP) operated by the author during the last ten years were collected, categorized according to the type of presentation. Discussion will include how to diagnose SOP, characters of each presenting form, as well as the specific line of management and follow up. 460 cases of SOP were included in the study, many presenting forms were identified including unilateral SOP, bilateral symmetric SOP, bilateral asymmetric SOP, masked bilateral SOP, SOP with the patient fixing with the paretic eye, SOP with head tilt to the same side, SOP with superior rectus contracture. Different management options will be discussed, as well as post operative follow up. Some cases require more than one surgery.
44. Differences in surgical management of Symmetric and Asymmetric Dissociated Vertical Deviation

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PURPOSE: Dissociated vertical deviation (DVD) is often perceived as a bilateral condition. However, many cases are so markedly asymmetric, that they seem to be unilateral. Just as oblique muscle dysfunction makes DVD incomitant in different gaze positions, the presence of a true vertical deviation makes it asymmetric. In this study, we compare the outcomes of different surgical approaches in symmetric and asymmetric DVD cases. The aim of this study was to assess optimal treatment procedures in patients with DVD.

METHODS: A retrospective review of 117 consecutive patients with DVD who underwent strabismus surgery between January 2001 and December 2011. Asymmetric DVD was diagnosed when a difference of 5pd. or more between both eyes was found.

RESULTS: Sixty seven patients had symmetric DVD and 50 had asymmetric DVD. All cases with symmetric DVD received bilateral and symmetric procedures: Bilateral Superior Rectus recession, bilateral IOAT or 4 oblique muscles weakening. Patients with asymmetric DVD underwent unilateral SRR (12), unilateral IOAT (15), symmetric bilateral surgery (6) and asymmetric bilateral surgery (17). Only one case with unilateral surgery needed re-operation, while the six cases who received bilateral and symmetric surgery resulted in a noticeable vertical deviation.

CONCLUSION: In patients with DVD the symmetry or asymmetry of the amount of the vertical deviation is very important to choose appropriate procedures. Unilateral or asymmetric surgery is recommended if the asymmetry is larger than 5 pd.
45. Surgical dose-response curve of Inferior Rectus Recession for Thyroid Ophthalmopathy

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PURPOSE: The restrictive nature of rectus muscles affected in thyroid ophthalmopathy may alter the surgical dose-response curve compared to normal muscles undergoing strabismus surgery. This study intends to establish a thyroid ophthalmopathy specific surgical dose-response curve for the recession of inferior rectus muscles.

METHODS: Retrospective review of results obtained in 76 strabismus surgeries performed on 63 patients with thyroid ophthalmopathy at the Indiana University School of Medicine and the Midwest Eye Institute, Indianapolis, USA.

RESULTS: Average patient age at the time of surgery was 59.8 years (range, 38.8-88.4). The 76 procedures included a total of 122 rectus muscles. The most commonly operated rectus muscle was the inferior rectus N=68 (56%), followed by the medial rectus N=40 (33%), superior rectus N=11 (9%) and lateral rectus N=3 (2%) respectively. Of those patients undergoing single muscle recession of the inferior rectus (N=24) the average preoperative deviation was 23.77±11.66 PD. At the 2-4 month post-operative visit, the average residual deviation was 5.13±7.22 PD. The resulting mean change in PD per millimeter of muscle recession was 3.56±1.39 PD/mm, however, smaller recessions produced smaller average change per mm and larger recessions produced larger average change per mm of recession.

CONCLUSION: We suggest the following surgical dose-response curve for the recession of inferior rectus muscles in thyroid ophthalmopathy (PD = preoperative prism diopter deviation, mm = millimeters to recess inferior rectus on the hypotropic eye): 7 PD = 3 mm, 12 PD = 4 mm, 18 PD = 5 mm, 25 PD = 6 mm, 33 PD = 7 mm. It should be cautioned that these are guidelines only and that there exists significant variability amongst patients.
46. The Natural Course of Anterior Segment Ischemia after Disinsertion of Extraocular Rectus Muscles in an Animal Model

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PURPOSE: To compare the frequency and severity of anterior segment ischemia (ASI) after disinsertion of two, three and four rectus muscles in a rabbit eye model.

METHODS: This was a prospective experimental study on rabbit eye. One of the eyes in each rabbit randomly underwent three muscles surgery, including disinsertion and myectomy, and in the fellow eye either 2 or 4 rectus muscles were operated. Subjects were examined daily in order to detect the presence of ASI. Severity of inflammation and duration of involvement until complete resolution of the inflammatory signs was documented. Finally both the involved and the non-involved eyes of the each rabbit were enucleated and studied by the pathologist.

RESULTS: 84 rabbits were operated and examined which in 42 cases one of the eyes underwent three and the fellow eye two rectus muscles surgery and in the other 42 rabbits, in one eye three muscles and in the fellow eye four muscles were operated. The incidence of ASI was 9.5% in two muscles group, 31% in three muscles group and 50% in the four muscles group (p=0.001). Inflammation improved spontaneously in all cases of ASI within about two weeks and pathology study was normal in most cases.

CONCLUSION: The inflammation was resolved in all of the involved eyes spontaneously without therapeutic intervention in an approximately similar period of time and there was no significant destruction or loss of the eye.
**Poster Abstracts**

**P01. Amblyopia and Socio-Educational Implications**

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**PURPOSE:** To assess the socio-educational implication and quality of life in children with refractive, anisometropic and strabismic amblyopia.

**METHODS:** Prospective observational transversal study for 53 ambulatory children (33 girls, 20 boys). Clinical parameters checked: visual acuity, squint deviations, binocular vision, (auto)-refractometry, ophthalmoscopy, orthoptic exams. We used 46 questionnaires in 9 chapters. Data were statistically studied.

**RESULTS:** Age of study was: 9.4943 ± 3.8422 years (limit 3 and 20 years) and age of first ophthalmological diagnosis was 7.1415 ± 2.9317 years old. Moderate and severe amblyopia was present in 47.72% in the right eye and in 43.18% in the left eye. Visual acuity for right eye non-corrected was 0.45 ± 0.31 and corrected was 0.63 ± 0.31, (p<0.0001). Visual acuity for left eye non-corrected was 0.49±0.33 and corrected 0.69±0.32, (p<0.0001). It was no statistical significant any difference between right and left eye. Questionnaires focused on child health, visual acuity, binocular vision, refraction, time for occlusion, penalization, child emotions / activity, family and society integration.

**CONCLUSIONS:** 1. First ophthalmological examination is very late - after 7 years old. 2. Quality life questionnaires detect life or scholar problems of children with amblyopia and educate parents. 3. Children with uncorrected refractive errors or with strabismic deviation are very shy or very nervous and their social attitude will be change after treatment (correction of refractive errors / surgery for strabismic deviations.)
P02. Is NLDO an independent Risk Factor for Amblyopia?

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PURPOSE: To evaluate the risk of amblyopia developing over time in children presenting with NLDO (Nasolacrimal Duct Obstruction) but not found to have amblyopia risk factors on the initial exam.

METHODS: Retrospective chart review of 314 children <3 years old with NLDO but no amblyopia risk factors. 74% children had a follow-up exam.

RESULTS: Only 1 child with NLDO without amblyopia risk factors developed amblyopia or amblyopia risk factors.

CONCLUSION: We previously found that 22% of children with NLDO had amblyopia risk factors on their initial exam. We then reported that 63% of these children eventually developed amblyopia. The rate of development of amblyopia in children with NLDO but no amblyopia risk factors is exceedingly low. We suggest that a cycloplegic refraction should be performed on children with NLDO as they are more likely to have amblyopia risk factors. Children with amblyopia risk factors need to be monitored carefully, while those without may not.
**P03. Anizohypermetropic Ambliopia-Do we treat after ten years of age?**

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**PURPOSE:** It is generally known that amblyopia is present in 2-3% of the total population. One of the most common types of functional amblyopia is anisohypermetropic amblyopia, which occurs as a result of constant suppression of the eye with greater hypermetropia. The universal principle to detect amblyopia as soon as possible and begin treatment as soon as possible (the younger child- the more rapid the response), despite three centuries of experience still does not give universal regimen.

**METHODS:** This is a retrospective study of 18 patients Stankov Ophthalmology, both sexes, aged between 10 and 12 years. A review of all patients, we find that the best visual acuity determined by Snellen is up to 0.3 on amblyopic eye with appropriate correction. All children were treated with total occlusion of sound eye for 1 to 6 months, with monthly control. Before starting treatment we make a fundus examination and excluded the possibility of organic impairment.

**RESULTS:** In 16 patients (89%) there was an increase in visual acuity of 0.7 or more with optimal optical correction. After correction of visual acuity of all patients, was prescribed partial occlusion.

**CONCLUSION:** Treatment of anisohypermetropic amblyopia should try in the years after the maturation of the visual system. If after six months of treatment, visual acuity does not progress, it is appropriate to consider discontinuation of further treatment.
P04. Outcomes of 3 hours Part-time Occlusion treatment combined with Near Activities among children with Unilateral Amblyopia

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PURPOSE: to evaluate the outcome of part-time occlusion therapy with near or non-near activities in monocular amblyopic patients according to gender, age, severity and cause of amblyopia.

METHODS: One hundred and thirty patients who were prescribed daily occlusion therapy (part-time occlusion) and were followed up every four weeks. Sixty five patients were recommended to do three hours of near visual activities (such as reading a book during patching) while the other sixty five patients were not advised to do any near activity. Main outcome measures were best corrected visual acuity (VA) for both groups and line improvement.

RESULTS: At the end of the patching therapy, visual acuity improved from baseline by an average of 6.7 ± 2.37 line log MAR unit in the group of patching with near activities, and by average of 5.3 ± 2.04 line log MAR unit in the group of patching without near activities. The improvement was remarkable significant in both groups, but it was statistically more significant in those with near activities.

CONCLUSION: Improvement in VA was noted in three follow ups in the patients with near activities and without near activities, the improvement was significantly higher in those with near activities. Performing near activities while patching in treatment of anisometropic, stabismic or combined amblyopia improve the VA outcome more than patching alone. We recommend combining near activities with all regimens of patching therapy in amblyopia treatment to enhance the treatment outcome.
**P05. Interactive Binocular Treatment System (I-BiTTM) for amblyopia: pilot study with 3D shutter glasses**

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**PURPOSE:** Conventional patching treatment for amblyopia involves lengthy treatment times and can give disappointing results. A computer-based interactive binocular treatment system (I-BiTTM) for amblyopia has been developed. The purpose of this pilot study was to establish whether the latest I-BiTTM system prototype which utilises new 3D technology in the form of shutter glasses is effective in improving visual acuity in children with amblyopia.

**METHODS:** 10 patients aged 4-8 years were recruited with either anisometropic, strabismic or mixed amblyopia. 3 patients had had previous patching. 30 minutes of I-BiTTM treatment was given once weekly for 6 weeks. Treatment consisted of playing a computer game and watching a DVD through the I-BiTTM system. Visual acuity (VA) was assessed at baseline, mid-treatment, at the end of treatment and 4 weeks post-treatment.

**RESULTS:** 9 patients completed the course of treatment. After 6 weeks of treatment mean VA improved from 0.58±0.19 logMAR at baseline to 0.39±0.13 logMAR with a mean improvement of 0.19±0.15 logMAR. Exploratory statistical analyses showed that this was statistically significant (p=0.005). 6 out of 9 patients (67%) improved by 0.1 logMAR or more.

**CONCLUSION:** This small, uncontrolled study has shown promising results. A mean improvement in VA of almost 2 logMAR lines was found with 3 hours of I-BiTTM treatment delivered over 6 weeks. A multi-centre randomised controlled trial (RCT) has been designed to further investigate the efficacy of I-BiT treatment. Computer software has been developed specifically and the I-BiTTM system has been granted a patent. Recruitment of 75 patients for the RCT will commence this year. This will be followed by a multi-centre randomised study to compare I-BiTTM with patching treatment.
P06. Binocular triplopia induced by occlusion therapy

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We report the case of a five-year-old child who developed esotropia with a rapid onset after an ordinary infectious disease. Her unilateral moderate amblyopia was treated with bifocal lenses and full time (6:1) patching for 6 months in another clinic. The patient’s visual acuity improved. Her cycloplegic refractive values were +4.25 and +5.5 dioptres. She first presented to our clinic after 6 month of therapy with complain about triple vision. To compensate the disturbing binocular triplopia the angle of strabismus doubled. We decided not to correct the amblyopic eye (optic penalization), resulting in gradual disappearance of the triplopia. To avoid binocular triplopia, we suggest refractive adaptation as the first choice of treatment to improve the visual acuity of amblyopic patients, while part time occlusion (in this case 2 hours per day) should be reserved for patients not responsive to this therapy.
**P07. Unilateral Amblyopia: Optical Coherence Tomography**

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**PURPOSE:** This study was performed to measure the macular and the retinal nerve fiber layer (RNFL) thicknesses using optical coherence tomography (OCT) in patients with unilateral amblyopia.

**METHODS:** Measurement of the Retinal nerve fiber layer and Macular Retinal Layer thickness for both amblyopic and normal fellow eyes by (OCT) was carried out at King Abdulaziz University Hospital, Riyadh, Saudi Arabia.

**RESULTS:** Ninety-three patients with unilateral amblyopia between the ages of 5 years and 12 years were included. The macular retinal thickness and the RNFL thickness were measured using OCT. The mean macular retinal thickness was 259.3 lm and 255.6 lm, and the mean RNFL thickness was 112.16 lm and 106 lm, in the amblyopic eye and the normal eye, respectively. OCT assessment of RNFL thickness revealed a significantly thicker RNFL in amblyopic eye (P < 0.0001), but no statistically significant difference was found in macular retinal thickness (P =0.195).

**CONCLUSION:** The amblyopic process may involve the RNFL, but not the macula. However, further evaluation is needed.
P08. Visual Function Improvement in Nystagmus using Neurovision Technology

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PURPOSE: The NeuroVision technology is a computerized visual training program using Gabor patches to improve contrast sensitivity and visual acuity. This paper describes the treatment of 28 patients with nystagmus using this perceptual learning method.

METHODS: Twenty eight nystagmus patients aged 11 to 51 (mean 24.8) were treated in 16 clinics in 5 countries. Baseline Best Corrected Visual Acuity (BCVA) was 6/9- 6/60. Twenty two had congenital motor nystagmus, 5 patients had albinism, and one patient had punctata albescens.

RESULTS: Following 2-4 months of treatment, BCVA improved in 23/28 patients by an average of 2 Snellen lines (range 0-5). Contrast sensitivity improved in 9 out of 10 patients tested. Eight patients obtained at least 6/12 vision in their better eye, allowing them to meet the driving license criteria for the first time in their lives.

CONCLUSION: To the best of our knowledge this is the first report to show improvement in visual acuity and contrast sensitivity following perceptual learning treatment in patients with nystagmus. Although this study was not controlled, the average improvement in visual acuity of nystagmus patients is in correlation to previous prospective, double blind and controlled studies, using Neurovision technology for amblyopia treatment,3 which may suggest an amblyopic component in this condition.
**P09. Keratoconus and Amblyopia problem in children under 15 years of Age**

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**PURPOSE:** Although Keratoconus is a relatively rare corneal disease, it impact on vision and overall lifestyle. It has been estimated to occur in 1 out of every 1-2,000 persons in the general population. Keratoconus is generally first diagnosed in young people at puberty or in their late teens and progresses through the third or fourth decade of life. It tends to progress more rapidly in young patients. Vision correction in the early phases is often possible with eyeglasses and contact lenses. By carefully monitoring the progression of keratoconus and applying the necessary treatment options it is possible to help patients maintain good vision and functioning.

**METHODS:** Contact lens department on University Eye Clinic Ljubljana has administered 90 keratoconus patients younger than 15 years of age from the year 1996 to 2011.

**RESULTS:** There are 3 children under 5 years, 27 from 6 to 10 years and 60 from 11 to 15 years of age. The youngest was 3 years of age. All had amblyopia, which has not been improved with spectacles. Vision has improved with contact lenses, but cooperation in wearing contact lenses was not always the best.

**CONCLUSION:** Keratoconus is a disease of relatively low prevalence that rarely results in blindness, but because it affects young adults, the magnitude of its public health impact is disproportionate to its prevalence. Because of its young onset it has impact on detection and presence of amblyopia and later treatment of it.
P10. Myelinated Nerve Fibers combined with High Myopia and Amblyopia

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The rare combination of myelinated nerve fibers and high myopia usually leads to deep amblyopia. Improvement of visual function after occlusion therapy has been very limited. We present three patients with the above diagnosis with description of their clinical findings. We also discuss findings in the literature. We came to the conclusion that the results of amblyopia treatment are usually disappointing in patients with combination of myelinated nerve fibers and high myopia.
P11. Peculiarities of treatment of Strabismus and Amblyopia in children with disorders of Neuropsychofunctional State

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PURPOSE: The aim: is to adapt methods of pleopto-orthoptic treatment to neuropsychofunctional state of patients.

METHODS: 201 children with cerebral palsy (CP) and disturbances of intellect, attention and hand motility; full ophthalmological investigation; traditional and optimized methods of pleopto-orthoptic treatment.

The peculiarities of pleopto-orthoptic treatment:
1) registration of real intellectual age of child (not calendar age).
2) exception of usage of impulse light in treatment of children with epilepsy and convulsive activity; accent on methods of developing of distinctive abilities.
3) wide usage of semi-transparent occlusion in treatment of amblyopia instead of full occlusion, which often is endured bad;
4) application of methods, that combine irritation of different sensory systems;
5) wide usage of computer programs in children with disturbances of hand motility and method of activation of attention in children with its disturbances.

RESULTS: Optimized pleoptic and orthoptic treatment increases average visual acuity in patients with CP, amblyopia and strabismus in 1,8 times, leads to full removal of strabismus in 20,7% of children, decreases the deviation in 32,2% of patients, helps to achieve stable binocular vision in 11,5% and simultaneous vision in 25,3% of patients.

CONCLUSION: Optimised pleoptic and orthoptic treatment can be used in children with different neurology diseases with disturbances of intellect, attention and hand motility.
P12. Comparing the iScreen to the MTI Photoscreener in Pediatric Vision Screening

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PURPOSE: The iScreen digital photoscreener and the MTI photoscreener are both used to objectively screen for amblyopia risk factors in children. The MTI photoscreener is an analog model placing images on polaroid style film and has been extensively tested, but limited availability of film may render it obsolete. The iScreen digital photoscreener is a similar hand-held device, taking two rapid digital images, which are electronically transmitted for interpretation. In this study we compare the iScreen with MTI for the ability to detect amblyopia risk factors compared to a cycloplegic refraction in one cohort of children.

METHODS: We performed a retrospective chart review of patients who underwent iScreen and MTI photoscreening. 47 consecutive children were examined. Each child was screened with both the iScreen as well as the MTI in our office on the same day as part of a comprehensive paediatric ophthalmology examination. iScreen images were analyzed by the company and MTI images were analyzed by an expert masked examiner. Referral by either device was compared to the presence of amblyopia risk factors as determined by a cycloplegic examination as per the AAPOS referral criteria.

RESULTS: 47 children were analyzed in total. 70% of children were found to have amblyopia risk factors. The iScreen was found to have a sensitivity of 81% and specificity of 79%. The MTI was found to have a sensitivity of 79% and specificity of 100%.

CONCLUSION: The iScreen and MTI performed similarly when compared to a comprehensive pediatric ophthalmology examination. Screening programs should feel comfortable substituting the iScreen photoscreener for the MTI.
P13. Comparison of SureSight Autorefractor and PlusoptiX Photoscreener for vision screening in rural Honduras

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PURPOSE: We compared the SureSight autorefractor and the PlusoptiX photoscreener used on children in rural Honduras to detect amblyopia risk factors.

METHODS: Retrospective chart review of patients who had an undilated SureSight autorefractive screening, undilated plusoptiX photoscreening, and cycloplegic refraction performed by a pediatric ophthalmologist.

RESULTS: 216 children were evaluated. The sensitivity and specificity of the SureSight autorefractor was 89% and 80%. The sensitivity and specificity of the plusoptiX photoscreener was 89% & 80%.

CONCLUSION: Both devices were found to be reliable vision screening devices when used on the general population of remote villages in Honduras, though the PlusoptiX was found to have a higher specificity.
P14. Can the PlusoptiX Replace the need for a Cycloplegic Examination in select pediatric ophthalmology patients?

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PURPOSE: To determine if children presenting to a pediatric ophthalmologist and found to have a normal plusoptiX photoscreening, normal acuity, and normal alignment/motility, receive any additional benefit from having a dilated examination.

METHODS: Retrospective record review on all children who had an undilated plusoptix on their initial examination. 1,377 children were identified. Half of these records were selected randomly and reviewed. Of these patients, 222 were found to have a normal undilated plusoptiX on their initial examination. 19 patients were excluded for abnormal alignment and/or abnormal vision. 13 children were excluded because they were sent for a medical or ophthalmic condition requiring a dilated fundus exam (Diabetes, JRA, Neurofibromatosis, Glaucoma and Trauma).

RESULTS: Of 190 patients analyzed, cycloplegic examination provided additional information in only 4 patients, 2 pre-verbal children, one with non-visually significant congenital cataract <1mm, one with refractive amblyopia from moderate astigmatism, 1 child with moderate hyperopia who was put into glasses because parents noted esotropia and was later found to have AET and 1 child with increased cupping but normal IOP. Although now being examined yearly, this patient is felt unlikely to have glaucoma.

Discussion: A normal PlusoptiX, combined with normal alignment/motility evaluation and visual acuity was found to have a 98% negative predictive value for ophthalmic pathology including significant refractive error.

CONCLUSION: Dilating drops are traumatic for many children. The PlusoptiX and an abbreviated eye examination may obviate the need for dilation in select children.
**P15. Retinal Nerve Fiber Layer and Macular Thicknesses in dominant eyes as measured by Cirrus HD OCT**

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**PURPOSE:** To determine whether macular and retinal nerve fiber layer (RNFL) thicknesses differ in the dominant and nondominant eyes of healthy adults.

**METHODS:** One hundred healthy adults were recruited and assessed for ocular dominance using a hole in the hand test. Peripapillary RNFL and macular thicknesses of both eyes were measured using spectral domain (SD) Cirrus OCT. The parameter of peripapillary RNFL thickness was mean average RNFL thickness and each four quadrants (superior, nasal, inferior and temporal) of thickness. The parameter of macular thickness was central subfield thickness (CST), and cube average thickness (CAT). The differences between average and quadrant RNFL thicknesses and macular thickness in dominant and nondominant eyes were analyzed.

**RESULTS:** No difference was observed between average RNFL thickness and macular thickness in dominant and nondominant eyes (P=0.187, and 0.653, respectively). However, when the peripapillary RNFL circle was divided into four quadrants, nasal quadrants had thicker (P=0.001), and superior quadrant had thinner (P<0.001) in dominant eyes.

**CONCLUSIONS:** This study shows that in the healthy normal adult eyes, dominant eyes have a thicker nasal quadrant peripapillary RNFL and a thinner superior quadrant peripapillary RNFL. Nevertheless, these findings require histologic confirmation.
P16. The Prevalence of Myopia and Hyperopia among Children 3 to 9 Years of Age, in the City of Fier, Albania

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PURPOSE: To determine the prevalence of myopia and hyperopia among children 3 to 9 years of age in urban and rural areas of Fier, Albania.

METHODS: Population-based cross-sectional samples of children 3 to 9 years of age were obtained through cluster sampling. Presenting, uncorrected, and best-corrected visual acuity, along with refractive error under cycloplegia, were the main outcome measures. Children 3 to 5 years of age with a visual acuity of 20/40 or worse and those 6 to 9 years of age with a visual acuity of 20/30 or worse underwent a complete ophthalmic examination to determine the cause of visual impairment. A spherical equivalent of -0.5 diopter (D) or worse was defined as myopia, +2.0 D or more was defined as hyperopia.

RESULTS: The uncorrected visual acuity was 20/40 or worse in the better eye of 112 children (4.8% of participants). According to results of cycloplegic refraction, 1.2% of the children were myopic and 6.7% were hyperopic. In the multivariate logistic regression, myopia was correlated with age (p=0.030), and hyperopia was correlated also with age (p<0.001).

CONCLUSION: The present study reveals the considerable prevalence rates of refractive errors among children of 3 to 9 years of age in Fier and the high rate of an unmet need for their correction.
P17. The Long-term Change of Refractive Error in Korean Children with High Myopia

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PURPOSE: Myopia occurs with time, presenting usually at school age and degree of myopia continue to increase with age until time of physical maturity in early 20s. However the change of refractive error in children with high myopia may be different, and there is no sufficient long term study about that. So, we investigated the change of refractive error in Korean children with high myopia.

METHODS: The medical records of 43 myopic children (62 eyes) featuring a spherical equivalent (SE) of -6.0 Diopeters (D) or less prior to the age of 15 years were reviewed retrospectively. They were followed up at least 1 year. The refractive state was measured with autorefractometer under cycloplegia. We divided all subjects into one of three groups according to the severity of initial refractive errors and the age of initial visit, and compared the change of refractive error with time.

RESULTS: The mean age of initial visit was 7.89 years of age (range, 2.2~15 years of age), the mean initial refractive error was -8.67 D (range, -6.00~-17.25 D) and the mean follow-up period was 47.51 months (range, 12.4~170.9 months). The mean change of refractive error per 6-month was -0.12 D (range, -0.95~+0.42 D). The amount of change was only half compared with simple school myopia, and it was significantly small in children with initially higher level of myopia (p=0.021).

CONCLUSION: The refractive error in children with high myopia showed myopic progression, but the amount of change was only half compared with simple school myopia and in some children it showed even stability or regression. We also found that in children with initially higher level of myopia the amount of progression of myopia was significantly small.
P18. The Impact of Corneal Refractive Surgery on Ocular Alignment in Patients with Myopia

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PURPOSE: To evaluate the impact of corneal refractive surgery on ocular alignment in patients with myopia in a prospective study.

METHODS: Ninety eight myopic patients (195 eyes) who underwent refractive surgery were assessed with orthoptic examination before and 3 months after surgery. The main outcome measure was variable alignment defined as a change by ten or more prism diopters (PD) between assessments before and after surgery.

RESULTS: Patients with a mean age of 26.6 years were treated for a mean refractive error of -4.80±1.78 D myopia. The mean postoperative refractive error was -0.12±0.46 D. Ocular alignment remained unchanged postoperatively in 95 patients (96.9%) at distance, and 91 (92.8%) at near, respectively. No patient experienced diplopia postoperatively. However, there were three patients who showed the change in deviation more than 10 PD both at distance and near: one patient had decompensation of exophoria, and two patients, who showed a decrease in deviation, had anisometropia. There was no significant correlation between the magnitude of myopia and the change in ocular alignment. Patients with anisometropia showed decrease in deviation at near (p=0.002), whereas patients with greater near point of convergence demonstrated increase in deviation at near postoperatively (p=0.014).

CONCLUSION: The myopic refractive surgery does not cause a significant change in ocular alignment. However, the misalignment of near fixation tends to decrease in patients with anisometropia after refractive surgery.
PURPOSE: Refractive values and ocular motility assessment of identical twins.

METHODS: In Strabismology Department of our hospital 30 identical twins examined during 2002 - 2012 was evaluated retrospectively. Ages of the 15 girl twins and 15 male twins were between 1-7 years.

RESULTS: Even though there were differences in refractive values of 7 twins, their deviation trend were the same. Refractive values and ocular motility were exactly the same in 16 twins. In other 7 twins there were similar refractive values but, their motility response showed 10- 20 PD difference. 2 twins underwent ambliopia treatment. At the end of the treatment period, one cooperative child from each twin was completely cured but, the uncooperative ones stayed ambliopic.

CONCLUSION: Although, refractive values and ocular motility is generally similar in identical twins, it can rarely be a refractive difference and they may develop different motility. Responses to amblyopia are in line with their compliance to treatment.
**P20. Postnatal Refractogenesis in Children with Congenital Concomitant Non-accommodative Esotropia (CCNE)**

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**PURPOSE:** In children with unilateral strabismus the refraction of fixing eye often becomes significantly stronger during the growth of child than the refraction of deviated eye. The purpose is to study all long-term refractive changes in children with CCNE.

**METHODS:** Cycloplegic refraction was determined annually in 663 hyperopic patients from 1-18 ages, divided in 4 groups: 168 - alternating CCNE; 159 - unilateral CCNE; 284 successfully operated CCNE in preschool age; 52 patients without squint as a control group. Initially the degree of anisometropia wasn’t higher than 2 D among all 4 groups.

**RESULTS:** The refraction strengthening in equal degree on both eyes was determined in 96,2±1,0% alternative CCNE patients; in 91,5±1,6% of early operated patients; in 91,4 ± 2,7% of patients from control group.

In patients with unilateral CCNE the refraction strengthening of fixing eye was observed more often (93,1±2,0%) in comparison with squinting eye (84,0±2,8%). Average value of hyperopia decreasing was 2,69 D on fixing eye and 1,57 D on deviated eye and depended on initial degree of hyperopia. Emetropia was achieved in 35,6 ±3,8% of fixing eyes and only in 16,2±2,9% of squinting eyes, myopia arose in 13,1±2,7% and 2,5 ± 1,2% cases respectively. Due to asymmetric emmetropization, the acquired anisometropia appeared in 55,1±3,8% of unilateral CCNE patients including 25,1 ± 2,2% patients with 4-8D anisometropia difference, who required special correction (contact lenses, laser refractive surgery). Acquired anisometropia above 2 D wasn’t observed in children from other groups.

**CONCLUSION:** Early surgical correction of unilateral CCNE provides normal postnatal refractogenesis and prevents the development of anisometropia.
P21. Following the Changes in Refractive Status and Strabismus Prevalence in Premature Infants with Retinopathy of Prematurity (ROP) after Laser Treatment

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PURPOSE: To evaluate changes in refractive status and strabismus prevalence in premature infants with retinopathy of prematurity (ROP) after laser treatment.

METHODS: This is a retrospective study about refractive status and prevalence of strabismus with 47 premature infants (gestational age less than 34 weeks or birth weight less than 1,500 g) with different stage of ROP laser treatment. All infants were hospitalized at the Institute of Neonatology in Belgrade, Serbia. Follow up periods: first and second year of life. Eye examinations included fundus, ocular motility and refractive error. Strabismus was detected when using the Hirschberg and cover tests. Eyes were refracted using retinoscopy in cycloplegia with Cyclopentolate 1%.

RESULTS: Follow up year 1: In 47 premature infants (94 eyes) after laser treatment we have found astigmatism in 66 eyes (70%), hyperopia in 18 eyes (19%), myopia in 10 eyes (11%) and the presence of strabismus in 1 of them (2%).

Follow up year 2: we have found astigmatism in 70 eyes (74%), hyperopia in 14 eyes (15%), myopia in 10 eyes (11%) and the presence of strabismus in 1 of them (2%).

CONCLUSION: There has been no significant difference between refractive statuses in the follow ups after 1 or 2 years. The main features are increasing levels of myopia through 1D, the gradual emmetropization in most cases of hyperopic infants as well as crossing the mixed astigmatism to myopic in 4 cases. The constant evaluation of refraction status and appropriate adjustments are the way to provide these children a normal development of visual acuity.
P22. Superficial Electromyography in Children with Concomitant Squint

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PURPOSE: In spite of known publications about electromyography (EMG) in patients with concomitant strabismus which did not show much information for surgeons, it is interesting to specify EMG in cases with unilateral or alternative eso- or exotropia in children, to choose kind of treatment. Requirement of non-invasive EMG is still obvious in these cases. The purpose was to study functional state of external horizontal rectus muscles in children with concomitant squint applying modified electrodes for surface (through conjunctive) electromyography (SEMG) with M-TEST-2 electromyograph.

METHODS: 20 children aged (13, 9 ± SD 2, 4) were observed. Among them 11 (22 eyes) were with esotropia (20-40 PD) and 9 (18 eyes) with exotropia (25-45 PD). Following parameters of surface electromyography (SEMG) were defined: frequency of total electric activity of muscles, the maximum and average amplitude of a signal.

RESULTS: It was found that SEMG maximal amplitudes of MR muscles were increased in unilateral esotropia in comparison with amplitudes of LR muscles on more squinting eye in exotropia (16, 8 ± 1, 4 mV and 11, 7 ± 2, 5 mV accordingly), P = 0, 02. Frequency of electrical activity of LR and MR muscles on more squinting eyes was increased in exotropia (LR -672,0±164,72 Hz, MR - 619,0±156,2 Hz) but not significantly in comparison with esotropia (LR - 561,8 ±183,4 Hz and MR - 590,4 ±75,5 Hz).

CONCLUSION: Results revealed that SEMG with modified electrode by means of M-TEST-2 can be used in children. SEMG maximum amplitudes of medial recti in cases with unilateral esotropia were increased in comparison with maximum amplitudes of SEMG in lateral recti in unilateral exotropia.
P23. A New Conjunctival Incision for Strabismus Surgery

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PURPOSE: This is an assessment of new method for conjunctival incision for recess resect surgery.

METHODS: Between 2010 and 2011 I operated 84 recess/resect surgeries for pure horizontal strabismus, 40 of them (group A) with classic limbal incision for each muscle and the other 44 (group B) by my new technic.
The new technic is:
1. Superficial full 360 peritomy without tenon capsule and without relaxing incisions
2. Longitudinal incision over the muscle capsule, operating the muscle as usual and then closing the capsule above the muscle by one stitch
3. Finally conjunctival closing by just one creative stitch (inverted stitch that contracts the conjunctiva and in the same time fixes it at the sclera at 6 O’clock)
I used 4 measures for comparing the two groups: 1. Discomfort at one day after surgery, 2. Discomfort 2 weeks after surgery, 3. Total duration for complete relief of local symptoms, 4. Conjunctival appearance at two months after surgery.

RESULTS: The new technic (group B) was markedly better in criteria 2, 3, 4 and the classic limbal technic was slightly better in criterion 1.

CONCLUSION: The new technic seems to be better than classic limbal incision for two muscle surgery in the same eye.
P24. New Modified Fixation Forceps

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PURPOSE: This Poster describes a modified Fixation forceps used in strabismus surgery: the first is the classical castro vigio modification, the second is the sliding lock and the third is a sliding ring. Low profile modifications are described as well as the original high profile modification.
P25. Postoperative Treatment in Uneventful Strabismus Surgery Follow-up in Children under 14 years: Optimal Treatment vs. Over Dosage

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PURPOSE: The lack of consensus on intra and postoperative therapeutic measures in strabismus leads to great differences among countries.

METHODS: We have conducted a survey of 30 strabismologists from countries in and out of European Community, and the following intra and postoperative variables were assessed: aseptic method, treatment, and the time elapsed between surgery and first postoperative visit.

RESULTS: Presurgical 10% povidone iodine was used as aseptic solution in 93.33% of the respondents, 80% of which employed it both on skin and conjunctiva. Subconjunctival postoperative anaesthetic was administrated in 13.33% and only 3.33% applied it topically. 16.66% prescribed oral antibiotic, 6.66% used subconjunctival antibiotic at the end of the surgery. Although 96.66% preferred topical antibiotics, treatment regimen showed a profound heterogeneity. Most of the respondents (96.66%) prescribed drops three times a day during the first week and twice a day afterwards, as the patient resumed school activities. Postoperative treatment was prescribed for a period ranging from one to thirty days (mean 12.6 days), the reason given being economic issues. Finally, 80% of the respondents set first evaluation 24 hours after surgery (one of which did telephonically) and the others within the first week, with the exception of a doctor who did the first visit two months after surgery.

CONCLUSION: We have not found an established protocol about intra and postoperative treatment in unveventful strabismus surgery follow-up in children under 14 years. In our opinion, it would be most useful to reach a consensus on this issue, to avoid over dosage and provide optimal treatment for our patients.
P26. Similarity between Bacteriae in Nose and on Reattached Muscle Points to Reflux from Lacrimal Puncta

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PURPOSE: In our series of endophthalmitis after strabismus surgery (currently N=19) it occurred either in children under 7 after medial rectus recession causing enucleation, or in elderly over 65 after previous eye surgery, with more favourable outcome. In a multicenter double-blind RCT among 1-to-5-year-olds we study the effectiveness of irrigating the conjunctiva with 5% vs. 1.25% povidone-iodine (PI) as additional antiseptic measure.

METHODS: Smears are obtained after induction of anesthesia from (0) the nose, (1) conjunctiva, (2) conjunctiva 5 minutes after PI irrigation, (3) muscle and cut-off sutures after reattachment and (4) again from conjunctiva. Samples are taken from the conjunctiva with a small standard dissolving Ca-alginate swab (Sanofi-Pasteur). The moistened swab is taken softly via one rotational swipe over conjunctiva or eye muscle without touching the lid or eyelashes, and put into a tube containing Transport Medium 482 CE (Hain Lifescience). To minimize variation in culture techniques, all cultures are analysed in a central laboratory (Munich). 56 children were recruited by March 2012. Randomisation is still coded.

RESULTS: As in other studies, bacteriae were found on a quarter of the re-attached muscles. 8 children had the same bacteriae in the nose as on the re-attached muscle. In 3 of these no or other bacteriae had been found in the conjunctiva before PI rinsing.

CONCLUSION: The similarity between the bacteriae from the nose at the start of surgery and the bacteriae in the recontaminated surgical field, while these bacteriae were not found in the conjunctiva at the start of surgery, supports the suggestion by John Sloper, Moorfields Eye Hospital, that reflux from the lacrimal puncta may occur. We now continue the RCT with addition of massage of the lacrimal sack before PI rinsing.
P27. Anterior Segment Ischemia - A Case Report

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PURPOSE: To present a case of anterior segment ischemia (ASI) caused by a spontaneous rupture of medial rectus after total transposition of vertical rectus muscles.

METHODS: A 63-year-old woman with rheumatoid arthritis (RA) had developed a right sixth nerve paresis in 2002. In 2009, esotropia in the right eye increased (up to 85 PD). Head position was to the right and the patient had a complete sixth nerve palsy in her right eye. MRI was normal, except for an atrophic right lateral rectus (LR). Total transposition of vertical rectus muscles next to the insertion of the LR was conducted. Additionally, an injection of botulinum toxin to the medial rectus (MR) was planned. Before the injection, the muscle snapped spontaneously. Only a 5 mm-long stump of MR remained in the insertion and it was sutured to the tissue found.

RESULTS: ASI started to develop within the first post-operative day: the right eye showed corneal oedema, microcystic bullae, striated Descemet’s membrane, and anterior chamber cells and flare. The visual acuity was decreased from 20/20 to 20/100. The lens became swollen and the iris was soft and slightly rolled. As a final result of ASI, the patient had a cataract and secondary glaucoma. The visual acuity remained at 20/60 level. The head position was straighter than before operation and a slight right esotropia remained (14 PD). Adduction of the right eye was only slightly reduced.

CONCLUSION: Long-lasting RA causes changes in muscles, especially weakness and atrophy. The spontaneous rupture of the tight MR, which unfortunately caused ASI to the patient, may reflect a weakening caused by RA even though during the operation the medial rectus seemed to be within normal thickness.
P28. The Relationship between Accommodation and Age, Refraction and Ocular Biometry Parameters in School Children

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PURPOSE: To investigate the association of the amplitude of accommodation with age, refraction and ocular biometry parameters.

METHODS: The right eyes of 277 school children were included. The inclusions criteria were: 10/10 or better corrected Snellen visual acuity in both eyes and the absence of manifest eye deviation. The amplitude of accommodation was assessed binocularly using R.A.F. near point rule (HAAG-STREIT, UK). The near point of accommodation (NPA) which was considered to be the point at which blur was first noticed, was documented in centimetres (cm). The ocular biometry with Lenstar and auto refractometry was both performed 30 min after instilling 1% Tropicamide. Linear regression analysis was performed to evaluate the association of NPA with the refraction and ocular biometry measurements.

RESULTS: The mean age of the subjects was 9.97±2.54 (6-15) years old. The mean axial length (AL) was 23.06±0.88 mm, anterior chamber depth 3.15±0.27 mm and lens thickness 3.40±0.34 mm. The mean keratometric values in diopters (D) were 42.95±1.51 and 43.75±1.59 for K1 and K2 respectively. The mean spherical equivalent was 0.60±1.20 D and the mean NPA was 6.38±2.61 (4-18) cm. The age was positively and the AL was negatively correlated with the NPA (p<0.05). The other parameters were not correlated with NPA.
P29. Spasm of Accommodation among School Children

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PURPOSE: To describe this phenomenon and to measure it.

METHODS: The sample is obtained through the examination of all schoolchildren that have some complains and are presented at the ophthalmologists office. The symptoms were: headache, brow ache and variable blurring of distance vision. Presenting, uncorrected, and best-corrected visual acuity, along with refractive error under cycloplegia, were the main outcome measures.

RESULTS: The sample is compound of 196 children from 6 to 16 years old. The spasm of accommodation is found in 23 children (11.6% of all participants). None of the cases is related with local disease such as iridocyclitis or medications such as the anticholinesterases. In 6 cases the phenomenon is related with uncorrected hyperopia and in 3 others with uncorrected astigmatism. In all other cases the spasm of accommodation is related with prolonged and intense periods of near work. The amount of induced myopia varies from 6 to 8 diopters.

CONCLUSION: The present study reveals that the spasm of accommodation among schoolchildren is a considerable problem. It should be diagnosed and treated properly.
P30. The Change of Accommodational Ability Influencing Asthenopia with Viewing 3D Display

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PURPOSE: To identify the change of accommodational ability and correlation between accommodation and visual asthenopia with watching 3D display. And to measure the accommodational ability by objective method using optical quality analysis system (OQAS).

METHODS: 15 normal adults without ophthalmologic abnormality watched the same 3D display for 30 minutes. Each subject’s objective accommodational range and point of best near visual acuity were measured by OQAS. And each subject’s near point of accommodation was also measured by conventional Donders push-up method. And survey for subjective symptom after watching 3D display was done. The above-mentioned experiments were performed equally with 2D display for detection of innate influence of 3D display on the subject’s accommodation.

RESULTS: Objective accommodational ability measured by OQAS was decreased significantly after watching 3D display (p<0.05). Also, near point of accommodation was changed significantly after watching 3D display. And these two methods had significant correlation (p<0.05). Among subjective symptoms, pain, tearing, dryness were significantly increased after watching 3D display (p<0.05). But, no significant change was observed after watching 2D display in accommodational ability, near point of accommodation and subjective symptom.

CONCLUSION: Significant decrease of the accommodational ability was observed after watching 3D display with objective measurement by OQAS. Also, the measurement by OQAS had close relationship with the measurement of near point of accommodation. And several subjective symptoms were significantly increased after watching 3D display. Therefore, the decreased ability of accommodation may contribute visual asthenopia with 3D display.
P31. Accommodation and Binocular Vision in Children

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PURPOSE: Condition of accommodation and binocular function in children with various refraction.

METHODS: The accommodation expend was carried out by measuring dynamic refraction with different distances (0.33, 0.5, 1.0, 2.5, 5.0 m) on «WAM-5500», heterophoria by Maddox, stereovision measured on the program “stereopsis”, in same distances.

RESULTS: In emetropia accommodation expend lower than theoretical values, average of 0.4D, with hyperopia close to the theoretical and exceeded the average - 0.1D, with myopia decreased 1D, and the accommodation begin work in 1m. In emetropia to 5m in 70% orthophoria detected in 30% - exophoria.
From 0.33 m, orthophoria increased to 80%, and exophoria decreased to 20%. In hyperopia with 5m orthophoria observed 67%, esophoria 33%, from 0.33m, esophoria increased to 75% for myopia with 5m orthophoria was 64% -27% exophoria, and in 0.33m, exophoria increased to 45%, which occurred against the backdrop of the weakening of accommodation. Stereovision in emetropia were 6.3” as it approaches the object angle disparation smoothly increased and the expend of accommodation increased. In hyperopia 15.4”, accommodation expend exceed the expend obtained with emetropia. With low expend accommodation myopia accompanied by a decline stereovision acuity 26.8 “.

CONCLUSION: In emetropia expend of accommodation is less than the theoretical values and the smallest angle disparation. In hyperopia accommodation expend exceed the theoretical angle disparation higher than in emetropia - the stress accommodative and binocular systems, in myopia the expend of accommodation is lower than in emetropia, the disparation highest indicating a weakness and accommodative and binocular systems.
P32. Binocular Vision Following Refractive Surgery in Anisometropic Patients

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PURPOSE: To compare the degree of binocularity before and after refractive surgery in anisometropic patients.

METHODS: Comparative retrospective analysis of 47 consecutive patients who had an anisometropia greater than or equal to 1.5 diopters. Bilateral refractive surgery was performed from 2001 to 2010. We assessed the state of binocular vision and ocular motility before and 6 months after surgery. The examination included best corrected visual acuity, cycloplegic refractive error, ocular motility study and the degree of stereopsis using TNO test.

RESULTS: The mean negative refractive spherical equivalent preoperative in the better eye was 4.75 diopters [-0.25 to -18.00]. As for the positive spherical defect, the average in the better eye was 1.81 diopters [0.50 to 4.75]. The mean negative refractive error in the worse eye was 7.98 diopters [-2.00 to -19.50]. The positive spherical defect obtained in the worse eye was 3.13 diopters on average (1.00 to 5.00). Mean anisometropia found in the patients was 2.65 diopters. 12 patients had a preoperative anisometropia greater than or equal to 3 diopters. 7 patients had a greater or lesser degree of anisometropic amblyopia and 32 (68.08%) had strabismus. Regarding the degree of stereopsis, it remained unchanged in 39 patients (82.9%), increased in 5 (2 had no preoperative stereopsis) and deteriorated in another 3 patients.

CONCLUSION: Based on the results derived from the analysis of our patients can conclude that, in most patients with anisometropia higher than 1.5 diopters, binocular state does not change after the performance of a refractive surgery.
P33. Eye Appearance and Detection of Exodeviation in Children with Intermittent Exotropia

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PURPOSE: To assess the impact of eye appearance on the detection of ocular misalignment in children with intermittent exotropia (X[T]).

METHODS: A total of 70 children ages 3-10 years with untreated intermittent exotropia were recruited. Photographs were taken of eye appearance. Interpupillary distance, intercanthal distance, and the presence of epicanthal fold or double eyelid were evaluated on each photograph. One parent of each child completed a questionnaire to evaluate when and how ocular misalignment was detected, a home-based level of control of X(T), and the impact of misalignment on daily activities.

RESULTS: Forty seven (67.1%) of 70 parents had first found their children’s X(T), mean angle of 23.94±5.97 prism diopters. X(T) was most frequently detected at age 4-6 years (32.9%) and 1-2 times a day (30.0%), respectively. Misalignment of children who had epicanthal folds or no double eyelid was less frequently detected by their parents compared to children who did not (P=0.019 and P=0.034, respectively).

CONCLUSION: The presence of epicanthal fold or absence of double eyelid can make underestimated the control of X(T). We recommend heightened awareness of potential misalignment in children with epicanthal fold and no double eyelid.
P34. Predictable Factors of the Improvement in Distance Stereoacuity following Surgery for Intermittent Exotropia

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PURPOSE: To evaluate the factors to predict the improvement in distance stereoacuity following surgery for intermittent exotropia.

METHODS: We retrospectively reviewed the medical records of 53 intermittent exotropia patients undergoing surgery who showed successful surgical alignment. Stereoacuity was measured pre-, 1 week, 1 month, and 3 months postoperatively using Frisby Davis Distance (FD2) and Distance Randot stereotests (DR). Various factors were compared between stereoacuity improvement and no-improvement groups.

RESULTS: Distance stereoacuity measured with DR improved in 30 out of 53 patients (56.6%) at one month postoperatively. The age at surgery was younger in the DR-improvement group than DR-no-improvement group (7.5±2.7 years old, 10.5±13.9 years old, p=0.048). The number of patients with a dominant eye was higher in the DR-no-improvement group than DR-improvement group (69.6%, 33.3%, p=0.009). The frequency of constant deviation at only distance was higher in the DR-no-improvement group than DR-improvement group (60.9%, 30%, p=0.025). Distance stereoacuity measured with the FD2 improved in 18 out of 53 patients (34%) at one month postoperatively. There was no difference in two FD2 groups in any factors.

CONCLUSION: The young age at surgery, and the absence of a dominant eye and intermittent deviation at distance were significant factors in predicting the improving distance stereoacuity, especially using DR in intermittent exotropia patients following surgery.
P35. Factors Associated with Surgical Outcomes at Two Years after Surgery for Intermittent Exotropia

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PURPOSE: To evaluate the surgical success at 2 years after surgery for intermittent exotropia and to analyse factors associated with surgical outcomes.

METHODS: We retrospectively reviewed the medical records of patients who underwent exotropia surgery with postoperative follow-up of 2 years or more. Patients were divided into 2 groups according to postoperative deviation angles at 2 years after surgery: Orthotropia group included patients with orthotropia or exophoria/tropia 10 prism diopters (PD), and recurrence group included patients who showed recurrent exotropia of 10 PD or underwent reoperation within 2 years. We investigated the factors associated with surgical outcomes at 2 years after surgery using univariate and multivariate analyses.

RESULTS: Of 216 patients, orthotropia maintained in 128 cases (59%) and exotropia recurred in 84 cases (39%). Three cases (2%) were overcorrected and excluded from this study. The mean duration from surgery to recurrence was 2.27 years. By univariate analysis, surgical methods (p=0.022) and angle of deviation at postoperative 1 day at distance (p=0.000) and near (p=0.006) showed statistically significant associations with surgical outcome of intermittent exotropia (Fishers exact test, Chi-square test, t-test). However, logistic regression analysis showed that the angle of deviation at postoperative 1 day at distance was the only factor that contribute significantly to the surgical success (P=0.023).

CONCLUSION: The early overcorrection on postoperative 1 day determines surgical outcomes at 2 years after surgery for intermittent exotropia.
PURPOSE: Many clinical factors could influence the outcome of intermittent exotropia surgery. This study aimed to determine the effects of age on surgical outcome, with maximal control of other influencing factors.

METHODS: The authors retrospectively examined 94 exotropia patients, able to be examined for at least six months after operation. The patients were divided into two groups. Group 1 is composed of 48 patients with age under 7 years old at surgery, and Group 2 included 46 patients with age over 13 years old at time of operation. In order to exclude factors other than age that might affect the outcome of strabismus surgery, other clinical features like visual acuity, refractive error, preoperative binocular function, near and far deviation angle and operation method were same in two groups.

RESULTS: All patients received bilateral lateral rectus recession and had preoperative minimal binocularity. Amount of preoperative angle of deviation and postoperative angle of deviation at first week showed no significant differences in two groups (p>0.05). Surgical success was defined as sustained alignment from esotropia 10 prism diopter (PD) to exotropia 10 PD. The success rate of group 2 was 89.6% at the first week, 83.3% at one month, 81.3% at three months, and 81.3% at six months postoperatively. There was no significant difference between group 1 and 2 (p>0.05).

CONCLUSION: With maximal exclusion of other influencing factors except age, there was no difference in the surgical success rate between two age groups. We determined that age of patient at surgery had no impact on outcomes of exotropia surgery.

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PURPOSE: To compare surgical outcomes following unilateral lateral rectus recession (ULR) and unilateral recess-resect (RR) for intermittent exotropia of 20 to 25 prism diopters (PD). Setting/ Venue: retrospective cohort study.

METHODS: In this retrospective study, ULR was performed in 82 patients and RR in 98 patients for the treatment of intermittent exotropia of 20 to 25 PD with postoperative follow-up of 6 months or more. The main outcome measures were postoperative exodeviation angles and final success rates, which were compared between two groups. A surgical success was considered to be an alignment within 10 PD.

RESULTS: The mean angles of exodeviation were -0.29 (esodeviation) ± 2.83 PD in ULR group and -1.98 ± 4.31 PD in RR group at postoperative 1 day, and 4.41 ± 4.44 PD in the ULR group and 2.58 ± 3.37 PD in the RR group at 3 months, respectively, which was significantly different between two groups (p>0.05). The successful outcome was achieved in 60.9 % of the patients of ULR group and 56.1 % of those of RR group (p>0.5). Postoperative lateral incomitance occurred in 2 patients (2.4%) in ULR group, which persisted for 1 month whereas none of RR group had lateral incomitance postoperatively.

CONCLUSION: ULR is an effective and safe surgical method for the treatment of intermittent exotropia of 20-25 PD with results similar to RR.
P38. Tropicamid 0.2% for Treating Exotropia

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PURPOSE: As an opposite way to using miotics in esotropia with high AC/A, Cycloplegic drops may help in treating exotropia by elevating the ratio AC/A, low concentration prevents intolerance and may be more effective by keeping good efficacy of the accommodation.

METHODS: 15 patients of intermittent XT and 14 of consecutive XT were treated with Tropicamid 0.2% three times daily for two months. All patients in the study must have reduction in exotropia at least 7 PD after one hour of the first using of the drop, and also all patient have hyperopia under correction between +1.00 and +2.00D or myopia overcorrection by -1.00D.

RESULTS: 1- In the group 1 there was no important reduction in exotropia after one month of stopping treatment but in 5 patients of them there was remarkable reduction in strabismus occurrence during the period of using the drop, this effect wasn’t noticeable after one month of stopping the drop.
2- In group 2 there was an important reduction of XT and in 5 patients of them this was sufficient to avoid second surgery, the average reduction in XT in group 2 was 9 PD (range 0 to 16 PD).

CONCLUSION: Reduced concentration cycloplegic agent may be effective and non-invasive way to treat small angle exotropia especially after surgery for esotropia. We need more studies for exact determination of the cases that may benefit from this treatment and to determine the suitable concentration to use, and if one can use very low concentration of Cyclopentholat or even Atropine.
P39. The Prevalence of Strabismus in Population Base Study

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PURPOSE: To determine the prevalence of tropia and its determinants in Mashhad.

METHODS: In a cross-sectional population-based study, random stratified cluster sampling was performed in Mashhad. All the participants received a complete eye examination including refraction test, visual acuity measurement, colour vision test, contrast sensitivity testing, binocular vision and slip-lamp evaluation.

RESULTS: Of 4453 selected subjects, 70.4% participated in the study. The prevalence of strabismus was 2.2% (95% CI: 2.8-1.7). No significant difference was found in the prevalence of tropia between the two sexes (p=0.881). Strabismus was not correlated with age in the participants (p=0.755). The prevalence of esotropia and exotropia in the studied population was 0.4% and 1.8%, respectively. Tropia at near was more common. Myopia was significantly more prevalent in all subjects with strabismus.

CONCLUSION: As the first population-based study of all ages, the current study provided us with valuable information on tropia. Our result on the prevalence of strabismus was similar to the findings of other studies.
P40. Strabismus Distribution among the Patients in a Sofia Eye Clinic

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**PURPOSE**: To analyse the types of strabismus among the patients in a Sofia Eye Clinic.

**METHODS**: A retrospective study among 168 consecutive cases of strabismus consulted in a general eye clinic over a period of 8 years.

**RESULTS**: There were 77 males and 91 females. The ages varied from 15 months to 91 years. 18 patients had family history of strabismus. 60 were amblyopic. 92 patients were with esotropia (54.7%), 37 with exotropia (22%), 7 with vertical deviations (4.1%), 1 with cyclotropia (0.59%), 23 (13.6%) with paralytic strabismus and 8 (4.76%) with restrictive strabismus. 61 patients underwent surgery by the author.

**CONCLUSION**: The distribution of strabismus is comparable with the published in the European literature. Strict documentation of the orthoptic status is very important for the estimation of the long term results.

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PATIENTS AND METHODS: The causes of strabismus surgery in children and types of surgical techniques used were compared for year 2011 and for 10 and 20 years ago.

RESULTS: All together 171 squint operations in children were done in years 1991, 2001 and 2011 (89, 47, 35). The causes for operations were primary convergent squint (86,44,32), congenital esotropia (7,10,3), primary divergent squint (17,8,9), vertical strabismus (1,2,3), nystagmus (1,1,0), reoperations after previous strabismus surgery (6,6,5). Operational techniques that were used were: recession and/or resection of horizontal rectus muscles (86,44,32), recession and/or resection of vertical rectus muscles (0,1,1), miotomy of inferior oblique muscle (2,1,1), transposition of superior and inferior rectus muscles (0,0,1), application of botox in paralitic strabismus (1,0,0).

CONCLUSIONS: In the last 20 years the number of children operated for strabismus decreased considerably (32 children were operated in year 2011, 47 children in year 2001 and 89 children in year 1991). The possible causes are earlier squint detection and proper cycloplegic refraction and prescription of glasses together with early amblyopia screening, prevention and treatment.
P42. The Results of the Surgical Treatment of Strabismus in Children with Cerebral Palsy

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THE AIM: To study the efficacy of surgical treatment of strabismus in patients with cerebral palsy (CP).


METHODS: Viso- and refractometry, estimation of binocular vision, angle of strabismus, motility of eyes, convergence, biomicroscopy, ophthalmoscopy. The surgical treatment consisted mainly in operations by recession and resection of oculomotor muscles. Operations on horizontal rectus, vertical rectus and inferior oblique muscles were performed.

RESULTS: The orthotropia was achieved in 66% of children, unstable binocular vision was noted in 8%, simultaneous vision in 21%, fusion on the synoptophore was appeared in 11% of children. The long-term observations from 1 month to 11 years was conducted in 28 patients, 14 of them underwent active orthoptic treatment. The orthotropia was noted in 61% of patients, unstable binocular vision in 18%, simultaneous vision in 46%, fusion on the synoptophore in 46% of children (in 7% of them the normal amplitude of fusion was achieved).

CONCLUSION: Surgical correction of strabismus in children with CP is reasonable in pre-school and school age.
P43. Comparison of the Surgical Response to Medial Rectus Recession in Esotropes with and without Cerebral Palsy

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PURPOSE: To compare the surgical outcomes of medial rectus muscle recession in esotropes with and without cerebral palsy (CP).

METHODS: Thirty esotropes with CP and 60 age-matched esotropes without CP who underwent unilateral/bilateral medial rectus muscle (MR) recession were included. The surgical amount of MR recession was reduced by 1 mm per muscle in patients with CP. Success rates and factors affecting surgical responses were evaluated.

RESULTS: The rate of overcorrection was significantly higher in patients with CP (p=0.003). Patients with CP showed a larger surgical response than patients without CP, about 1.3 prism diopter per millimeter of recession (p=0.008).

CONCLUSION: Even with the reduced amount of recession, patients with CP showed a larger surgical response to MR recession than did those without CP.
P44. Outcome of Strabismus Correction by Botox Injection

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PURPOSE: To determine the outcome of botox injection to treat horizontal strabismus.

METHOD: 75 patients were enrolled in this study. All patients were injected with a dose ranged from 2.5 to 7.5 I.U of freshly prepared botox in O.R. diluted in normal saline. Young patients were injected under general anesthesia while adults and cooperative young patients were injected under topical anesthesia. Inclusion criteria: All patients with horizontal strabismus were included; mean age is 9.8 years, 40 males, 35 females. Angle of deviation was divided into 2 groups: - angle of deviation 30 PD were 52 patients - angle of deviation > 30 PD were 23 patients 67 patients received single injection; only 8 patients received the injection twice. Patients were considered to be corrected if the angle became within 10 PD. Measurement were recorded along 3 visits (3, 6 and 12 months).

RESULTS: 58 patients were corrected to within 10 PD, from those 36 patients remained corrected after 6 months and only 22 patients remained corrected in the final follow up, and it was noticed that in first group of patient, 47 patients were corrected to within 10 PD while in the second group with angle of deviation more than 30 PD, 11 patients were corrected only.

CONCLUSION: Angles of deviation equal to or less than 30 PD are better correct than those > 30 PD with P-value = 0.0002 and Chi-square = 14.12. Our study showed that 77.3% of horizontal strabismus with small to moderate angle of deviation was corrected with botox injection.
P45. Conventional Recession-Resection Combined with Faden Operation in High AC: A Esotropia with Marked Amblyopia

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INTRODUCTION: The purpose of this study is to report the effect of combining conventional recession of medial rectus - resection of lateral rectus with a medial rectus posterior fixation suture (Faden operation) in adults with esotropia with marked amblyopia and distance-near disparity.

METHODS: In a retrospective study, we evaluated 21 esotropic adults with distance-near disparity and decreased vision (20/200 or worse) in esotropic eye. We performed in all patients a monocular horizontal strabismus surgery (recession - resection) combined with a posterior fixation suture placed on the medial rectus, 12-14 mm posterior to its insertion. Before surgery, all adult patients were at least 14 prism diopters (PD) esotropic at near than at distance fixation. All patients had orthoptic assessments before and after surgery and were followed for at least 3 years.

RESULTS: The mean preoperative deviation in primary position at distance fixation was 30 PD (range 20 - 65 PD), while the mean deviation at near fixation was 47 PD (range 35 - 80 PD). Postoperatively, most of the patients (87%) achieved an excellent cosmetic result. All 21 patients were between 0 and 14 PD of distance esotropia postoperatively. The excess near esotropia decreased from an average of 20 PD (range 14 -26 PD) preoperatively to 8 PD (range 0 -12 PD) postoperatively. Two patients were overcorrected at distance (exotropia of 10 and 15 PD respectively). In these patients, we removed the Faden sutures after 1.5 month postoperatively.

CONCLUSION: We have found that a posterior fixation suture of medial rectus added to conventional recession - resection is an effective procedure in adult patients with high AC: A esotropia with marked amblyopia.
P46. Transposition Surgery for damage of Abducens Nerve: optimal strabismological portrait of patients to get the best outcome

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PURPOSE: A surgery on the muscles of the horizontal action at the abducens nerve palsy is often combined with the lateral transposition of the superior and inferior rectus muscles (various modifications). An appearance of the active eye abduction is widely attributed to the lateral transposition. There is a concern, however, that a surgery on 3-4 muscles simultaneously increases a risk of the anterior segment ischemia and occurrence of a vertical strabismus. Using chemodenervation, we verified validity of the combined surgery use.

METHODS: We retrospectively analyzed outcomes of the treatment of 132 patients, whom the combined lateral transposition was performed. Initially, all patients were clinically diagnosed to have paralysis of n. abducens as they had a complete lack of abduction. In another group of 38 patients (candidates for the lateral transposition), a pre-surgery treatment chemodenervation of the medial rectus muscle was carried out.

RESULTS: Eye orthoposition was surgically achieved in 124 of the 132 patients from the first group. The ability to horizontally move the eye appeared; the maximal abduction attained, on average, 15° (range 10 to 25°). In the second group, 6 months after chemodenervation that eliminated medial rectus muscle contracture in all cases, abduction also appeared (range 12-30°) in 32 of the 38 patients. In 6 non-responders, the following surgery was supplemented by the lateral transposition; the post-surgery abduction did not exceed 3°.

CONCLUSION: Chemodenervation may substitute lateral transposition in many patients indicating overdiagnosis of the n. abducens damage (complete vs. partial paralysis).
P47. The Surgical Treatment of the Sixth Nerve Palsy

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In this presentation I would like to present the long term results of the surgical treatment of the sixth nerve palsies in children and adults. The surgical treatment was a modified homalshieme procedure with medial rectus recession augmented sutures are added in few cases. The results were satisfactory with improved ocular rotations.
P48. The Rotating Effect of Recession Carried out in Relation to the Frontal Equator of the Eye

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AIMS: To examine the biomechanical aspects of the recession’s effect on the amount of postoperative angle of deviation, to assess the results of operation from the point of altered biomechanics.

MATERIALS AND METHODS: We have analyzed different options of recessed muscle’s attachment with different amount of recession conducted and different points of muscle’s attachment relating to the frontal equator of the eye. Influence of these two factors on the amount of angle of deviation was also analyzed. We have studied the change in biomechanics and consequently the amount of a weakening effect of the recession: an attachment of the muscle in front of the frontal equator and behind it. We have shown that these 2 options have a different effect on changing the postoperative angle of deviation: an attachment in front of the frontal equator has almost no effect on postoperative angle of deviation, whereas an attachment behind the frontal equator has a significant weakening effect and considerably affects the postoperative deviation. In order to explain this effect we have developed a biomechanical scheme, which shows that when eye rotates medially the point of application of muscle’s force is equally important as the strength of the muscle and as the vector value of the direction of the muscle’s action.

RESULTS: We have compared the change of postoperative angle of deviation in 257 patients with esotropia operated with a different amount of recession but considering the point muscle’s attachment relative to the frontal equator of the eye. Collected data significantly corrects the tactics of the use of recession in patients with horizontal concomitant strabismus.
P49. Anterior and Nasal Transposition of Inferior Obliques in Crouzon Syndrome

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PURPOSE: Strabismus in Crouzon Syndrome is generally characterized by exotropia associated to a severe V pattern with apparent dysfunction of oblique muscles (inferior obliques overaction and superior oblique underaction). Furthermore, it is well known that surgical correction of the ocular motility disorders in craniosynostosis and especially in Crouzon Syndrome may be very difficult and frustrating. Aim of our study is to assess the effectiveness of anterior and nasal transposition (ANT) of inferior obliques to correct the important V pattern typical of Crouzon Syndrome.

METHODS: To evaluate the clinical outcome of three patients affected by Crouzon Syndrome operated on by means of bilateral anterior and nasal transposition of inferior oblique. In patients 1 and 2 the value of V Pattern was about 50PD, in the patient 3 the difference of horizontal deviation between up- and down-gaze was about of 90PD. In patient 1 (age 14yrs) anterior and nasal transposition of inferior obliques was associated to bilateral lateral rectus recession, in patient 2 (age 12yrs) only surgery on inferior obliques was performed and, finally, in patient 3 (age 6yrs), who previously underwent classic inferior obliques recession and superior obliques tucking, the anterior and nasal transposition of inferior obliques was associated to recession of inferior rectus muscles with temporal shift of insertions.

RESULTS: In our patients anterior and nasal transposition of inferior obliques showed to be effective in reducing V pattern even if an anti-elevation syndrome was observed post surgery in all cases.

CONCLUSION: Mechanical effects of anterior and nasal transposition of inferior obliques related to origin of V pattern in Crouzon Syndrome are discussed.
P50. Unilateral Enophthalmos with Limited Motility and Shortening of the Optic Nerve: Case Report

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PURPOSE: Case report of an unusual, unilateral eye motility disorder.

METHODS: A 42-year old man was admitted to the Department of Neurology due to aphasia and weakness in the right side of the body. Cerebral CT showed a moderate haematoma in the left cerebral hemisphere. A reduced ocular motility of the right eye was noted, and he was referred for an eye examination.

RESULTS: At examination the eyes were straight in primary position, but there was a marked enophthalmos and a general restriction of motility of the right eye. According to the patient’s history, his face had always been asymmetric, his right eye being situated deeper in the orbit and with poorer motility compared to the left. The right lateral orbital wall was 5 mm posterior to the left lateral orbital wall. Exophthalmometry showed an additional difference; 10 mm on the right side and 15 mm on the left. Thus, the total posterior displacement of the right eye was 10 mm. MRI of the orbit showed a very short optic nerve, which looked stretched. A conical shape of the bulbus at the exit of the optic nerve (“tenting”) was observed. Comparing the length of the optic nerves on MRI, the right was 8 mm shorter than the left. The extraocular muscles looked normal. Visual acuity was normal in both eyes. Slit lamp examination of the anterior segment, ophthalmoscopy, and intraocular pressure was normal. Bulbar axial length was normal and symmetric. Concerning the neurological symptoms, complete recovery occurred and antihypertensive treatment was instituted.

CONCLUSION: The patient’s condition, probably unrelated to the cerebral haemorrhage, seems to be a congenital, unilateral anomaly with an underdeveloped orbit and a short optic nerve, giving rise to both the enophthalmos and restricted eye motility.
P51. Strabismus Surgery in the Management of Diplopia due to Different Etiologies

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PURPOSE: To evaluate the effectiveness of strabismus surgery in treatment of diplopia patients of different etiologies.

METHODS: A retrospective analysis of patients operated in University Eye Hospital in Ljubljana in last 3 years due to diplopia caused by nerve palsies, trauma or endocrine orbitopathy. Resolution of diplopia and restoration of binocular functions were studied.

RESULTS: We operated on 43 patients; 17 with trochlear nerve palsy, 12 with abducens palsy, 5 with oculomotor palsy, 2 after ocular trauma and 7 with endocrine orbitopathy motility restrictions. 7 patients reported complete resolution of diplopia, 30 patients had satisfactory stable single vision in primary position but still some double vision in different lateral positions. 6 patients still complains of diplopia in primary position and additional surgical or medical treatment is planned. After surgery 32 patients gained or restored fusion.

CONCLUSION: Diplopia is one of the most troublesome visual disorders. It is very important to establish realistic goals with patients before treatment. In our study 86% of patients showed resolution from primary gaze diplopia after strabismus surgery.
P52. Iatrogenic Ciclotorsional Diplopia in Acquired Traumatic Bilateral Third Nerve Palsy: How Can We Manage It?

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PURPOSE: Bilateral third nerve palsy is always a very complex issue. We present a very particular case of a young lady complaining for torsional diplopia due to a wrong medical approach to a traumatic bilateral third nerve palsy.

METHODS: A 27 years old lady came to our observation after a bilateral third nerve palsy consecutive to a car crash due to an ice-slab slipped from the lorry travelling before her car and that caused to the young lady a contusive head trauma. She had already been treated elsewhere once with Botox after one year from the trauma that caused torsional diplopia and later on twice with traditional muscle surgery in attempt to resolve the diplopia. When she came to our observation she was complaining for a incoercible inciclotorsional bilateral diplopia, an anomalous chin-up head posture, bilateral ptosis and a residual exotropia.

RESULTS: The authors describe the orthoptic and ophthalmologic decision making approach and the surgery with the results gained. Before surgery we used a prism in torsional position to decrease diplopia and the anomalous head posture. During surgery, according to the technique of Conrad and De Decker, we founded an engagement of the superior oblique tendon fibers in the suture scars of the prior resected superior recti. Now the patient look straight at corneal reflex test, she has no more diplopia and a practically orthotropic Hess Lancaster test.

CONCLUSION: The authors stress the importance of a very carefull approach to the third nerve palsy patients, avoiding Botox and surgical approach without a precise examination. We highly recommend the use of a prism in torsional position before surgery, that should be made according to Conrad and
P53. Iatrogenic Exotropia after Endoscopic Sinus Surgery: A Case Report

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PURPOSE: We present surgical results and the importance of the Magnetic Resonance Imaging (MRI) scan in a case of iatrogenic exotropia after endoscopic sinus surgery (ESS).

METHODS: ESS risks directly damage the extraocular muscles by penetration of the medial wall of the orbit, which is very thin.
A 57 years old man, was operated in 2005 for right maxillary and ethmoidal poliposis by ESS. Immediately post operator he presented large right exotropia, no right eye adduction and horizontal diplopia. Shortly after that, two surgeries were done on the horizontal muscle: first small recession on right LR and second small resection on right MR, without any result.

RESULTS: After 3 years from previous surgeries the patient had disturbing horizontal diplopia with small binocular field in far right gaze and left face turn. At this moment it was necessary to perform orbital MRI scans, which demonstrated absence of the entire posterior part of the medial rectus. The surgery done was large recession of right LR, medial transposition of the vertical muscles with augmented posterior fixation. The postoperator result was good: the torticolis diminished, the binocular diplopia-free field expands, but the right eye adduction remains limited. No evidence of ocular ischaemia after surgery on four rectus muscles.

CONCLUSION: In the treatment of ocular motility problem after ESS is helpful to perform orbital MRI scan immediately after injury to establish the plan surgery. In this way we can avoid unnecessary surgery and preserve the ocular vascularization.
P54. Whiplash injury and diplopia

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PURPOSE: To present 3 cases of patients with diplopia after whiplash injury due to traffic accidents.

METHODS: A retrospective chart review of 3 patients with complains of diplopia after whiplash injury. We evaluated clinical study, treatment approach and evolution.

RESULTS: In all cases the whisplash injury was grade II. Neurological examination, and cranial and orbital magnetic resonance imaging were normal. Ophthalmological examination was normal except for motility examination and complementary study with Lancaster test. Case 1: A 36-year-old woman who presented with esotropia of 45 PD and bilateral limitation in abduction. We diagnosed bilateral sixth nerve palsy and injected 5U of botulinum toxin in both medial recti. The patient was free of diplopia 2 months after treatment. Case2: A 43-year-old man who presented with a slight ductions limitation. Multiple paresis diagnosis was made. We performed prism adaptation and prescribed 2 PD base-in in the right eye and 3 PD base-down in the left eye. The patient continues using prisms 2 years after its prescription. Case 3: A 32-year-old man who presented with exotropia of 14 PD at near, orthotropia at distance, and an adduction limitation in his left eye. We diagnosed left partial third nerve palsy and performed prism adaptation. The patient was depressed; he rejected treatment and did not complete the follow-up.

CONCLUSIONS: Many patients with whiplash injury grade II present oculomotor dysfunctions related to alterations of cervical afferents. The different clinical presentations have different treatment options, and evolution can be variable. Ophthalmologists must be concerned about these patients because of the psychological and legal implications.
A 33-year-old man presented with binocular vertical diplopia for a month. Neurological examination showed bilateral skew deviation, upward gaze palsy and light-near dissociation with neither lid retraction nor convergence retraction nystagmus. Cerebral magnetic resonance imaging and pathological examination revealed a pineal gland germinoma. He was treated with irradiation, 3,000 centiGray (cGy) to the craniospinal region and 5,400 cGy to the tumour site, with complete tumour regression. Neuro-imaging is warranted to exclude pineal germinoma in patients presenting with binocular vertical diplopia from skew deviation.

Keywords: diplopia, dorsal midbrain syndrome, ophthalmoplegia, pineal germinoma, skew deviation
P56. Comparison of Methods of Double Maddox Rod Test in Unilateral Superior Oblique Muscle Palsy

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PURPOSE: To compare the efficacy of double Maddox rod test (DMRT) with different colour combinations of Maddox rods to localize the paretic eye in patients with unilateral superior oblique muscle palsy.

METHODS: DMRT was performed in 61 patients with unilateral superior oblique muscle palsy in three different methods in a dark room. Each patient was tested placing a red Maddox rod in front of the paretic eye and a white Maddox rod in front of the non-paretic eye in a trial frame, and then the test was repeated with Maddox rods reversed. Finally the patient was tested with the same red colour Maddox rods in front of both eyes.

RESULTS: Fifty six (92%) of 61 patients reported subjective extorsion of the paretic eye under the all three different colour combinations of DMRT irrespective of the position of red Maddox rod. The proportion of patients who localized the extorsion in paretic eye was not different among three methods of DMRT (p=0.553, Repeated measurement analysis). The average amount of extorsion was not different among three methods of DMRT (p=0.456).

CONCLUSIONS: We did not find any significant differences in the localization and the magnitude of extorsion with DMRT of different colour combinations of Maddox rod in the dark room. It is permissible to place the red Maddox rod in either eye or to put the same red colour Maddox rods in front of both eyes in DMRT.
P57. Relationship between Posture and Strabismus

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AIM: Compensating misalignments affecting head-neck, shoulders, spine and lower limbs are always present in strabismus. The use of vertical prisms in the squint management can also improve the bone condition restoring a satisfactory alignment of the body. The current study was conducted by several health care professionals with the purpose to identify and highlight the strong relationship occurring between strabismus and posture.

MATERIAL AND METHODS: The current study is a retrospective case series of patients treated between January 2011 and January 2012 for vertical eyes deviations. A total of 36 patients (mean age 13) with PAC were treated. All patients underwent orthoptic and orthopedic assessment and received a prismatic lens correction. Follow up at 1, 3, 6, and 12 months.

RESULT: A total of 28 patients (77.77%) met study criteria having been found an improvement in the postural disorder after prisms application. In 6 patients (16.67%) the postural misalignment did not improve more likely due to an association with postural gnathologic disorders. 4 patient (5.56%) were noncompliant and unreliable results were obtained. The sample reproduces the characteristics of the population (3-5%):

CONCLUSION: Our study shows a clear correlation between posture disorders and strabismus and the analysis of the data collected demonstrates how useful the orthoptic aid is in the management of the strabismus and orthopedic diseases either.
P58. A Case of Inferior Oblique Paresis: Clinical Features and Surgical Treatment

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AIM: The Inferior Oblique paresis is considered to be a rare condition and its clinical findings as torticolis and limitation of elevation in adduction of the involved eye, can be similar with those from restrictive Brown Syndrome. We present a case of one boy 6 years old, diagnosed as Inferior Oblique paresis and who required surgical treatment.

METHODS: The patient has presented in our clinic with important and complex torticolis with chin-up, face turned to the left and slight head tilt on the right. Clinical examination revealed a hypotropia of the right eye in primary position about 25 PD and also a moderate ambliopia with suppression in the same eye. Examination of the versions showed a down-shoot in adduction and moderate limitation of elevation in adduction of the right eye, which improved on duction testing. Based upon three-step test we found a greater vertical deviation on left gaze and with head tilt on the left side, suggesting involving of the right Inferior Oblique Muscle. The restrictive causes of limitation of elevation in adduction in the right eye were excluded by intraoperative negative forced duction test. The surgical approach was a recession of Superior Oblique Muscle in the paretic right eye and recession of Superior Rectus Muscle in the left eye.

RESULTS: The vertical deviation was reduced to an average of 6-8 PD in primary position with almost normal versions. The abnormal head posture was significantly improved and the patient regained fusion and high degree of stereopsis at near.

CONCLUSIONS: Affecting only one muscle out of those innervated by the third nerve stays as a question. A slight underaction of Inferior Oblique Muscle can produce a vigorous torticolis and requires a complex surgery for reestablishing a normal status.
P59. Surgical Treatment in Brown Syndrome: Good Results Using Silicon Expander

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PURPOSE: To compare the efficiency of two surgical techniques in patients with Brown syndrome (weakening the great oblique muscle by using a silicon expander vs. recession of the muscle and posterior tenotomy).

MATERIAL AND METHOD: Four children with Brown syndrome (having a similar degree of vertical deviation in primary position and limitation of elevation in adduction) were treated either by inserting a silicon expander in the nasal part of the superior oblique tendon (2 patients), or by weakening the muscle by recession and posterior tenotomy (2 patients).

RESULTS: In the patients with silicon expander, deviation in primary position was resolved completely, the restriction of elevation in adduction being decreased from -4 to -1. In the patients with superior oblique weakening, the vertical deviation persisted (8 DP, respectively, 6 DP). Limitation of elevation in adduction has decreased in one patient (from -4 to -3), without any change in the other one.

CONCLUSIONS: Elongation of the Superior Oblique using a silicon expander proved to be superior to recession and posterior tenotomy. The former method is able to solve the restriction of limitation, irrespective of the location of the obstacle (tendon, trochlea or proximal to trochlea).
P60. Left Trochlea and Superior Oblique Complex in toto Detachment and Reconstruction: A Case Report

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We report a rare case of avulsion of trochlea and superior oblique muscle complex from the bony orbit during functional endoscopic sinus surgery, which was reconstructed successfully. A 43-year-old female presented with acute diplopia that had began 1 day prior. On extraocular movement examination, up-gaze limitation, both superior oblique overaction and superior rectus underaction were detected in the left eye. Orbital computer tomography revealed the defects of a left superomedial orbital rim and trochlea with superior oblique muscle and tendon complex. We performed exploration of the left superomedial orbital wall and identified the detached left trochlea and superior oblique tendon complex in toto. Re-attachment after making a burr hole through the superomedial orbital rim was performed. After 1 year follow up, the patient’s ocular movement was normalized.
P61. Partial Improvement of Unilateral Dissociated Vertical Deviation (DVD) with Refractive Corneal Surgery and Final Correction with Subsequent Eye Muscle Surgery: Case Report

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PURPOSE: DVD is poorly understood eye motility disorder of unexplained aetiology so planning and performing effective surgery is often difficult. Our purpose is to report a case of combined corneal refractive and strabismus surgery in DVD patient.

METHODS: We had 40 years old patient with mild anisometropic amblyopia (RE+:0,75/+0,75/75=1,0, LE:+3,0/+1,25/90=0,8, Snellen charts) who did not wear regularly spectacle correction. She had lack of binocularity (Worth four doth test) and stereopsis (Lang, Titmus stereo test) changing preference but mostly excluding her amblyopic eye with large (30 PD) unilateral DVD. LASIK surgery was performed on both eyes with WAVELIGHT IQ 400 Hz. Eight months after corneal procedure the patient undergo strabismus surgery: Superior rectus muscle recession (3 mm)+ Faden operation on 14 mm posterior to its initial insertion. Follow up was seven months.

RESULTS: After LASIK surgery patient gained almost two lines of visual acuity on amblyopic eye (LE=0,95) with no correction needed on both eyes as well as changed fixating preference starting to use mostly her DVD eye. After the strabismus surgery was performed, hyperdeviation of DVD eye was clearly smaller (10 PD). Although her fixation preference was changed, no binocularity and stereovision were gained.

CONCLUSIONS: Performing superior rectus recession combined with Faden procedure on the same muscle, proved to be safe and effective method for surgical treatment of unilateral DVD. Corneal refractive surgery aimed to improve visual acuity and fixation preference prior to strabismus procedures in cases of anisometropia and amblyopia is a reasonable approach in order to achieve the best outcome of strabismus surgeries.
P62. Comparison between AS-20 and A&SQ questionnaires by principal component analysis in the historic Waterland cohort

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INTRODUCTION: The Adult Strabismus-20 questionnaire and the Amblyopia & Strabismus Questionnaire assess quality of life in strabismus patients. The AS-20 was developed with a rational-reductive method: strabismus patients were interviewed to generate items that were subsequently reduced by factor analysis identifying 2 domains, with each 10 questions. The A&SQ was developed with an intuitive-deductive method: questions were developed for 5 functional restrictions, like lack of depth vision or double vision, and subsequently validated.

METHODS: The historic cohort comprised all children with amblyopia or strabismus treated 1968-1973 by 1 orthoptist in Waterland. After 35 years, 203 of 471 patients could be contacted, of whom 173 filled out the A&SQ. These were contacted again to fill out the AS-20. With principal component analysis, a procedure in multivariate statistics to structure, simplify and elucidate complex data, the overlap was assessed between the domains of the AS-20: psychosocial (10 questions) and functional (10) and the domains of the A&SQ: fear to loose function of the better eye (2), depth vision (10), visual disorientation (3), double vision (3) and psychosocial (5).

RESULTS: Of the AS-20-questionnaires, 106 were returned, 89 could be used. Principal component analysis showed 3 factors explaining 48.7% of the variance in the answers. The psychosocial domains of both questionnaires overlapped. With the 10 questions about depth vision of the A&SQ, only question 14 of the AS-20 overlapped: “I have problems with depth perception”. Eight questions of the functional domain of the AS-20: “I avoid reading because of my eyes”, “I stop doing things because my eyes make it difficult to concentrate”, “My eyes feel strained”, “I have problems reading because of my eye condition”, “I feel stressed because of my eyes”, “I worry about my eyes”, “I can’t enjoy my hobbies because of my eyes”, “I need to take frequent breaks when reading because of my eyes” constituted a separate group with no overlap.

DISCUSSION: The A&SQ contains too many questions about lack of depth vision: Its influence on quality of life of strabismus patients had been overestimated. The AS-20 contains many questions about asthenopic complaints that are frequent among outpatient-clinic strabismus patients, the source of the questions. The makers of the AS-20 did show that these questions can distinguish cornea, retina, glaucoma and cataract patients from strabismus patients, but this should be repeated for patients with other causes of asthenopic complaints.
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Dear Colleague,

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4 - 7 September 2013
Palais du Pharo - Marseille - France

We are looking forward to welcome you for a time of science and friendship

Danièle DENIS Marseille, MD
Local Organizer
The 35th Meeting of the European Strabismological Association
2-5 September 2012, Bucharest, Romania
Thank you for your support!