32nd Meeting
of the
European Strabismological Association

Munich, Germany
7th – 10th September 2008

Joint Meeting with the
Bielschowsky Gesellschaft and the BOD

BIELSCHOWSKY-GESELLSCHAFT FÜR SCHIELFORSCHUNG UND NEUROOPHTHALMOLOGIE

BOD
Berufsverband der Orthoptistinnen Deutschlands e.V.

www.esa2008.org

ABSTRACTS

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Welcome to Munich!

it is my great pleasure to welcome you to the 32nd Meeting of the European Strabismological Association. This year it is a joint meeting with the Bielschowsky Gesellschaft, the German Society for Strabismology and Neuroophthalmology, and the BOD, the German Orthoptic Association.

I'd like to thank all authors who submitted their scientific work, the scientific committee, chaired by John Lee, Dagmar Verlohr who organised the BOD Session on various aspects of orthoptics and Joachim Esser who is in charge of the Bielschowsky Sessions on aetiopathological aspects of strabismus and motility disorders. Out of the 94 posters 15 will be presented in the meanwhile traditional rapid-fire session.
This year's ESA Lecturer is André Roth who is going to talk on infantile esotropia.

They all helped to put together an exciting scientific program and I look very much forward to three days of inspiring talks, posters and lively discussion during the sessions and in the corridors.

I hope you will not only enjoy the scientific program but make new friendships, strengthen old ones and take advantage of what the city of Munich has to offer beyond strabismology: numerous museums, concert and theatre halls, modern and historic architecture, restaurants with local and international cuisine, endless shopping as well as green parks. It is also an ideal starting point for pre and post congress tours to Bavaria, the Alps with its lakes, mountains, castles of King Ludwig and many other places.

Welcome and "Grüß Gott!"

Oliver Ehrt
Local Organiser

General information

Date: **Sunday, 7th September 2008 to Wednesday, 10th September 2008**

Venue:
Ludwig-Maximilians-University München (LMU)
Geschwister-Scholl-Platz 1, 80539 Munich, Germany
www.lmu.de

Homepage: **www.esa2008.org**

Local Organiser:
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Internet: www.med.uni-muenchen.de/augenkl

Organisation:
Congress-Organisation Gerling GmbH
Werftstraße 23, 40549 Düsseldorf, Germany
Phone: +49 211 592244, Fax: +49 211 593560
E-Mail: info@congresse.de, Internet: www.congresse.de

Registration:

Sunday, 7th September	16.00 – 19.00
Monday, 8th September	07.45 – 18.00
Tuesday, 9th September	08.00 – 14.30
Wednesday, 10th September	08.00 – 17.30

Venue & Directions:
Ludwig-Maximilians-Universität München
Geschwister-Scholl-Platz 1, 80539 Munich, Germany
www.lmu.de

Parking: There is very limited parking at the Ludwig-Maximilians-University

Public Transport: Underground (U-Bahn) U3, U6 Station "Universität"

Information Hotline: +49 211 - 53 70 233

Official Language: English (no simultaneous translation)

Means of payment:
American Express, Mastercard, VISA
Bank transfer after receipt of invoice

CME certification: The conference is CME-credited. 8 + 5 + 8 Points will be allocated.

Note for German attendees:
Bitte vergessen Sie nicht Ihre Barcode-Aufkleber (EFN-Nummer).
Unser Tipp:
Speichern Sie Ihre EFN-Nummer in Ihrem Mobiltelefon!

Associations

Program Committee: **John Lee** (London, England)
Seyhan B. Özkan (Aydin, Turkey)
Hermann Dieter Schworm (Munich, Germany)
Oliver Ehrt (Munich, Germany)

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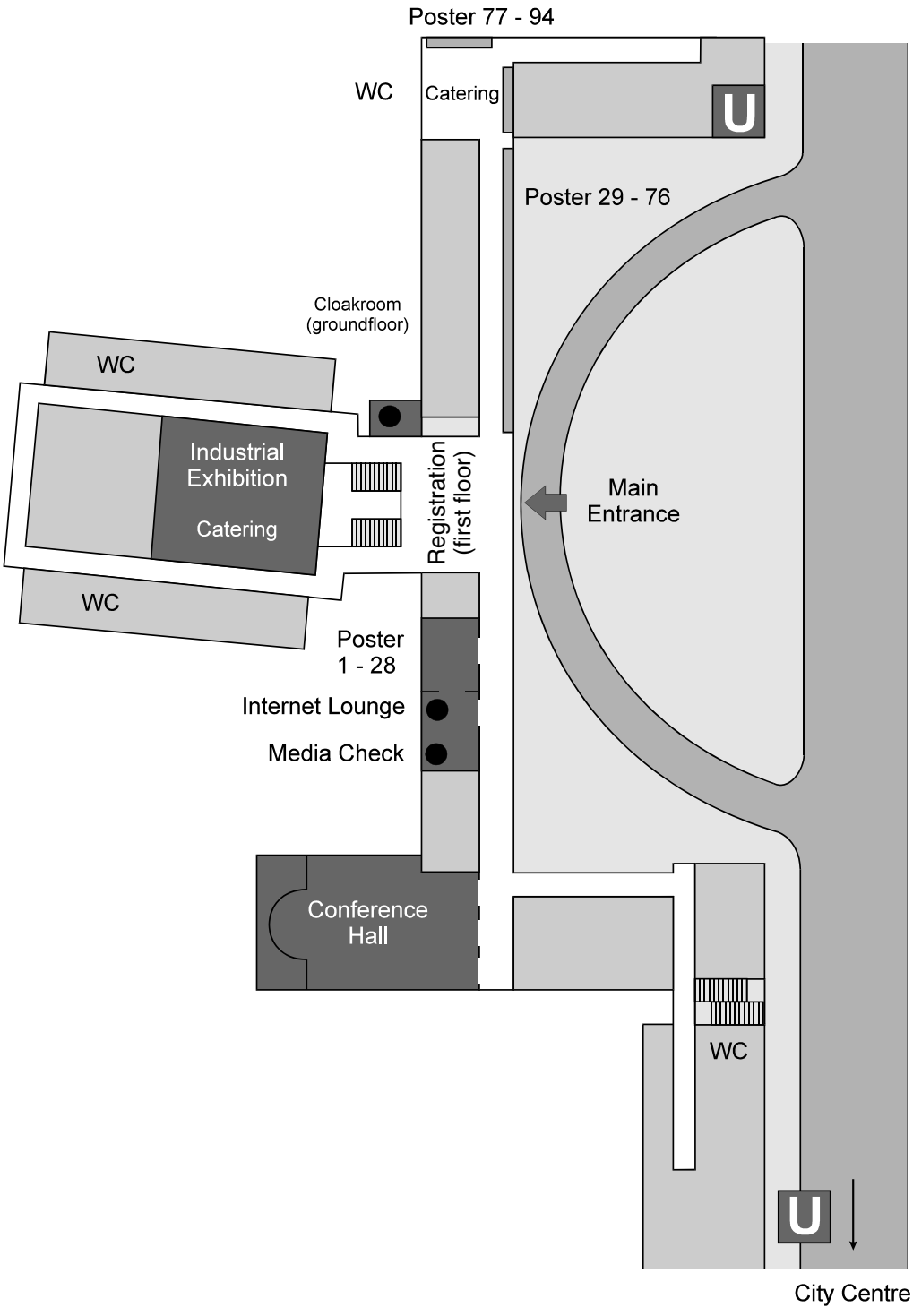
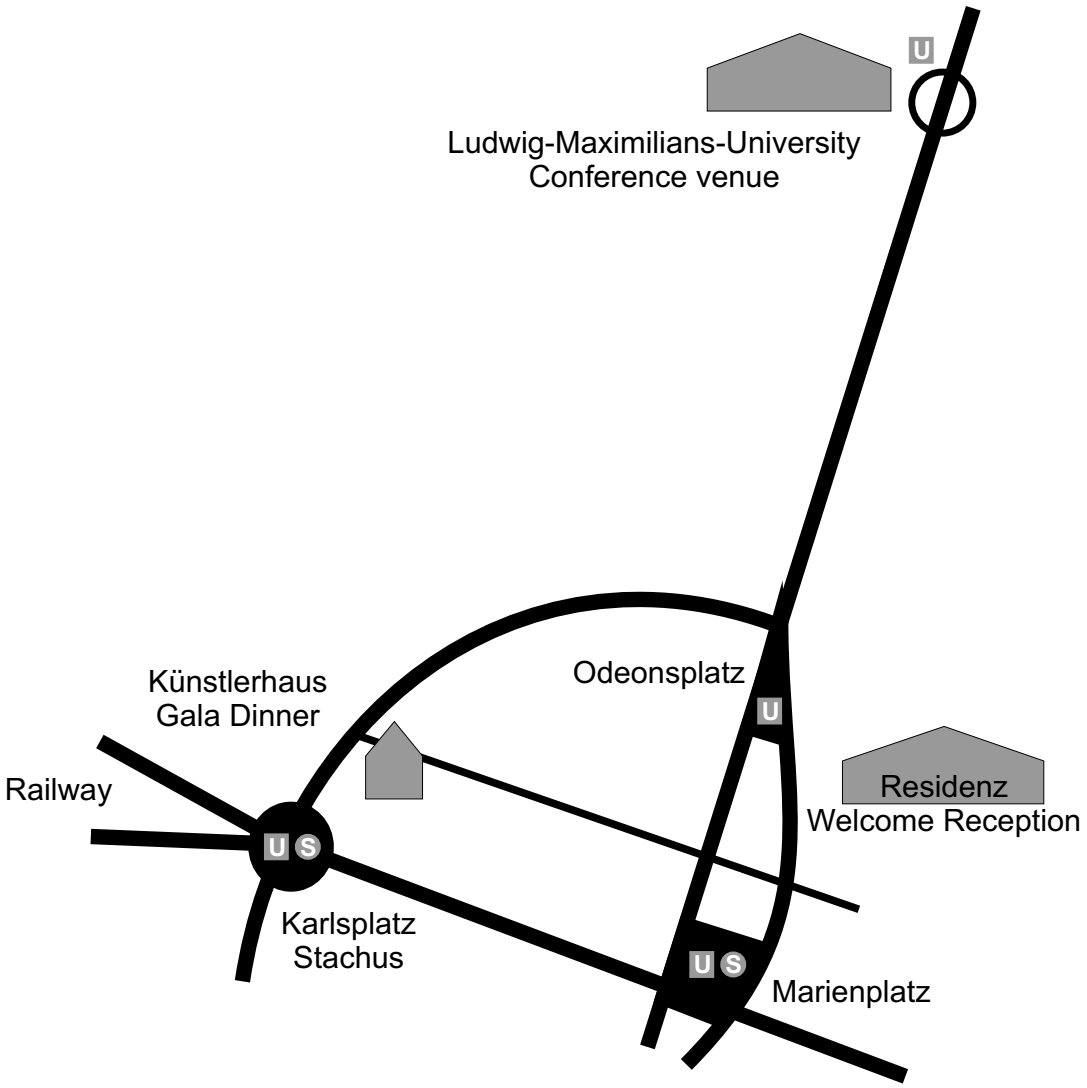
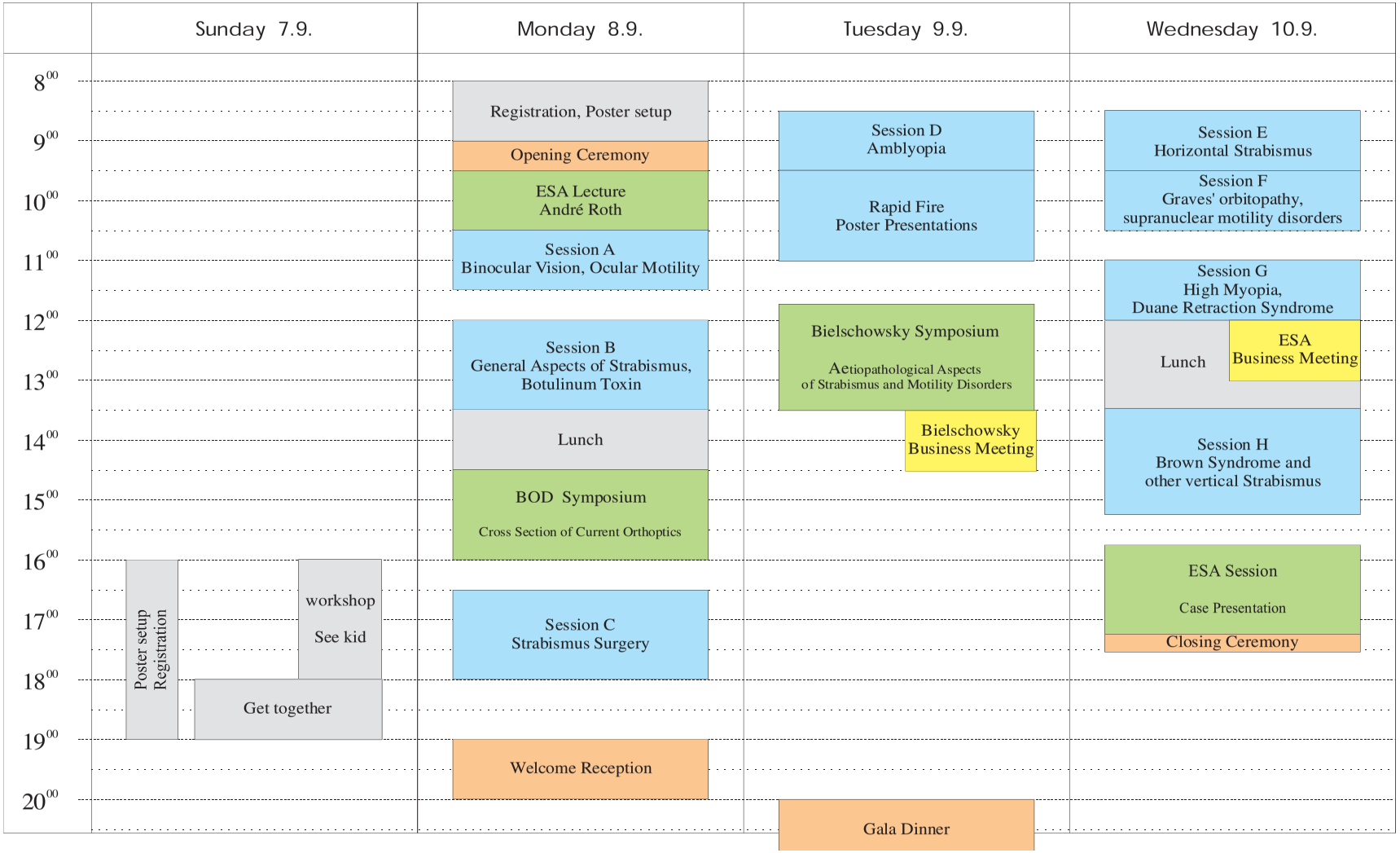
Location


Poster 77 - 94
WC
Catering
U
Poster 29 - 76
Cloakroom
(groundfloor)
WC
Industrial
Exhibition
Catering
Registration
(first floor)
Main
Entrance
WC
Poster
1 - 28
Internet Lounge
Media Check
Conference
Hall
WC
U
City Centre

Location


U
Ludwig-Maximilians-University
Conference venue
Künstlerhaus
Gala Dinner
Odeonsplatz
U
Railway
Residenz
Welcome Reception
U S
Karlsplatz
Stachus
U S
Marienplatz


Sunday 7.9.
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18^00
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20^00
Registration, Poster setup
Opening Ceremony
ESA Lecture
André Roth
Session A
Binocular Vision, Ocular Motility
Session B
General Aspects of Strabismus,
Botulinum Toxin
Lunch
BOD Symposium
Cross Section of Current Orthoptics
Session C
Strabismus Surgery
Welcome Reception
Session D
Amblyopia
Rapid Fire
Poster Presentations
Bielschowsky Symposium
Aetiopathological Aspects
of Strabismus and Motility Disorders
Bielschowsky
Business Meeting
Gala Dinner
Session E
Horizontal Strabismus
Session F
Graves' orbitopathy,
supranuclear motility disorders
Session G
High Myopia,
Duane Retraction Syndrome
Lunch
ESA
Business Meeting
Session H
Brown Syndrome and
other vertical Strabismus
ESA Session
Case Presentation
Closing Ceremony
Poster setup
Registration
workshop
See kid
Get together

Social events

Sunday
7th Sept. 08

Pre Congress Tour:
Royal Castle Neuschwanstein

08:30
18:00

The price includes bus transfer, guided tour, lunch and entrance fee

Meeting Point:
InterCity Hotel München,
Bayerstr. 10 (Directly
at the main station.
Underground "
U-bahn" U1, U2, U4,
U5, U7 stop
"Hauptbahnhof")

Price per person:

€ 89.00

Monday
8th Sept. 08

For accompanying persons:
Guided tour:
Maximilianstreet – Stroll mile under political care

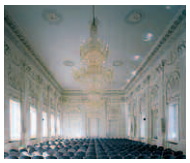
10:00
12:30

Meeting Point:
Ludwig-Maximilians-University
München (LMU)
Geschwister-Scholl-Platz 1
at the Registration on
the 1st floor
80539 Munich, Germany

Price per person:

€ 10.00

19:00



For participants and accompanying persons:
Welcome reception

Residenz München –
Max-Joseph-Saal
Residenzstrasse
Entrance Kapellenhof
Underground (U-Bahn)
U3 oder U6 to stop
"Odeonsplatz"

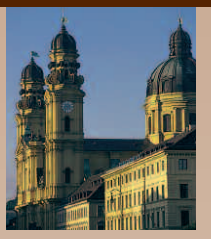
Participants
free of charge,
registration required

Price for
accompanying
persons:

€ 20.00

Tuesday
9th Sept. 08

For accompanying persons:
"Altstadt" walk –
a leisurely walk through the old part of Munich



09:15
12:00

Meeting Point:
Ludwig-Maximilians-University
München (LMU)
Geschwister-Scholl-Platz 1
at the Registration on the 1st floor
80539 Munich, Germany

Price per person incl. snack: € 15.00

14:30
17:30

For participants and accompanying persons:
Sightseeing bus tour "Munich´s Highlights"

Meeting Point:
Ludwig-Maximilians-University
München (LMU)
Geschwister-Scholl-Platz 1
At the fountain in front of the building
80539 Munich, Germany

Price per person: € 25.00

20:00

For participants and accompanying persons:
Gala dinner
Münchner Künstlerhaus
Lenbachplatz 8
Underground "U-Bahn" U4, U5
to stop "Karlsplatz"

The Band "Brosowskeys", the 5 professional musicians offer a program that ranges from cool lounge sounds to easy swing and jazz, to soul and sophisticated dancing music.

Price per person incl. dinner
and drinks: € 60.00

Wednesday
10th Sept. 08

For accompanying persons:
"Prinzregentenstrasse" –
Munich's museums mile

09:30
12:00

Meeting Point:
Ludwig-Maximilians-
University München (LMU)
Geschwister-Scholl-Platz 1
at the Registration
on the 1st floor
80539 Munich, Germany

Price per person: € 17.00

Scientific program

Sunday, 7th September

16:00 – 19:00 **Registration, Poster setup**

16:00 – 18:00 **Workshop See kid**
Get together

Monday, 8th September 2008

08:00 **Registration, Poster setup**

09:00 **Opening Ceremony of ESA 2008**

09:30 **ESA-Lecture**

What's at stake in infantile esotropia?
André Roth (Geneva, Switzerland)
Introduced by Hermann Mühlendyck

10:30 – 11:30 **Session A**
Binocular Vision, Motility

Chair: Guntram Kommerell
Moderator: Seyhan B. Özkan

01 ***Prisms for non-strabismics: is the "vergence position of rest" stable?***
Guntram Kommerell, J.M. Otto, M. Bach (Universitäts-Augenklinik Freiburg, Germany)

02 ***Stereoacuity changes that exceed test-retest variability.***
Jonathan M. Holmes, W.E. Adams, N.V. Odell, D.A. Leske, S.R. Hatt (Mayo Clinic, Rochester, USA)

03 ***The "8 diopters base-in test" for the diagnosis of microstrabismus in daily practice.***
Andrea C. Piantanida, G. Falcicchio, I. Pipitone (Centro Oculistico Lariano-Cernobbio, Como, Italy)

04 ***Comparison of clinical features and outcome of patients with primary and secondary microtropia.***
Sibel Oto, S.A. Bayar, S. Metindogan, A.C. Yazici, S. Cantürk, Y.A. Akova (Baskent University Hospital, Department of Ophthalmology, Ankara, Turkey)

05 ***Dissociated vertical divergence, dissociated horizontal deviation, and infantile esotropia: What is the link?***
Michael C. Brodsky (Department of Ophthalmology Mayo Clinic, Rochester, USA)

06 ***Succinylcholine activation of human horizontal eye muscles.***
Gunnar Lennerstrand, R. Bolzani, S. Tian, M. Benassi, M. Fusari, E. Campos, C. Schiavi (Department of Ophthalmology, Karolinska Institutet, St Erik's Eye Hospital, The Bernadotte Laboratories, Stockholm, Sweden)

11:30 **Coffee Break in the Industrial Exhibition**

12:00 – 13:30 **Session B**
General Aspects of Strabismus, Botulinum Toxin

Chair: Jan-Tjeerd H.N. de Faber
Moderator: Jonathan M. Holmes

07 ***Postoperative improvement in health related quality of life in adults with strabismus.***
Sarah R. Hatt, D.A. Leske, J.M. Holmes (Mayo Clinic, Rochester, USA)

08 ***Sensory fusion and quality of life in adult patients before and after strabismus surgery.***
Anna Dickmann, Gustavo Savino, M. T. Rebecchi, E. Di Nardo (Clinic of Ophthalmology, Catholic University of Rome, Italy)

09 ***Outcome analysis of surgery for eye muscle palsy.***
Laura Cabrejas, F.J. Hurtado, J. Tejedor (Department Ophthalmology Hospital Ramón y Cajal, Madrid, Spain)

10 ***Quality of life in children with congenital cataract: Findings with the FKS, the German adaptation of the "Children's visual function questionnaire".***
Christina Pieh (Department of Ophthalmology, University of Freiburg, Germany)

11 ***Strabismus in children with congenital glaucoma – a case series.***
Isabel Oberacher-Velten, H. Winkler, H. Helbig (University Eye Hospital, Klinikum of the University of Regensburg, Germany)

12 ***The profile of strabismus in stroke survivors.***
Fiona J. Rowe (Division of Orthoptics, University of Liverpool recruiting centres, Liverpool UK)

13 ***Strabismus after pterygium surgery.***
Rosario Gomez de Liaño, R. Borrego, D. Santander (Hospital Universitario Clinico San Carlos, Madrid, Spain)

14 ***Convergence spasm treated with botulinum toxin.***
Beata Kaczmarek, E. Dawson, J. Lee (Moorfields Eye Hospital, London, UK)

15 ***Consecutive exotropia after esotropia treatment with botulinum toxin A – When can you diagnose.***
Rita Dinis da Gama, A. Sulzbacher, G. Varandas, M. de Lourdes Vieira, A. Castanheira Dinis (Instituto de Oftalmologia Dr. Gama Pinto, Lisbon, Portugal)

13:30 **Lunch**

Scientific program

14:30 **BOD-Symposium**
16:00 **Cross Section of Current Orthoptics**

Chair: Dagmar Verlohr

S 01 ***Patching vs. Atropine: A Compliance Study.***
Kyle Arnoldi (Ross Eye Institute, Buffalo, NY, USA)

S 02 ***Performance of the PlusOptix vision screener for the detection of amblyopia risk factors in children.***
Angelika Cordey, L. Cirina, A.A. Zubcov-Iwantscheff (Frankfurt/Main, Germany)

S 03 ***The Brueckner Test – a tool in mass screening? A Kenyan experience.***
Christiane Paschke, M. Njuguna (Dortmund, Germany)

S 04 ***Sixth Nerve Palsy; when to act and when not to.***
Jan Roelof Polling
(Department for Ophthalmology, Erasmus Medical Center Rotterdam, The Netherlands)

S 05 ***Hemianopia and Squint: Strabotomy recommendable.***
Melanie van Waveren (Department for Ophthalmology, University Clinic Tübingen, Department for Strabismus, Periocular Surgery and Pediatric Ophthalmology, Germany)

16:00 **Coffee Break in the industrial exhibition**

16:30 **Session C**
18:00 **Strabismus Surgery**

Chair: Heimo Steffen
Moderator: Rosario Gómez de Liaño

16 ***Minimally invasive strabismus surgery (MISS) for horizontal rectus muscle reoperations.***
Daniel S. Mojon (Department of Strabismology & Neuro-Ophthalmology, Kantonsspital St. Gallen and University of Bern, Switzerland)

17 ***Single horizontal rectus muscle recession or resection for small to moderate angle strabismus.***
Daniel Neely, D. Rogers, N. Shah, D. Sprunger, D. Plager, G. Roberts (Indiana University School of Medicine, Indianapolis, USA)

18 ***Technique and results of bilateral faden operation of the medial rectus – modification of Mühlendyck.***
Marion Kaup, A. C. Mödder, K. Hartmann (Orthoptik und Neuroophthalmologie, RWTH University Aachen, Germany)

19 ***Reoperation on fadenoperation: How often & why?***
Isay Ozdemir, B. Gokyigit, S. Akar, A. Ozdemir, O.F. Yilmaz (Istanbul Beyoglu Education and Research Eye Hospital, Turkey)

20 ***Coming back on a fadenoperation, still a nightmare?***
Dominique Thouvenin, C. Lesage, O. Norbert, S. Nogue, L. Fontes (Clinique Saint Nicolas, Toulouse, France)

21 ***Y-splitting Surgery. An effective procedure in lever arm reducing surgery.***
Siegfried Priglinger, A. Kampik, D. Mojon, H. Kroehn, G. Rudolph (Krankenhaus der Barmherzigen Brüder, Linz, Austria)

22 ***The efficacy of augmented transposition on surgery in several indications.***
Serpil Akar, G. Birsen, P. Gökhan, H. Pelin, Ö. Isilay, G. Hülya, Y.F. Ömer (Istanbul Beyoglu Eye Training and Research Hospital, Turkey)

23 ***Modified medial palpebral ligament fixation for third nerve palsy.***
Ramesh Murthy
(L V Prasad Eye Institute, Hyderabad, India)

24 ***Submuscular Tenon's capsule and slipped muscles.***
Gideon P. du Plessis
(Pretoria Eye Institute, Pretoria, South Africa)

Tuesday, 9th September 2008

08:30 **Session D**
09:30 **Amblyopia**

Chair: Klaus-Peter Boergen
Moderator: Dominique Thouvenin

25 ***Left eye predominance in amblyopia.***
Michael X. Repka, T. Kraker, K.A. Simons (Wilmer Institute, Johns Hopkins University, Baltimore, USA)

26 ***Vision screening in Pennsylvania Dutch Country, how accurate is the PlusOptix?***
Noelle S. Matta, E.L. Singman, D.I. Silbert (FAAP Family Eye Group, Lancaster, USA)

27 ***The development of monofixation syndrome in strabismic amblyopes using the Bangeter foil.***
Michael S. Abrams, C. Duncan, R. McMurtney (Excel Eye Center, Orem, USA)

28 ***Effect and its sustainability of 3-6 hour part-time occlusion treatment for anisometropic amblyopia in children aged 8 years and older.***
Joo Yeon Lee, Y.R. Lee (Subdivision of Pediatric Ophthalmology, Department of Ophthalmology, Hallym Univercity College of Medicine, Seoul, South Korea)

29 **Refractive surgery and amblyopia.**
Anna Dickmann, V. Cima, C. Radini, G. Berto, L. Mosca (Catholic University of Sacred Heart, Dept. of Ophthalmology, Rome, Italy)

Scientific program

09:30 – 11:00 **Rapid Fire, Poster Presentations**
see page 30

Chair: John Lee

11:00 **Coffee Break in the industrial exhibition**

11:45 – 13:30 **Bielschowsky Symposium**
Aetiopathological Aspects of Strabismus and Motility Disorders

Chair: Joachim Esser

S 06 ***Strabismus and genes: where are we?***
Birgit Lorenz (Department of Ophthalmology Universitätsklinikum Giessen and Marburg GmbH, Germany)

S 07 ***A possible role of palisade endings in strabismus***
Anja Horn-Bochtler (Institute of Anatomy, Ludwig-Maximilians-University, Munich, Germany)

S 08 ***Congenital ocular elevation deficiencies: Which are congenital cranial dysinnervation disorders?***
Antje Neugebauer, J. Fricke, C. Kubisch (Center of Ophthalmology, Institute for Human Genetics, University of Cologne, Germany)

S 09 ***Congenital fibrosis of the extraocular muscles***
Günther Rudolph (Department of Ophthalmology, Ludwig-Maximilians-University, Munich, Germany)

S 10 ***Aetiology and Classification of paretic disorders***
Hermann D. Schworm (Munich, Germany)

S 11 ***Aetiopathology of Graves' ophthalmopathy***
Anja Eckstein, J. Esser (Department of Ophthalmology, University of Essen, Germany)

13:30 – 14:30 **Bielschowsky Business Meeting**

Wednesday, 10th September 2008

08:30 – 09:30 **Session E**
Horizontal Strabismus

Chair: Birgit Lorenz
Moderator: G. Robert LaRoche

30 ***Clinical and demographic characteristics of childhood intermittent exotropia: A prospective multicentre study.***
John Sloper, E. Dawson, D. Buck , C. Powell, M. Clarke, H. Davis, N. Strong, P. Tiffin, R. Drewett, P. Cumberland, J. Rahi (Moorfields Eye Hospital, London, UK)

31 ***Medium term follow-up results in operated consecutive exotropia.***
Daniela E. Cioplean (Opththalmology Clinic OFTAPRO, Bucharest, Romania)

32 ***Infantile esotropia. Influence of the age of treatment in the vertical deviation.***
Marta Vila-Franca, H. Nogueira, R. Dinis da Gama, G. Varandas, M.L. Vieira, A. Castanheira-Dinis (Instituto de Oftalmologia Dr. Gama Pinto, Lisboa, Portugal)

33 ***Diagnosis and surgical treatment of dissociated horizontal deviation.***
Susana Gamio (Buenos Aires Children's Hospital, Buenos Aires, Argentina)

34 **Long-term follow-up of high accommodative convergence to accommodation (AC/A) ratio in a population-based cohort.**
Brian G. Mohney, C.C. Lilley, N.N. Diehl (Mayo Clinic, Rochester, USA)

35 **Surgical correction of high AC/A ratio associated with accommodative esotropia.**
Ahmed L. Ali (Tanta University Eye Hospital, Egypt)

09:30 – 10:30 **Session F**
Graves' Orbitopathy, Supranuclear Motility Disorders

Chair: Hermann Dieter Schworm
Moderator: Alain Péchereau

36 ***Retrobulbar irradiation for Graves' ophthalmopathy: A retrospective study, evaluating the efficacy of doses between 12-20Gy.***
Kristian T. M. Johnson, C. Loesch, J. Esser, K. Mann, A.K. Eckstein (Department of Ophthalmology, University of Essen, Germany)

37 ***Unilateral inferior rectus recession in patients with dysthyroid eye disease.***
Anna P. Maino, R. Batra, M. Vishwanath, I.B. Marsh, A.M. Ansons (Royal Eye Hospital, Manchester, UK)

38 ***Tendon elongation: A new surgical technique for large convergent squint after three wall orbital decompression in thyroid associated ophthalmopathy.***
Anja K. Eckstein, K.T.M. Johnson, J. Esser (Department of Ophthalmology, University of Essen, Germany)

39 ***Surgical treatment of INO***
Jonathan M. Durnian, F. Jazayeri, V. Trimble, I.B. Marsh (Walton Hospital, University Hospital Aintree, Liverpool, UK)

40 ***Superior rectus recessions for downbeat nystagmus***
Mandagere R. Vishwanath, A. Maino, I.B. Marsh (Walton Day Centre, University Aintree Hospitals, Liverpool, UK)

10:30 **Coffee Break in the industrial exhibition**

Scientific program

11:00 **Session G**
12:00

High Myopia, Duane Retraction Syndrome

Chair: Olav Henrik Haugen
Moderator: John Sloper

41 ***Surgical treatment of the heavy eye syndrome: Long-term results with Yokoyama technique.***
Costantino Schiavi, M. Fresina, E.C. Campos (Department of Ophthalmology, University of Bologna, Italy)

42 ***A review of the Yokoyama procedure for eso-hypotropia associated with high myopia.***
Chris S. Child, A. Jkawaja, J.J. Sloper, J.P. Lee, G.G.W. Adams (Moorfields Eye Hospital, London, UK)

43 ***Heavy eye syndrome pulley surgery – yes or no?***
Robert Hörantner, S. Abri, M. Buchberger, T. Kaltofen, B. Neudorfer, C. Priglinger, S. Priglinger (Krankenhaus der "Barmherzigen Schwestern", Ried, Austria)

44 ***Surgery for esotropia in myopes: results on 44 patients.***
Giovanni B. Marcon (Department of Ophthalmology, Public Hospital of Gorizia-Monfalcone, Bassano del Grappa, Italy)

45 ***Duane retraction syndrome, clinical & anatomical study.***
Dalal Shawky (Faculty of Medicine, Alexandria University, Egypt)

46 ***Problems with lateral rectus orbital wall fixation in Duane syndrome.***
Seyhan B. Özkan, I. Isikligil (Department of Ophthalmology, Adnan Menderes University Medical School, Aydin Turkey)

12:00 **Lunch**

12:00
13:00 **ESA Business Meeting**

13:30 **Session H**
15:15

Brown's Syndrome and other Vertical Strabismus

Chair: Michael H. Gräf
Moderator: Vincent Paris

47 ***Spontaneous resolution in patients with congenital Brown syndrome.***
Emma L.M. Dawson, J.S. Barry, J.P. Lee (Moorfields Eye Hospital, London, UK)

48 ***Congenital Brown's syndrome: intraoperative findings and postoperative results.***
Kathi Hartmann (University-Eye-Clinic RWTH Aachen, Germany)

49 ***Superior oblique posterior tenectomy in congenital Brown's syndrome.***
Andreea Ciubotaru, K.-P. Boergen, O. Ehrt (Infosan Eye Clinic, Bucharest, Romania)

50 ***The reasons of second and third operations for patients with Brown syndrome.***
Birsen Gokyigit, S. Akar, P.K. Hekimhan, I.Ozdemir, O.F. Yilmaz (Beyoglu Education and Research Eye Hospital, Istanbul, Turkey)

51 ***Aetiology of isolated inferior rectus palsy.***
Louise Garnham, J. Lee (Moorfields Eye Hospital, City Road, London, UK)

52 ***Bivertical rectus muscle recession for comitant vertical strabismus.***
M. Gabriela Wirth Barben, O. Bergamin , K. Landau (Department of Ophthalmology, University Hospital of Zurich, Switzerland)

53 ***Superior oblique tucking with vs. without inferior oblique recession for trochlear nerve palsy.***
Michael Gräf, J. Esser (Department of Ophthalmology Universitätsklinikum Giessen and Marburg GmbH, Germany)

54 ***Surgery for congenital superior oblique palsy in childhood.***
Sebastian Schmidt, M. Gräf, B. Lorenz (Department of Ophthalmology Universitätsklinikum Giessen and Marburg GmbH, Germany)

55 ***Unilateral Superior Rectus Contracture related to Extorsional Syndrome: Partner or Enemy?***
Vincent Paris (Center of Strabismology, Liège University, Marche en Famenne, Belgium)

56 ***Adaptation to distinct torsion in monocular patients after macular translocation.***
Dorothea Besch, K. Eser, S. Eisenschmid, K.U. Bartz-Schmidt, V. Herzau (Department for strabismus, periocular surgery and pediatric ophthalmology University Eye Hospital Tuebingen, Germany)

15:15 **Coffee Break in the industrial exhibition**

15:45

Case Presentation

Chair: Costantino Schiavi

17:15 **Closing Ceremony**

17:30 **End of ESA 2008 Meeting**

10:15 **Session A**

Binocular vision, Motility

11:15

Chair: Guntram Kommerell
Moderator: Seyhan B. Özkan

01 ***Prisms for non-strabismics: Is the "vergence position of rest" stable?***

Guntram Kommerell, J.M. Otto, M. Bach
(Universitäts-Augenklinik Freiburg, Germany)

Introduction: Keeping the eyes together can cause asthenopic symptoms. Prisms are an established remedy: they allow the eyes to assume their Vergence Position of Rest. One requirement for the prescription of prisms is that the Vergence Position of Rest remains fairly stable.
Methods: We determined the Vergence Position of Rest in two sessions, one to six weeks apart. Each session contained 8 trials. Twenty observers with normal eyes had to look through Herschel-Risley-prisms that allowed a continuous modulation of their strength. We asked the observers to look at fully fusionable pictures, and adjust the prisms such that viewing appeared most relaxing. For the present analysis, we did not use conventional tests for heterophoria, because these tests require a differentiation between the images of the two eyes (e.g. Nonius lines). Such a differentiation could have produced artefacts (Otto et al., 2008: http://dx.doi.org/10.1007/s00417-008-0798-3).
Results: At a viewing distance of 400 cm, 12 of 20 observers changed their preferred prism from the first to the second session by more than 1.0 prism diopter [cm/m], up to 3.3 cm/m; at a viewing distance of 50 cm, 11 of 20 observers did so, up to 5.1 cm/m.
Conclusion: The prism estimated as being most relaxing can be very variable. Before considering a prescription, the practitioner should find out whether the preferred prismatic strength remains reasonably stable. To ascertain this constancy, more than one session appears to be necessary, because the scatter in one single session does not indicate the long-term variability.
Commercial Relations: none

02 ***Stereoacuity changes that exceed test-retest variability.***

Jonathan M. Holmes, W.E. Adams, N.V. Odell, D.A. Leske, S.R. Hatt
(Mayo Clinic, Rochester, USA)

Introduction: To establish the thresholds for real change in each of four measures of stereoacuity [Preschool Randot (PSR), near Frisby (nF), Frisby Davis Distance (FD2) and Distance Randot (DR)] by determining the 95 % limits of agreement for test-retest differences under 2 clinical scenarios.
Methods: 15 normal adults were monocularly blurred with each of 4 Bangerter filters. Stereoacuity was measured twice on the same day with PSR, nF, FD2 and DR for each filter. 36 patients with stable strabismus had their stereoacuity measured on 2 consecutive clinic visits, 10 to 364 days apart. Stereoacuity was transformed to log units for analysis (0.3 log arcsec = 1 octave step e.g. 50 arcsec to 100 to 200 to 400). 95 % limits of agreement were calculated based on 1.96 standard deviations of differences between test and retest.
Results: Under artificial conditions of monocular blur, and testing on the same day, 95% limits of agreement were 1.2 octaves for PSR, 0.4 octaves for nF, 1.4 octaves for FD2, and 1.1 octaves for DR. Under clinical conditions of sequential office visits, 95 % limits of agreement were 1.9 octaves for PSR, 0.8 octaves for nF, 2.7 octaves for FD2, and 1.5 octaves for DR.
Conclusion: Although test-retest variability was lower under same-day artificial conditions than for sequential office visits in strabismus patients, a change of approximately 2 octaves in stereoacuity threshold (e.g. 40 to 160 arcsec) is needed to exceed test-retest variability, for most tests, in both artificial and clinical conditions. Small changes in stereoacuity (e.g. 40 to 80 arcsec) should be interpreted with caution.
Commercial Relations: none

03 ***The "8 diopters base-in test" for the diagnosis of microstrabismus in daily practice.***

Andrea C. Piantanida, G. Falcicchio, I. Pipitone
(Centro Oculistico Lariano-Cernobbio, Como, Italy)

Introduction: The diagnosis of microesotropia is considered one of the most difficult to obtain during daily practice. The authors stress the importance of "8 diopters base-in test" (Paliaga test) that seems to be forgotten in the ophthalmologic literature of these last years.
Methods: We have considered 407 patients whose age ranged from 1 to 50 years (mean age 8,9) suspected to be microesotropic. All underwent a full orthoptic and ophthalmological examination. An accommodative fixation stick was showed to all the subjects at a distance of 30/40 cm to gain the attention and stimulate the accommodation. An 8 diopters base-in prism was placed in front of the non dominant eye suspected to be microtropic: the movements obtained were examined. Cover test was considered the "gold standard" diagnostic test.
Results: We founded three different movements caused by the prism: normometric divergence, no movement, paradoxic convergence. Among the patients 341(83,78 %)were considered normal (without strabismus) and 66(16,21 %) were considered affected (microtropic). The authors founded a specificity of 99,41 % and a sensitivity of 98,48 %.We could also calculate the positive predictive value (97 %) and the negative predictive value (99,7 %) of the test since we knew the prevalence of microesotropia in our population.
Conclusion: We stress the importance of Paliaga 8 diopters base-in test due to its high specificity and sensitivity, and its simple execution and reliability even in poorly cooperating subjects. Positive and negative predictive values confirmed the data described in the literature. We highly recommend the use of this test in practice where cover test gives unreliable results in the diagnosis of microesotropia.
Commercial Relations: none

04 ***Comparison of clinical features and outcome of patients with primary and secondary microtropia.***

Sibel Oto[1], S.A. Bayar[1], S. Metindogan[1], A.C. Yazici[2], S. Cantürk[3], Y.A. Akova[1]
([1]Baskent University Hospital, Department of Ophthalmology, Ankara, Turkey; [2]Baskent University Hospital, Department of Biostatistic, Ankara, Turkey; [3]Baskent University Hospital, Department of Ophthalmology, Adana, Turkey)

Introduction: To evaluate and compare the clinical features and outcome of children with primary microtropia and residual secondary microtropia after full refractive correction of accommodative esotropia.
Methods: The records of 39 children with primary microtropia (Group 1) and 47 patients with residual secondary microtropia (Group 2), aged between 2 to 12 years, and with a follow up period of 6 months or more were retrospectively evaluated. Best corrected visual acuity (BCVA), presence of amblyopia and anisometropia, binocular sensory status at the initial and last visit were recorded and compared. Patients were given part-time occlusion therapy during the follow-up period.
Results: The mean age at the initial visit was 7.1±2.8 years for group 1 and 5.5±2.6 years for group 2 (p=0.008). The mean follow-up period was 43.5.7±28.3 and 57.6±35.4 months in Group I and II, respectively (p=0.081). Mean BCVA at the initial visit was 0.28±0.2logMAR in Group I and 0.25±0.2 logMAR in Group II (p=0.282); at the final visit improved to 0.08±0.14 logMAR in Group I and 0.03±0.1 logMAR in Group II (p= 0.92). Fusion and stereoacuity responses were similar in both groups at the first visit (p→0.05). Anisometropia ratio was 59 % in primary group with a refraction difference of 2±1.03 D and 40.4 % in secondary group with a refraction difference of 1.38±0.6 D (p=0.087 for anisometropia, p=0.034 for refraction difference). The presence of amblyopia at the initial visit was 71.8 % and 66 % in Group I and Group II respectively (p=0.561). Binocular sensory functions were found to be improved at the last visit in 76.9 % of patients in Group 1 and 67.4 % in Group II (p=0.331) besides, 30.1 % of patients in Group I and 19.1 % in Group II gained normal binocular functions (p=0.212).
Conclusion: Both primary and secondary microtropia have similar and dynamic clinical characteristics and functional recovery in sensorial status could be gained by occlusion treatment
Commercial Relations:

05 ***Dissociated vertical divergence, dissociated horizontal deviation, and infantile esotropia: What is the link?***

Michael C. Brodsky
(Department of Ophthalmology Mayo Clinic, Rochester, USA)

Introduction: Infantile esotropia gives rise to a unique set of overlapping dissociated eye movements, including dissociated vertical divergence and dissociated horizontal deviation. These dissociated eye movements are considered to be epiphenomena of infantile strabismus.
Methods: Analysis of basic mechanisms of dissociated horizontal deviation and their potential role in the pathogenesis of infantile esotropia.
Results: New clinical findings suggest that dissociated horizontal deviation results from the superimposition of dissociated esotonus upon a baseline exodeviation. This dissociated esotonus, brought about by unequal binocular visual input to the two eyes, may exert itself early in infancy, gradually driving the eyes into a convergent position.
Conclusion: Infantile esotropia may arise from the same dissociated eye movement that we recognize clinically as dissociated horizontal deviation.

06 ***Succinylcholine activation of human horizontal eye muscles.***

Gunnar Lennerstrand[1], R. Bolzani[2], S. Tian[1], M. Benassi[2], M. Fusari[4], E. Campos[3], C. Schiavi[3]
([1]Department of Ophthalmology, Karolinska Institutet, St Erik's Eye Hospital,
The Bernadotte Laboratories, Stockholm, Sweden, [2]Department of Psychology,
University of Bologna, Italy, [3]Department of Ophthalmology, University of Bologna, Italy, [4]Department of Anesthesiology, University of Bologna, Italy)

Introduction: Succinylcholine (Sch) can induce contracture in slow, multiply innervated muscle fibers of the extraocular muscles in animals of different species. Slow muscle fibers exist also in human eye muscle but their physiological properties have not been studied. Previously it was shown that force development during saccadic eye muscle activation could be recorded not only at the muscle tendon but also at the so called pulleys of the eye muscles. Recording of isometric force during Sch activation may shed further light on the muscle control of the eye muscle pulleys.
Methods: Isometric tension development was recorded from the lateral and the medial rectus muscles in twelve patients operated under general anesthesia. Two strain gauge probes were used, each attached with 5-0 silk sutures either to the muscle tendon and or to the pulley. Recordings were done in 12 eye muscles with the tendon attached to the globe and in 4 muscles detached from the globe. Muscle activation was produced by intravenous injection of Sch at a dose of 0.2 - 0.3 mg/kg bw.
Results: Sch induced slow and long-lasting contractions that could be recorded at both the muscle tendon and the pulley. In the muscle attached to the globe, the mean maximal isometric tension at the tendon of the lateral rectus was 12.2 g and of the medial rectus 12.8 g. The mean isometric tension at the pulley was 6.1 g and 4.5 g, respectively. In the muscles detached from the globe the force developed at the tendon was the same, but the force at the pulley was considerably lower.
Conclusion: The contracture of eye muscles to Sch showed characteristics of typical slow muscle fiber activation in animal eye muscle, and confirmed the participation of slow fiber systems in the human ocular motor control. Muscle control of the pulley could be demonstrated also in Sch activation of eye muscle.
Commercial Relations: none

Notes

12:00 **Session B**
13:30

General Aspects of Strabismus, Botulinum Toxin

Chair: Jan-Tjeerd H.N. de Faber
Moderator: Jonathan M. Holmes

07 ***Postoperative improvement in health related quality of life in adults with strabismus.***

Sarah R. Hatt, D.A. Leske, J.M. Holmes
(Mayo Clinic, Rochester, USA)

Introduction: We evaluated the responsiveness of the Adult Strabismus (AS-20) questionnaire, a recently developed, strabismus-specific, patient-derived health related quality of life (HRQOL) instrument.
Methods: 18 adults with strabismus (paretic and non-paretic, childhood onset and acquired) completed the AS-20 questionnaire. 9 of 18 patients underwent surgery and completed the AS-20 preoperatively and a median of 9 weeks (range 6 to 21 weeks) postoperatively. 9 of 18 adults with stable strabismus and no intervening treatment (control group), completed the AS-20 a median of 3 weeks (range 1 to 19 weeks) apart. Responses to each of the 20 questionnaire items were recorded on a 5-point scale: 'Never' (score 100), 'Rarely' (score 75), 'Sometimes' (score 50), 'Often' (score 25) or 'Always' (score 0). Mean scores (ranging from 100, best HRQOL to 0, worst HRQOL) were calculated for each patient and for each group, at each time point. Mean change in scores was compared between groups using the t-test.
Results: For the surgery group, mean AS-20 score improved from 50 ± 17 preoperatively to 72 ± 15 postoperatively. For the control group, mean AS-20 score remained unchanged from 59 ± 18 to 59 ± 16. Overall mean change in the surgery group was greater than in the control group 36 ± 18 versus 0 ± 11; P=0.007.
Conclusion: The AS-20 questionnaire is responsive to changes in HRQOL in adults undergoing strabismus surgery. The AS-20 provides valuable information in the clinical assessment of adults with strabismus and may prove useful as an outcome measure for clinical trials.
Commercial Relations: none

08 ***Sensory fusion and quality of life in adult patients before and after strabismus surgery.***

Gustavo Savino, M.T. Rebecchi, E. Di Nardo, A. Dickmann
(Clinic of Ophthalmology, Catholic University of Rome, Italy)

Introduction: Aim of this study is to evaluate sensory fusion, binocular field and quality of life in adult patients affected strabismus before and after strabismus surgery.
Methods: 8 adult patients, ranged in age from 23 to 47 years, 2 patients affected with congenital esotropia and 6 patients with exotropia, 2 consecutive, 2 intermittent, 2 congenital were included in this study. The degree of binocularity was examined with weak and strong dissociating tests (the Bagolini striated glass test and the Worth's test). During the binocular field with Goldmann perimetry we tested the binocularity in the central 30° of binocular field with the Bagolini striated glass. The quality of life was studied with two different questionnaire given to patients before and one month after strabismus surgery.
Results: We observed an increase of binocularity in 5 patients. Postoperatively 2 patients converted from total suppression to partial suppression, three patients converted from total suppression to CRA, one patient with total suppression was unchanged, one patient converted from disharmonic CRA to harmonic CRA. One patient with CRN was unchanged. At the Worth's test one patient converted from suppression to fusion for near. 2 patients that presented fusion preoperatively were unchanged. five patients with suppression were unchanged. Postoperatively 3 patients presented binocular field unchanged, 2 patients with esotropia and 1 patient with exotropia presented increase of binocular field, 2 patients with exotropia presented decrease of binocular field.
Conclusion: Our findings seem to prove that surgical approach in adults strabismus have not only cosmetic and psychosocial benefits but also functional improvement.

09 ***Outcome analysis of surgery for eye muscle palsy.***

Laura Cabrejas, F.J. Hurtado, J. Tejedor
(Dept Ophthalmology Hospital Ramón y Cajal, Madrid, Spain)

Introduction: Eye muscle palsy due to ocular motor cranial nerve disease may require surgical treatment to correct diplopia, eye misalignment, or torticollis. We have investigated outcome and predictive factors of surgical treatment of ocular motor palsy.
Methods: Records of patients requiring surgery for eye muscle palsy in our institution were retrospectively reviewed. Age, sex, etiology, deviation, muscle function, time between onset and surgery, presence of diplopia, torticollis, botulinum treatment, and number of surgical procedures were recorded as potential predictive factors. Main outcome measure was motor outcome (motor success defined as deviation <8 PD horizontal, <5 PD vertical, at distance). Secondary outcome measures were presence of diplopia, torticollis, and limitation of muscle function.
Results: Surgery was required in 22, 110, and 41 patients for 3rd, 4th, and 6th cranial nerve palsy, respectively. The most frequent etiology was ischemic in 3rd and 6th cranial nerve palsy, and congenital in 4th cranial nerve palsy. Motor success was obtained in 14/22 (63.6 %), 103/110 (93.6 %), and 33/41 (80.5 %), respectively. After multivariate analysis time between onset and surgery (p= 0.03), and initial deviation (p= 0.05) were significantly associated with motor success, in 3rd nerve palsy. Age was marginally associated with motor success in 6th nerve palsy (p= 0.05). Incidence of diplopia was significantly reduced by surgery (p= 0.02, p<0.01, and p=0.027, respectively).
Conclusion: Longer time from onset to surgery and larger eye deviation are negative prognostic factors for motor success in 3rd cranial nerve palsy surgery. Younger age at onset is a bad prognostic factor of motor success in surgery for 6th cranial nerve palsy. No significant prognostic factors are identified in 4th cranial nerve palsy surgery.
Commercial Relations: none

10 ***Quality of life in children with congenital cataract: Findings with the FKS, the German adaptation of the "Children's visual function questionnaire".***

Christina Pieh
(Department of Ophthalmology, University of Freiburg, Germany)

Introduction: The assessment of quality of life plays an increasing role in ophthalmology. The Children's Visual Function Questionnaire is a useful instrument to assess the quality of life in young children with visual impairment. We employed its German adaptation, the "Fragebogen zum Kindlichen Sehvermögen" to assess the quality of life in children with congenital cataract and the influence of the treatment on the patients' and their families' quality of life.
Methods: A total of 50 questionnaires were completed by the parents and analysed. 31 children were aphakic and had contact lens treatment (11 unilateral, 20 bilateral), 19 were pseudophakic (8 unilateral, 11 bilateral). Besides vision and general health the following quality of life domains were assessed: competence, personality, family impact and treatment.
Results: The total score was significantly reduced in all patients groups compared to a healthy reference group. Aphakic children scored lower than pseudophakic children, mainly because of lower scores on the subscales "family impact" and "treatment". Children with bilateral cataract scored lower than children with unilateral cataract, predominantly due to "competence".
Conclusion: Children with congenital cataract experience a reduction in quality of life due to their visual impairment and the necessary treatment. Children with bilateral aphakia and contact lens treatment seem to be mostly affected owing to their altered skills, an extensive treatment and its impact on the family.
Commercial Relations: none

11 ***Strabismus in children with congenital glaucoma – a case series.***

Isabel Oberacher-Velten, H. Winkler, H. Helbig
(University Eye Hospital, Klinikum of the University of Regensburg, Germany)

Introduction: Avoiding amblyopia is one of the tools in the treatment of children with congenital glaucoma. As amblyopia in these patients may be caused by strabismus, the coincidence of strabismus and congenital glaucoma was regarded in a case series of 9 children.
Methods: Nine consecutive patients with primary trabeculodysgenesis and secondary congenital glaucomas (due to anterior segment dysgenesis or Sturge-Weber's syndrome) examined in our hospital between January 2005 and March 2008 (age 2 to 7 years) were retrospectively evaluated for visual acuity, strabismus, stereoacuity, cycloplegic refraction, and intraocular pressure (IOP).
Results: Three children had unilateral, six bilateral glaucoma. Under treatment, IOP was lower than 18 mmHg in all patients. Two patients showed microesotropia, two intermittent exotropia. Two of the children with strabismus had unilateral and two bilateral glaucoma. In five patients, orthophoria or well compensated exophoria only for near distance was found. All four children with strabismus had an anisometropia of at least 1.5 dpt (spherical equivalent, range 1.5 to 7.0 dpt), whilst anisometropia ranged from 0 to 0.5 dpt (spherical equivalent) in the children without strabismus.
Conclusion: In our case series strabismus was a frequent finding in children with congenital glaucoma and was associated with anisometropia.
Commercial Relations: none

12 ***The profile of strabismus in stroke survivors.***

Fiona J. Rowe
(Division of Orthoptics, University of Liverpool recruiting centres, UK)

Introduction: The aim has been to evaluate the profile of strabismus that occurs in stroke survivors and determine the relationship between site of stroke and symptom of diplopia.
Methods: Prospective multi-centre cohort trial involving 16 recruiting centres (Vision in Stroke [VIS] group). Standardised referral and investigation protocol are used by local investigators.
Results: 512 patients were recruited with a mean age of 69 years: SD 15 over a 2-year period (59 % male, 41 % female). Median duration from onset to vision assessment was 19 days (range 0 to 1140 days). 19 % had strabismus detected on Orthoptic investigation after onset of stroke. Of these strabismic patients 12.5 % had strabismus that pre-existed the onset of stroke (that could be determined from case history). 70 % had strabismus associated with ocular motility abnormalities and 30 % were in isolation. 24 % were associated with brain stem, cerebellar, thalamus or basal ganglia strokes and 73 % with cortical strokes. 36 % complained of diplopia and the remainder had no symptoms related to their strabismus.
Conclusion: Strabismus was found to occur in 16.5 % of patients following their stroke. Strabismus with diplopia was always associated with other ocular motility abnormalities whereas strabismus without associated ocular motility abnormalities did not result in the symptom of diplopia.
Commercial Relations: none

Notes

13 ***Strabismus after pterygium surgery.***

Rosario Gomez de Liaño, R. Borrego, D. Santander
(Hospital Universitario Clinico San Carlos, Madrid, Spain)

Introduction: To analyze the clinical and therapeutic characteristics, of a series of patients, with double vision and strabismus after multiple Pterygium surgeries.
Methods: Prospective study of 10 consecutive patients, with double vision or strabismus, after Pterygium surgery. We classify the clinical characteristics and the degree of limitation as well as the pathogenia.
Results: All patients had risk factors for the recurrence of the Pterygium, and all of them were recurred cases. The most frequent reason of limitation was aberrant nasal conjuntivo-tenonian scar. 5 patients declined further surgery, as they could be compensated in primary position either spontaneously or with prisms. One patient was treated with botox. 3 patients were operated only with Pterygium auto graft and in two of them persisted the limitation of abduction. One patient was treated with mucous membrane and simultaneous strabismus surgery. Topical anaesthesia has advantages in strabismus surgery in that type of complicated strabismus.
Conclusion: It is important to evaluate passive ductions and ocular motility intraoperatively, after the conjunctiva surgery, as only the Pterygium surgery does not correct important limitations. Topical anaesthesia for strabismus helps us in the management of this complicated pathology.
Commercial Relations: none

14 ***Convergence spasm treated with botulinum toxin.***

Beata Kaczmarek, E. Dawson, J. Lee
(Moorfields Eye Hospital, London, UK)

Introduction: Convergence spasm is a difficult condition to treat and these patients may be very symptomatic. Various treatments are available but typically are of limited value.
Methods: A retrospective review of the toxin clinic database since 1994 was carried out to identify patients who had undergone botulinum toxin injection to one or both medial recti for convergence spasm.
Results: A total of 17 patients met our criteria. In total 62 injections were performed: 45 to a single medial rectus muscle and 17 to both medial rectus simultaneously. The average number of injections was 4 with a range of one to 22 per patient. Fourteen patients (82%) were temporarily overcorrected after their first injection. Three patients (18%) were symptom free after just one injection and were subsequently discharged. Seven patients (41%) continue with botulinum toxin on a regular basis, with or without occlusive contact lens as additional treatment to remain symptom free. Seven patients found no benefit from this treatment and so were discharged from the clinic or did not attend for follow up appointments. The side effects included 4 patients with transient ptosis and 3 with transient vertical deviation.
Conclusion: The common view of patient with spasm of the near reflex is that this is a self-induced functional disorder of a psychiatric nature. Our experience has led us to conclude that in some patients convergence spasm may be a subtype of dystonia, and may like other dystonias be suitable for botulinum toxin treatment.
Commercial Relations: none

Notes

15 ***Consecutive exotropia after esotropia treatment with botulinum toxin A – When can you diagnose.***

Rita Dinis da Gama, A. Sulzbacher, G. Varandas, M. de Lourdes Vieira, A. Castanheira Dinis
(Instituto de Oftalmologia Dr. Gama Pinto, Lisbon, Portugal)

Introduction: The purpose of Botulinum toxin A (BTA) treatment for childhood esotropia is to produce an overcorrection that vanishes with time, diminishing the previous angle of deviation or achieving orthotropia. On very few cases the overcorrection remains, originating a consecutive exotropia. PURPOSES: To determine the proportion of children with esotropia that remained with exodeviation 6, 12 and 24 months after the injection of BTA on both medial rectus.
Methods: A non comparative case series study was conducted and 183 files of children with esotropia that had their last BTA treatment between January 1st 2003 and June 30th 2005 were found.
Results: Eighty nine patients were included. Final distance deviation was 4,1+-14,2 PD at 6 months; 6,5+-12,2 PD at 12 months and 5,7+-9,8 PD at 24 months after treatment. (p>0,05). At 6 months after treatment, 10 patients (13,2 %) remained with exotropia as well as 4 patients (5,4 %) at 12 months and 3 (3,8 %) at 24 months after treatment. (p>0,05) There was a correlation between exotropia at 24 months of follow-up and low AC/A (p=0,02) and Acquired nonaccommodative esotropia (p=0,01). There was no correlation between exotropia and the doses of BTA administered (p>0,05).
Conclusion: After injection of BTA on both medial rectus for the treatment of childhood esotropia exodeviation was found on 13,2 % of the patients after 6 months, 5,4% after 12 months and 3,8 % after 24 months. Consecutive exotropia should be considered only 24 months after treatment.

Notes

14:30 **BOD-Symposium**
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16:00

Cross Section of Current Orthoptics

Chair: Dagmar Verlohr

S01 ***Patching vs. Atropine: A Compliance Study.***
Kyle Arnoldi
(New York, USA)

Introduction: One of the most important keys to successful amblyopia therapy is compliance. There is a statistically significant relationship between compliance and improvement in visual acuity in amblyopia.1 Non-compliance with treatment occurs primarily due to resistance on the part of the child, or lack of motivation on the part of the parent or caregiver. If the non-compliance is patient-related, it may improve with a switch to atropine penalization, as atropine has been found to be better tolerated than occlusion in previous studies.2 However, if the non-compliance is due to lack of commitment from the caregiver, compliance may not improve regardless of the method prescribed.
Methods: The hypothesis tested in this study was that parental non-compliance (rather than child non-compliance) poses the greater obstacle to success in most cases. To test this hypothesis, we conducted a retrospective study of 270 patients diagnosed with amblyopia and prescribed treatment between 2004 and 2006.
Results: Overall, compliance with atropine was significantly better (p>005) than compliance with patching. A subgroup (30 % of patients) were allowed to choose their method of treatment. Of these, half chose atropine, and half patching. Compliance was significantly better (p>005) when the family was allowed to choose the treatment method. In this subgroup, there was no difference in compliance between those who patched and those who used atropine.
Thirty-percent of patients were switched from the original treatment method to the other due to non-compliance. Compliance was unchanged with the second method in over 80 % of cases. Only 18 % improved compliance, and all of these cases were originally treated with patching and switched to atropine penalization.
Conclusion: Overall, compliance with atropine is slightly better than that with patching. Families are more likely to comply with either method if presented with alternatives and allowed to choose. If compliance is poor with the initial method, it is unlikely to improve with any subsequent method employed, suggesting that of the two main factors affecting compliance, lack of commitment to the treatment by the parents poses the greater obstacle.
1. Loudon SE, Polling JR, Simonsz HJ: Electronically measured compliance with occlusion therapy for amblyopia is related to visual acuity increase. Graefes Arch Clin Exp Ophthalmol 2003: 241: 176 - 180.
2. Holmes JM, Beck RW Kraker RT, Cole SR, Repka MX, Birch EE, Felius J, Christiansen SP, Coats DK, Kulp MT, PEDIG: Impact of patching and atropine treatment on the child and family in the amblyopia treatment study. Arch Ophthalmol 2003; 121: 1625 - 1632.
Commercial Relations: none

S02 ***Does a retinoscopy without cycloplegia make sense? Experiences with the Vision Screener PlusoptiX.***
Angelika Cordey
(Frankfurt, Germany)

We performed a refraction examination with the Visionscreener in miosis and consequently in cycloplegia with retinoscopy in 200 children, visiting our out-patient practice for a routine examination. Our special attention was directed to infants and children up to 2 years of age. The refraction results measured with the Plusoptix and with the conservative retinoscopy are compared and statistically evaluated. The evaluation is divided into the spherical and the astigmatic values.

S03 ***The Brueckner Test – a tool in mass screening? A Kenyan experience.***
Christiane Paschke
(Detmold, Germany)

The aim of early detection and treatment of serious eye-diseases in children can be reached by simple screening methods. These need to be implemented in the daily work of primary eye-care workers.
The presentation reports about a 4 day training-workshop in rural Kenya in 2007. The well-known classic Brueckner-test was adapted to the local situation. The presentation gives an insight into the practical set-up and outcome of the workshop as to encourage further initiatives."

S04 ***Sixth Nerve Palsy; when to act and when not.***
Jan Roelof Polling
(Rotterdam, Netherlands)

Introduction: Sixth nerve palsies are frequently seen in orthoptic clinics. Vascular diseases are the most known common causes in patients over 50 years of age. Neuroimaging should be considered if the palsy does not resolve within 3 to 6 months after onset or if progression of the palsy occurs within the first 2 weeks. We present three case-reports of an acquired sixth nerve palsy.
Methods: Three patients visited the orthoptic department with complaints of progressive horizontal diplopia. Patient history and orthoptic examination showed a sixth nerve palsy with unknown origin; a compensatory head posture, limitation of abduction and an esotropia increasing at distance was found in all patients. Neuroimaging showed three unusual different causes for the palsy. Strabismus surgery was planned in two cases: a Hummelsheim procedure and a recession of the medial rectus of the non paretic eye. Depending on the cause of the palsy other interventions could include occlusion, prisms of compensatory head posture.
Conclusion: Sudden horizontal diplopia at distance fixation is very suspicious for a sixth nerve palsy. Orthoptic examination must confirm a compensatory head posture (turn to the affected side), limitation of abduction and an esotropia increasing at distance and in the direction of the affected side. In general, vascular or undetermined causes of the palsy resolve within 8 weeks. If the palsy does persist, progress or combined with other neurological signs neuroimaging is strongly indicated.
Commercial Relations: none

S05 ***Hemianopia and Squint: Strabotomy recommendable?***
Melanie van Waveren
(Tübingen, Germany)

Introduction: Homonymous hemianopia leads to severe disturbance of visual orientation under binocular conditions. In contrast patients with bitemporal hemianopia binocularly show a normal visual orientation except hemifield-slide phenomena is present.
Methods: The effects of Strabismus (eso-, exotropia), retinal correspondence (NRC, ARC) and strabismus surgery on these two conditions will be discussed.
Conclusion: Although expecting that visual field loss and additional strabismus will lead to a more pronounced disturbance of vision, rarely, strabismus might even compensate the visual field defect. In these cases strabismus surgery is not to be recommended.
Commercial Relations: none

Notes

16:30 **Session C**
18:00

Strabismus Surgery

Chair: Heimo Steffen
Moderator: Rosario Gómez de Liaño

16 ***Minimally invasive strabismus surgery (MISS) for horizontal rectus muscle reoperations.***

Daniel S. Mojon
(Dept. of Strabismology & Neuro-Ophthalmology, Kantonsspital St. Gallen and University of Bern, St. Gallen, Switzerland)

Introduction: To study if minimally invasive strabismus surgery (MISS) is suitable for rectus muscle reoperations.
Methods: This prospective study presents the results of the first 70 consecutive patients operated on by the same surgeon at Kantonsspital St. Gallen, Switzerland, with a novel MISS horizontal rectus muscle reoperation technique. Surgery is done by applying two small radial cuts along the muscle insertion. Through the tunnel obtained after muscle separation from surrounding tissue, a recession, advancement, or plication is performed. All patients with a follow-up of at least 6 month were included.
Results: 84 % (59/70) of all patients could be followed for 6 month. On the average the eyes had 2.1 previous operations. In 10 % (6/59) of patients the MISS opening had to be enlarged to Harms limbal opening in order to perform surgery. On the first postoperative day, in primary position 68 % (40/59) of eyes had minimal and 32 % (19/59) moderate lid and conjunctival swelling. 14 % (6/59) patients had an unsatisfactory outcome after six month or needed additional surgery within the first six postoperative months. No serious complication was observed (e.g. globe penetration or infection).
Conclusion: This study demonstrates that a small-cut, minimal dissection technique allows performing rectus muscle reoperations. In some eyes the opening had to be enlarged in order to adequately perform surgery. The MISS technique seems to be superior in the direct postoperative period since only minimal or moderate conjunctival and lid swelling were observed.
Commercial Relations: none

17 ***Single horizontal rectus muscle recession or resection for small to moderate angle strabismus.***

Daniel Neely, D. Rogers, N. Shah, D. Sprunger, D. Plager, G. Roberts
(Indiana University School of Medicine, Indianapolis, USA)

Introduction: Single horizontal rectus muscle recessions or resections are frequently useful for correction of small to moderate angle strabismus. Unfortunately, very little published surgical outcome data exists for single muscle surgery and most surgical dose tables do not include guidelines for single muscle recessions or resections. We present outcomes on a surgical case series and suggest guidelines for single muscle surgery.
Methods: Retrospective review of 113 cases of single horizontal rectus muscle surgery. Mean patient age was 10.3 years. Of the 113 cases, there were 54 lateral rectus recessions, 31 medial rectus recessions, 16 lateral rectus resections and 12 medial rectus resections.
Results: For all patients, the mean preoperative deviation with distance fixation was 18 prism diopters (PD) while the mean deviation with near fixation was 17 PD. Single horizontal rectus muscle surgery reduced this to a postoperative mean deviation of 4 PD for both distance and near fixation. The average single lateral rectus muscle resection (7.3 mm) corrected 1.5 PD/mm recessed for both distance and near fixation. The average single medial rectus muscle recession (5.8 mm) corrected 1.8 PD/mm recessed for both distance and near fixation. The average single lateral rectus muscle resection (7.0 mm) corrected 1.4 PD/mm resected and 1.0 PD/mm resected for distance and near fixation, respectively. The average single medial rectus muscle resection (6.2 mm) corrected 2.2 PD/mm resected and 1.8 PD/mm resected for distance and near fixation, respectively.
Conclusion: Single horizontal rectus muscle recessions or resections are a valuable tool for small to moderate angle strabismus. Our pilot data would suggest that creation of an accurate surgical dose table should be possible for single muscle surgery.
Commercial Relations: none

18 ***Technique and results of bilateral faden operation of the medial rectus – modification of Mühlendyck.***

Marion Kaup, A.C. Mödder, K. Hartmann
(Orthoptik und Neuroophthalmologie, RWTH Aachen University, Germany)

Introduction: The Faden operation of the medial rectus, first presented by Cüppers 1974, is a standard procedure to treat esotropia with variable deviations and convergence excess. We evaluated the pre- and postoperative results of patients operated with the modified technique of Mühlendyck.
Methods: The Faden operation of the medial rectus was performed 13 to 17 mm posterior to its insertion. The superior and inferior part of the medial rectus was fixed on the sclera from the center to the border. Postoperative results at least two months after bilateral Faden operation were analysed in 178 patients retrospectively.
Results: Angles at distance and for near were significantly reduced postoperatively and the differences between distance and near angles were adjusted. In the majority of cases we measured a microesotropia with the simultaneous prism cover test. Only 15 patients (8.4 %) needed second surgery (11 because of remaining esotropia and 4 because of consecutive exotropia).
Conclusion: Faden operation modified by Mühlendyck in patients with esotropia with variable deviations and convergence excess leads to successful angle reduction for distance and near. Revision surgery is rarely necessary.
Commercial Relations: none

19 ***Reoperation on fadenoperation: How often & why?***

Isay Ozdemir, B. Gokyigit, S. Akar, A. Ozdemir, O.F. Yilmaz
(Istanbul Beyoglu Education and Research Eye Hospital, Istanbul, Turkey)

Introduction: To investigate the reasons of reoperations for patients who underwent classical faden operation or variations on medial rectus.
Methods: This study includes 278 patients who had been diagnosed and followed in our clinic between 1999-2007 for their esotropia. The files of patients were investigated retrospectively. Student t test were used for statistical evaluation.
Results: 135 of the patients were male and 143 were female with an average age of 8.82 years. Their mean follow up was 34 months. A second operation was performed on 16 patients. Among these patients, 7 patients (2.5 %) underwent removing the faden with or without advancement of the muscle toward to original insertion surgery for over correction, 9 patients (3.2%) underwent re-faden operation for hypo correction. While the mean age of over correction group was 2.2 years, it was 6.8 years on hypo correction group. Hyper correction was seen more often on younger age.
Conclusion: Because re-operation for over correction were needed for very young patients, it was necessary to be more careful when choosing operation indication for this group.

Notes

20 ***Coming back on a fadenoperation, still a nightmare?***

Dominique Thouvenin, C. Lesage, O. Norbert, S. Nogue, L. Fontes
(Clinique Saint Nicolas, Toulouse, France)

Introduction: Fadenoperation has specific indications, but its use is limited by pitfalls. Some of them are the difficulties encountered when it is necessary to come back on the muscle for iterative surgery. We use a specific technique of fadenoperation called posterior strapping (PS), and showed its efficiency on the tonic part of the deviation in esotropias (Esotropia with straight eyes under anaesthesia. About 73 cases treated exclusively with bilateral fadenoperation. Trans 30th ESA meeting, Killarney June 8-11, 2005. 2006. 93-96). We study here the feasibility of a possible second procedure on medial recti that have previously been operated with PS alone.
Methods: 408 cases of esotropia with straight eyes under anaesthesia were operated with PS alone extracted of 1620 cases of operated esotropias, between January 2002 and December 2006. By December 2007, 22 cases (5 %) necessitated second surgery, 9 cases for secondary exotropia, and 13 cases for secondary recurring esotropia. We show short videos of the initial surgical procedure and of second surgeries.
Results: On a surgical point of view, we found no atrophy of the anterior part of the tendon and the dissection of PS and of the muscle was easily done. Surgery on the anterior part of the tendon, resection or recession, or even replacement of the strapping was always possible. In secondary exotropias, we just took off the PS and did a recession of lateral rectus. In recurring esotropia, we always found anteriorly dislocated or disinserted PS. We just replaced it.
Conclusion: We believe that fadenoperation is an important surgical tool for treatment of strabismus, efficient on the tonic part of esodeviation. We show here that coming back on the surgical site for a second surgery is easy when a less aggressive technique (PS) is used during the initial procedure.
Commercial Relations: none

21 ***Y-splitting Surgery. An effective procedure in lever arm reducing surgery.***

Siegfried Priglinger[1], A. Kampik[2], D. Mojon[3], H. Kroehn[2], G. Rudolph[2]
([1]Krankenhaus der Barmherzigen Brüder, Linz, Austria; [2]Eye Hospital, Ludwig-Maximilians-University, Munich, Germany; [3]Kantonsspital St. Gallen, Switzerland)

Introduction: In Cüppers-operation or "Faden-Operation" shortening of the lever arm of eye rotation is achieved by fixation of the medial rectus muscle 12-15mm behind the insertion. In Y-splitting-surgery of the medial rectus muscle the eye muscle is split in to equal parts and refixed on the sclera with free arc of contact in Y-shape. The technique which is termed Y-splitting is demonstrated in a video presentation.
Methods: Before the operation factors like axial length of the globe and corneal diameter have to be measured. In Y-splitting surgery the eye muscle is split in two parts with a splitting length of 15-17mm, followed by refixation on the sclera with free arc of contact in Y-shape. The position of the refixed muscle parts have to be calculated according the pre-operative measured angle.
Results: This operative procedure reduces the strabismus, eliminates or weakens the nystagmus in primary position and can improve binocular vision and visual acuity. Side effects seem to be less than in Cüppers procedure.
Conclusion: Y-splitting surgery of the medial rectus muscle provides an alternative to Cüppers "Faden-Operation". In Y-splitting surgery motility as well as convergence is almost not impaired incomitantly. The risk of perforating injury of the sclera in comparison to the "Faden-procedure" is reduced and therefore suitable also in myopic eyes and in only one functional eye situations.
Commercial Relations: none

Notes

22 ***The efficacy of augmented transposition on surgery in several indications.***

Serpil Akar, G. Birsen, P. Gökhan, H. Pelin, Ö. Isilay, G. Hülya, Y.F. Ömer
(Istanbul, Beyoglu Eye Training and Research Hospital, Istanbul, Turkey)

Introduction: To evaluate the efficacy of augmented transposition surgery with lateral fixation sutures in several indications.
Methods: Of the 22 patients,13 eyes had type I Duane's syndrome, 8 eyes had a unilateral lateral rectus palsy, 2 eyes had a type II Duane's syndrome. Transposition of the vertical rectus muscles to the lateral rectus muscle was performed in 21 eyes of 20 patients; transposition to the medial rectus was performed in two eyes of two of these 22 patients. A lateral fixation suture of 5-0 Dacron polyester filament was placed in the sclera 16 mm posterior to the limbus and adjacent to the lateral rectus muscle, incorporating one fourth of the transposed vertical rectus muscle. The mean follow up period was 28 months.
Results: In most cases (87 %), alignment was achieved in the primary position with the use of the augmented transposition procedure alone. All of type I Duane's syndrome and lateral rectus palsy patients had improvement in abduction. No postoperative limitation of adduction in the transposed eye was noted. All of two patients with type II Duane's syndrome had improvement in adduction. After augmented transpositions, induced vertical deviations in the primary position were uncommon (3/22 patients) and not greater than 5 pd. Significant lid fissure changes were not seen.
Conclusion: Our results confirm the effectiveness of the augmented rectus muscle transposition procedure in lateral rectus palsy and type I Duane's syndrome. The addition of lateral fixation sutures to full vertical rectus muscle transpositions improves the tonic abducting force of the procedure without compromising adduction for this patients. Furthermore, our results demonstrate the useful of this procedure in type II Duane's syndrome.
Commercial Relations: none

23 ***Modified medial palpebral ligament fixation for third nerve palsy.***

Ramesh Murthy
(L V Prasad Eye Institute, Hyderabad, India)

Introduction: The surgical management of third nerve palsy is challenging. Most conventional procedures like recession and resection fail with recurrent exotropia. Fixation techniques especially to the periosteum and medial palpebral ligament have been proposed. We describe a modified medial palpebral ligament fixation to fix the globe in longstanding third nerve palsy
Methods: A prospective study of 6 cases of diagnosed congenital third nerve palsy was performed with a minimum of 6 month follow up post surgery. A non absorbable 4-0 polyester suture was passed anterior to the medial rectus insertion and beneath the conjunctiva to secure it to the medial palpebral ligament. The eye was left in 10-15 prisms adduction. Periodic review was done to evaluate the alignment in the primary position and recurrence of exotropia.
Results: The mean age was 27 years. The preoperative exotropia ranged from 45 to 90 prism dioptres and hypotropia 15 to 30 prism dioptres. Postoperatively the exotropia ranged from 5 to 20 prism dioptres and hypotropia 5 prism dioptres. There was an improvement in the pseudptosis. Complications included pain (3 patients) medially. Suture broke in 1 patient .
Conclusion: Modified medial palpebral ligament fixation may be a useful technique in the management of long standing third nerve palsy. Obvious concerns are the long term alignment following the procedure.
Commercial Relations: none

24 ***Submuscular Tenon's capsule and slipped muscles.***

Gideon P. du Plessis
(Pretoria Eye Institute, Pretoria, South Africa)

Introduction: Intrasheath slip of an ocular muscle is accepted as the most logical explanation for a slipped muscle as a surgical complication. (Bloom ; Parks). The amount of submuscular Tenon's capsule present in every surgical case must however not be overlooked as a major possible cause for a slipped muscle
Methods: Sutures can be placed very precisely into muscles with new finer sutures. One can and must make sure that muscle fibres are captured and not only the muscle capsule. Capturing of only the capsule will cause an intrasheath slip. Depending on one's technique, the sutures are however mostly placed about a millimeter from the muscle end . A variable amount of Tenon's capsule is present in exactly this submuscular space. Photographs of the amount of submuscular Tenon's capsule will be shown. When a muscle is reattached to the sclera, the submuscular Tenon's is sandwiched in between muscle and sclera. Very few operations end where the tendon is directly attached to the sclera and no Tenon's capsule is captured between muscle and sclera. If any substantial amount of submuscular Tenon's capsule is present in this location, it is most likely to prevent attachment of muscle fibres to sclera and thus cause a slipped muscle when the sutures absorb. This complication can be prevented by inspecting the scleral surface of the disinserted muscle at the time of surgery and by possibly excising excessive amounts of Tenon's capsule under the anterior 2 mm of the muscle before reattaching the muscle. The inspection of the submuscular Tenon's capsule has been pointed out by Dr A B Scott in the past, but the importance of this simple procedure did not find its way into the standard educational textbooks.
Results:
Conclusion: Ophthalmic surgeons are encouraged to inspect the undersurface of a muscle while performing recession muscle surgery. It can prevent such an obvious cause for a muscle slip
Commercial Relations: none

Notes

08:30 **Session D**

Amblyopia

09:30

Chair: Klaus-Peter Boergen
Moderator: Dominique Thouvenin

25 ***Left eye predominance in amblyopia.***

Michael X. Repka, T. Kraker, K.A. Simons
([1]Wilmer Institute, Johns Hopkins University, Baltimore, USA;
[2]Jaeb Center for Health Research, Tampa, USA)

Introduction: To report whether amblyopia is more or less prevalent in right or left eyes in children 3 to <18 years of age.
Methods: The Pediatric Eye Disease Investigator Group has conducted 9 prospective randomized treatment trials of amblyopia in children aged between 3 and <18 years of age across North America. In these 9 studies, 2694 children were enrolled between 3 and <18 years of age with visual acuity in the amblyopic eye 20/40 to 20/400. We compared the proportion of right and left eyes affected by amblyopia and examined the influence of baseline and demographic factors on the distribution.
Results: Overall, left eyes were more frequently affected by amblyopia than right eyes (56.6 % vs 43.4 %, p<0.001). This association was independent of age (p=0.46), race (p=0.28), and severity of amblyopic eye visual acuity (p=0.27), but was related to anisometropia as the underlying cause of amblyopia (p<0.001). Among patients with cause of amblyopia defined as anisometropia alone or combined mechanism (anisometropia and strabismus), left eyes were more frequently affected by amblyopia than right eyes (59.5 % vs 40.5 %, p<0.001). Among patients with cause of amblyopia defined as strabismus alone 50.3 % were affected by amblyopia in the left eye compared to 49.7 % in the right (p=0.89).
Conclusion: Determining the reason for the greater number of left eyes with amblyopia is worthy of further study. Anisometropia (with or without strabismus) was strongly associated with the left eye predominance of amblyopia. Careful prospective observational studies should be able to determine whether the anisometropia predates or postdates the onset of amblyopia.
Commercial Relations: none

26 ***Vision screening in Pennsylvania Dutch Country, how accurate is the PlusOptix?***

Noelle S. Matta, E.L. Singman, D.I. Silbert
(FAAP Family Eye Group, Lancaster, USA)

Introduction: We evaluated the accuracy of the PlusOptix vision screener for detecting amblyopia risk factors in the pediatric population and demonstrated that modifying the manufacturer's referral criteria can improve the clinical utility of the device.
Methods: We compared the rate and pattern with which the PlusOptix vision screener refers a patient for ophthalmic follow-up to the same metric obtained during a complete pediatric Ophthalmology examination using AAPOS guidelines. We then modified the manufacturer's criteria in determining which patient's would be referred to improve the clinical usefulness of the machine.
Results: 109 patients were examined and 53 % of the patients were found to have amblyopia or amblyopia risk factors. The PlusOptix vision screener referred 67 % of these patients, with a sensitivity, specificity, positive predictive value and false negative rate of 98 %, 69 %, 78 % and 1.4 %, respectively. These same metrics with the modified manufacturer's referral criteria were 98 %, 88 %, 90 %, and 1.5 %.
Conclusion: The PlusOptix vision screener is a useful tool to detect amblyopia risk factors in pediatric populations. Our study shows that the referral criteria can be internally modified to improve both specificity and positive predictive value of the device without reducing sensitivity in this study group.
The PlusOptix vision screener is an accurate, fast, user-friendly and portable way to detect amblyopia risk factors. Because the software automatically evaluates the refractive error and ocular alignment and then gives a simple referral grade, the PlusOptix screener may offer a reasonable way of providing large-scale vision screenings at significantly reduced costs.

27 ***The development of monofixation syndrome in strabismic amblyopes using the Bangeter foil.***

Michael S. Abrams, C. Duncan, R. McMurtney
(Excel Eye Center, Orem, USA)

Introduction: Examine the possibility the Bangerter foil encourages the development of monofixation syndrome in strabismic amblyopes without motor fusion and, confirm the validity of the 10pd base out test as an indicator of the presence or absence of motor fusion.
Methods: 54 consecutive amblyopes with mild to moderate amblyopia (VA equal to or better than 20/60), small to moderate angle horizontal strabismus ('flick' to 20pd by simultaneous prism cover), spectacles, and no motor fusion for at least one year previous, were given a (0.1) Bangerter foil 4hrs/day to treat residual amblyopia or for maintenance. Motor fusion was tested by looking for a convergent vergence of the amblyopic eye in response to a 10pd base out prism while binocularly viewing a near target without the foil in place. Data on visual acuity, deviation and results of the 10pd base out test were collected for a minimum of 2 years. The Bangerter foil was then discontinued when amblyopia no longer recurred and patients were followed to determine whether motor fusion persisted. Patients were finally tested with the Worth Four Dot (W4D) by a blinded examiner.
Results: 28 of 46 patients (60 %) developed motor fusion, called converters, after a mean of 201 days. 7 patients were lost to follow up, 1 required surgery. There was no significant difference in the mean initial visual acuities in the amblyopic eye (20/40+ and 20/30-), final visual acuities in the amblyopic eye (20/25- and 20/30), or initial horizontal angles (8.2pd and 10.1pd. p=0.064), between converters and nonconverters, respectively. There was a significant difference in the mean initial ages (4.8y and 5.8y. p=0.043) and the mean final angles (6.1pd and 9.2pd. p=0.022). There was also a significant decrease in the mean angle associated with conversion (-2.3pd. p=0.007). Motor fusion persisted in 20 of 20 patients 'converted' for a mean of 24.8 months and additionally in 17 of 17 of those 20 converters whose foil had been discontinued for a mean of 13.3 months. 14 of 14 converters fused the W4D at near only and 5 of 5 nonconverters failed to fuse at distance and at near, implying the 10pd base out test is an equivalent indicator of the presence or absence of motor fusion (Regular proportions test, p=0.0000).
Conclusion: Strabismic amblyopes with small to moderate horizontal angles, good to moderate initial visual acuities and no motor fusion when tested with the 10pd base out test, may develop motor fusion when treated with the Bangerter foil. Furthermore, the data suggests there is a mechanism that allows for realignment with the development of motor fusion. Correlation of the 10pd base out test with the W4D indicates the two are equivalent as a defining feature of the Monofixation syndrome and, with a mean final horizontal deviation of 6.1pd and persistent fusional vergences, conversion is therefore synonymous with the development of monofixation syndrome. These results are consistent with our current understanding of monofixation syndrome, Parks' 4-8pd rule and our knowledge of the spatial frequency tuning of photoreceptors in the parafoveal region known to participate the generation of motor fusion.

Notes

28 ***Effect and its sustainability of 3-6 hour part-time occlusion treatment for anisometropic amblyopia in children aged 8 years and older.***

Joo Yeon Lee, Y. R. Lee
(Subdivision of Pediatric Ophthalmology, Department of Ophthalmology, Hallym University College of Medicine, Seoul, South Korea)

Introduction: Anisometropic amblyopia is more common in the cases of amblyopia detected in older patients than strabismic amblyopia. The reason might be that it is harder to be self-detected at an earlier date because there is no manifest symptom. There is overwhelming clinical agreement on the concept that amblyopia therapy is less effective in older children with low compliance rate. The purpose of this study is to determine the effect and assess its sustainability of 3-6 hour part-time occlusion treatment for anisometropic amblyopia detected in school-age children eight years of age and older.
Methods: 33 patients whose corrected visual acuity of amblyopic eye did not improve by 2 lines or better within 2 weeks of wearing optimally-prescribed spectacles were prescribed occlusion treatment for 3-6 hours a day outside of their school hours. The patients were advised to do vision-training activities such as watching TV, reading, or computer operating for at least 1 hour while patching their sound eye. Patients whose corrected visual acuity of amblyopic eye reached LogMAR 0.1(=20/25) or better were considered cure of amblyopia and treatment success.
Results: Mean age of patients was 8.85+1.02 (range: 8-12) years old and their mean pre-treatment corrected vision of amblyopic eye was LogMAR 0.34+0.15. Compliance rate of 3-6 hour occlusion treatment was 92.6 %. Mean post-treatment corrected vision was LogMAR 0.03+0.01 and the success rate was 96 %. Mean post-treatment stereoacuity was 78.20+6.54 seconds of arc. It took an average of 5.22+3.35 months to reach the highest plateau of the post-treatment visual acuity. At the successful completion of the occlusion treatment 23 patients were followed over 1 year (range: 12-72 months). Among 23, 2 patients had worsening corrected visual acuity (< LogMAR 0.1).
Conclusion: The 3-6 hour part-time occlusion treatment in school-age amblyopes, which had been carried out after their school hours, was successful and had sustainable effect in most cases.
Commercial Relations: none

29 ***Refractive surgery and amblyopia.***

Anna Dickmann, V. Cima, C. Radini, G. Berto, L. Mosca
(Catholic University of Sacred Heart, Dept. of Ophthalmology, Rome, Italy)

Introduction: There is a general agreement about the unfeasibility to improve, over the critical period, the visual impairment due to amblyopia. Lately, some Authors have reported an increase of visual acuity in adult patients' amblyopic eyes when submitted to refractive surgery. The aim of this study is to evaluate if refractive surgery may actually induce an increase in visual acuity in adult amblyopic eyes, and if the potential improvement may be considered as a real cure for amblyopia.
Methods: 19 eyes of 13 patients (age range: 23 – 50 yrs, mean 37,3 yrs +/-8.05SD) affected with monocular amblyopia where enrolled in a retrospective non case control study. All 19 eyes underwent to refractive surgery (LASIK, PRK, LASEK). In relation to the type of amblyopia, two patients showed a strabismic amblyopia, two an anisometropic amblyopia and nine a mixed form. In all cases a complete pre- and post-operative orthoptic evaluation was performed. In the amblyopic eyes refractive error in spherical equivalent ranged from +6,87 to -11.87D (mean -5,12+/-5,77SD). Pre-operative BSCVA (range: 6/30 - 6/7.5) and post-operative UCVA (BSCVA if a refractive error was still present) were assessed (range: 6/60 - 6/6). Due to the small number of subjects enrolled, no statistical analysis was performed.
Results: Eight patients showed an increase in visual acuity from 2 to 6 lines. In two cases a decrease, from 1 to 3 lines, was observed and three subjects showed no variation of visual acuity.
Conclusion: According to Literature, our findings show that an increase of visual acuity in adult amblyopic eyes after refractive surgery seems to be possible. On the other hand, amblyopia out of critical period is untreatable in nature. The Authors discuss the possible causes which can determine this enhancement in visual acuity (optical factors, neuroplasticy in adulthood).
Commercial Relations: none

Tuesday, 9th September 2008

09:30
⇩
11:00

Rapid Fire, Poster Presentations

Chair: John Lee

P07 ***Screening for amblyogenic refractive errors with the VisionScreener® in a paediatricians' population.***
Ann-Kathrin Joost, S. Kirchhoff, O. Ehrt
(Department of Ophthalmology, Ludwig-Maximilians University Munich)

P08 ***Screening for small angle strabismus with the VisionScreener®.***
Silke Kirchhoff, A.-K. Joost, O. Ehrt
(Department of Ophthalmology, Ludwig-Maximilians University Munich)

P11 ***The influence of the method of treatment cessation in amblyopia treatment.***
Leah Walsh, R. LaRoche
(Dalhousie University, Halifax, Nova Scotia, Canada)

P14 ***Correlation between VA measurements with LEA symbols and ETDRS for 3-7 year old normal children.***
Safia Mulla, R. La Roche, E. Hahn
(Department of Ophthalmology and Visual Sciences, Dalhousie University, Halifax, Canada)

P20 ***Gradient versus heterophoria measurement of AC/A ratio: does a difference occur in strabismic cases?***
Fiona J. Rowe[1], C. P. Noonan[2]
([1]Division of Orthoptics, University of Liverpool, Liverpool, UK;
[2]Department of Ophthalmology, Warrington Hospital, UK)

P23 ***An improved visualization of oculodynamic eye movement recordings: Comparison of two patients with horizontal motility impairment.***
Anja M. Palmowski-Wolfe[1], C. Kober[2], I. Berg[3], C. Buitrago-Téllez[4], C. Kunz[3], E.W. Radü[5], S. Wetzel[5], K. Scheffler[5]
([1]University of Basel, Eye Hospital, Switzerland; [2]Faculty of Life Sciences, Hamburg University of Applied Sciences, Germany; [3]Dept. of Cranio-Maxillofacial Surgery, University Hospital Basel, Switzerland; [4]Radiological Center Aarau Zofingen, Spital Zofingen AG, Zofingen, Switzerland; [5]Institute of Radiology, University Hospital Basel, Switzerland)

P25 ***The "Menke-Saddle" improves conditions in children´s ophthalmological examination.***
Tim B. Menke, B. Neppert
(Department of Ophthalmology, Medical University of Lübeck, Germany)

P31 ***Evaluation of the sensory status in patients affected by infantile esotropia, who underwent surgery before and after 2 years of age.***
Adriano Magli, R. Carelli, A. Iovine, F. Fimiani
(Department of Ophthalmology, University Federico II, Naples, Italy)

P42 ***Sensorial strabismus due to congenital toxoplasmosis. Eso or exotropia?***
Susana Gamio, A. Tártara
(Buenos Aires Children´s Hospital, Buenos Aires, Argentina)

P50 ***Diagnostic problems in vertical strabismus - torsion is the clue.***
Piotr J. Loba[1]**,** E. Zamojska[2], M. Jozefowicz-Korczynska[3], W. Omulecki[1],
A. Broniarczyk-Loba[2]
([1]Department of Ophthalmology, Medical University of Lodz, Poland; [2]Institute of Binocular Vision Pathophysiology and Strabismus Treatment, Medical University of Lodz, Poland; [3]Department of Otolaryngology, Medical University of Lodz, Poland)

P63 ***Can extraocular muscle volume measured on MRI be used to determine dysmotility in Graves Orbitopathy?***
Wendy E. Adams, H. Haggerty, A. Coulthard, C. Neoh, A. J. Dickinson.
([1]Department of Ophthalmology, Royal Victoria Infirmary, Newcastle Upon Tyne, UK; [2]Department of Orthoptics, Royal Victoria Infirmary, Newcastle Upon Tyne, UK;
[3]Department of Radiology, Royal Brisbane and Womens Hospital, Australia)

P65 ***Results of lower lid lengthening after inferior rectus muscle recession with and without tarsorraphy in patients with Graves' ophthalmopathy.***
Anja K. Eckstein, K.T.M. Johnson, J. Esser
(Department of Ophthalmology, University of Essen, Germany)

P69 ***The intensity of downbeat nystagmus during daytime.***
Michael Strupp[1]**,** N. Rettinger[1], R. Spiegel[1], R. Kalla[1], D. Straumann[2], T. Brandt[1], S. Glasauer[1]
([1]Dept. of Neurology, Ludwig-Maximilians-University Munich, [2]University of Zürich, Switzerland)

P79 ***Predictability of strabismus surgery in children with developmental delays and/ or psychomotoric disorders compared to normally developed children.***
Laurentius J. van Rijn, A.E.L. Langenhorst, J.S.M. Krijnen, A.J. Bakels, S.M. Jansen
(Vrije Universiteit Medical Center, Department of Ophthalmology, Amsterdam, The Netherlands)

P83 ***Ophthalmic Findings in children with Periventricular Leucomalacia.***
Sezin Akca Bayar, S. Oto, S. Aksoy, I. Akkoyun, Y. A. Akova
(Baskent University Hospital, Department of Ophthalmology, Ankara, Turkey)

Notes

11:45 **Bielschowsky Symposium**
13:30

Aetiopathological Aspects of Strabismus and Motility Disorders

Chair: Joachim Esser

S06 ***Strabismus and genes: where are we?***

Birgit Lorenz, P. Steinmüller, M. Preising
(Dept. of Ophthalmology, Justus-Liebig-University Giessen, Universitaetsklinikum Giessen and Marburg GmbH, Giessen Campus, Germany)

Purpose: To review the actual knowledge on the molecular genetic basis of various forms of strabismus, and to direct further research in order to disclose the molecular basis of the most frequent form of strabismus i.e. infantile esotropia.
Methods: Literature search on known genetic causes and likely candidate genes. Analysis of the Giessen database of patients with hereditary forms of strabismus.
Results: Significant progress has been achieved during the recent years in dissecting the molecular genetic basis of incomitant isolated and syndromic strabismus disorders that are mainly monogenic. Despite the availability of genome wide scans to detect susceptibility loci for the most frequent form of strabismus i.e. infantile esotropia, this research is still at its beginnings. The search is complicated by the multifactorial nature of this disorder. Analysis of the Giessen records of patients with at least 3 family members affected with strabismus (by history) and seen between 2001 and 2007, has resulted in 2645 pedigrees with at least 6100 patients that will allow to use the genome wide screen approach to identify new susceptibility loci, and to correlate them with possible candidate genes.
Conclusion: The Giessen patient records provide an extraordinary set of useful pedigrees to study the heritability of strabismus using linkage analysis and to verify the results in a broad data set to calculate the susceptibility for inheritance in cases with strabismus.

S07 ***A possible role of palisade endings in strabismus.***

Anja Horn-Bochtler
(Institute of Anatomy, Ludwig-Maximilians-University, Munich)

Introduction: Little is known about the underlying cause of strabismus and in how far there are neuroanatomical changes in the extraocular muscles of patients, who develop ocular misalignment. While evidence exists to support the influence of extraocular proprioception for example on visuomotor development, or orienting behaviour, the contribution of extraocular proprioceptive feedback has not yet been fully established. Up to now it is unclear whether sensory receptors in extraocular muscles can provide appropriate proprioceptive signals about eye position to the brain. Since the existence of muscle spindles in eye muscles varies wildly across species, the most likely candidate to fulfil this role is the 'palisade ending', which is unique to eye muscles and only found in the myotendinous junction in the global layer.
Palisade endings are associated exclusively with multiply-innervated non-twitch muscle fibers, which are innervated by a set of motoneurons that are separate from those of the singly-innervated twitch muscle fibres. One hypothesis suggests that the palisade endings with their non-twitch muscle fibres form a sophisticated proprioceptive apparatus for the measurement of muscle tension and may thereby participate in eye movement control, possibly eye alignment. Then, a malfunction of these structures could theoretically cause strabismus. In a first attempt to address this issue a quantitative study has been started to investigate the palisade endings in patients with strabismus, compared to control eye muscle.

S08 ***Congenital ocular elevation deficiencies: Which are congenital cranial dysinnervation disorders?***

Antje Neugebauer, J. Fricke, C. Kubisch
(Center of Ophthalmology, Institute for Human Genetics, University of Cologne)

Introduction: The aetiology of congenital monocular elevation deficiencies such as Brown syndrome, double elevator palsy or vertical retraction syndrome is still under discussion.
With the term CCDD being coined for congenital cranial dysinnervation disorders that comprise the congenital fibrosis of the extraocular muscles which also leads to elevation deficiencies the question can be raised whether some other congenital elevation deficiencies may be understood as CCDDs.
Methods: Analysis of own case series, genetic studies applying classic cytogenetics, microdeletion screening with comparative genomic hybridization and analysis of candidate genes, neuroradiologic examinations and literature research was performed in order to clarify the aetiology of different congenital elevation disturbances.
Results: Findings of coinnervation in Brown syndrome described in the literature as well as associations of Brown syndrome or congenital double elevator palsy with other congenital dysinnervation disorders such as Duane syndrome or the Marcus Gunn phenomenon make an underlying congenital dysinnervation possible. The intact Bell´s phenomenon occurring sometimes with congenital double elevator palsy possibly could be explained by recent anatomic findings concerning the third nerve nucleus. Familial constellations with some members suffering from CCDDs others from congenital elevation deficiencies are of interest. Candidate genes for CCDDs in patients with congenital elevation defects up to now were not found to be mutated.
Conclusion: Our hitherto inquiries into the aetiology of congenital elevation deficiencies let seem it worthwhile to further investigate for a neurodevelopmental disorder in some congenital elevation deficiencies.

S09 ***Congenital fibrosis of the extraocular muscles.***

Günther Rudolph
(Eye Hospital, Ludwig-Maximilians-University, Munich, Germany)

Different congenital syndromes with impairment of the motility of the eye due to developmental anormalities of cranial nerves are classified as congenital cranial dysinnervation disorders (CCDD). The clinical appearance is dependant on the type of the dysinnervation disorder. CCDD summarizes syndromes like the congenital fibrosis syndrome of the extraocular muscles (CFEOM 1-3), Duane retraction syndrome (DURS 1-2), horizontal gaze palsy with scoliosis, Moebius syndrome (MBS 1-4), congenital ptosis (PTOS 1-2), and probably some types of Brown syndrome with fibrosis of the posterior part of the superior oblique muscle tendon.
Mutations in genes such as KIF21A, ARIX, SALL4 or carboxypeptidase CPAH, that are important in motoneuronal development and normal function of cranial nerves can cause ocular motility disorders or result in complex syndromes and synkinesis. Especially in CFEOM new insights in the mechanism of the disease and the dysregulation in the development of the extraocular muscle motor neuron system have been achieved. Patients with CFEOM type 1 harbor mutations in a kinesin motor protein that is localized throughout the neurons and encoded by the KIF21A gene.
Treatment options in different phenotypes of congenital cranial dysinnervation disorders are limited due to the origin and nature of the disorder. In CFEOM weakening procedures, resulting in the recession of eye muscles and ptosis surgery, like suspension of the upper lid, can improve the situation.

S10 ***Aetiology and Classification of paretic disorders.***

Hermann D. Schworm
(Munich, Germany)

S11 ***Aetiopathology of Graves` ophthalmopathy***.
Anja Eckstein, J. Esser
(Department of Ophthalmology, University of Essen, Germany)

Graves ophthalmopathy (GO) occurs in most of the cases together with an autoimmunthyreopathy. Signs and symptoms of GO, i.e. proptosis, edema and chemosis, impairment of ocular motility, are due to intraorbital inflammatory changes and expansion of the orbital contents. Several mechanisms are responsible for the expansion of the orbital contents including adipogenesis, overproduction of extracellular matrix glycosaminoglycans (GAG) and edema. The limited bony orbit can no longer accommodate the increased volume therefore compression of orbital vessels and nerves with anterior expansion and proptosis ensues.
Hyperthyroidism is directly caused by polyclonal autoantibodies to the thyrotropin receptor (TRAb) which mimic the action of thyrotropin (TSH). The orbital candidate antigen is probably the thyrotropin receptor (TSHR) as well, whose expression is upregulated in active disease stages and especially during adipogenesis.
Most of the patients present with expansion of both orbital fat and extra-ocular muscles (EOM), however preferential expansion of adipose tissue has been described in patients less than 40 years of age, and a predominant enlargement of EOM has been described in the elderly.
GO is more frequent in women than in men, but men tend to develop a more severe course. Cigarette smoking is associated with a higher prevalence of GO among patients with Graves autoimmune hyperthyroidism (GH), a higher degree of disease severity and a lower effectiveness of medical treatment. High TSH-receptor antibody (TRAb) levels are associated with a more severe course of GO and a lower remission rate of hyperthyroidism. Patients with GH/GO report a 2-5 fold increase of stressful life events before disease onset. First degree relatives have a 3 % risk to develop thyroid autoimmune disease. The management of hyperthyroidism plays an important role for the course of GO.

13:30

Bielschowsky Business Meeting

14:30

Notes

08:30 **Session E**

Horizontal Strabismus

09:30

Chair: Birgit Lorenz
Moderator: G. Robert LaRoche

30 ***Clinical and demographic characteristics of childhood intermittent exotropia: a prospective multicentre study.***

John Sloper[1], E. Dawson[1], D. Buck[2] , C. Powell[2], M. Clarke[2], H. Davis[3], N. Strong[2], P. Tiffin[4], R. Drewett[5], P. Cumberland[6], J. Rahi[6]
([1]Moorfields Eye Hospital, [2]Newcastle-upon-Tyne Hospitals NHS Foundation Trust, [3]Academic Unit of Ophthalmology and Orthoptics, University of Sheffield, Sheffield, UK [4]Sunderland Eye Infirmary, [5]Psychology Department, University of Durham,
[6]The Paediatric Epidemiology and Biostatistics Unit, Institute of Child Health, London, UK)

Introduction: To describe the clinical and demographic characteristics at presentation of patients recruited to a multicentre observational study of intermittent exotropia in the United Kingdom.
Methods: 465 children aged 0 to 11 years with an untreated intermittent divergent squint having a distance angle equal to or greater than near angle and diagnosed within the previous year have been recruited to the study at 26 participating centres. All children underwent a standardised orthoptic and clinical examination at entry to the study, including assessment of control using the revised Newcastle Control Score. Statistical analysis was performed by Spearman correlation analysis in SPSS.
Results: The mean age at presentation was 3.6 years (range 0 –11), with an estimated mean age of onset of the squint of 23.5 months. The median Revised Newcastle Score at presentation was 4 (25 % centile, 2; 75 % centile, 5). There was a family history of squint in 40 % of the children. Poorer control of the squint (higher score) was associated with younger age at presentation (Spearman correlation coefficient -0.21; P<0.001) poorer Frisby stereoacuity for near (0.22:P<0.001) and distance (0.25; P<0.02), and a greater angle on alternating prism cover test for near (0.37; P<0.001) and distance (0.32: P<0.001).
Conclusion: Conclusions: In children with an intermittent divergent squint, poorer control of the squint at presentation was associated with younger age of onset, poorer stereoacuity and a greater angle of squint when manifest. The children frequently had a family history of squint.
Commercial Relations: none

31 ***Medium term follow-up results in operated consecutive exotropia.***

Daniela E. Cioplean
(Ophthalmology Clinic OFTAPRO, Bucharest, Romania)

Introduction: Consecutive exotropia is the most frequent type of strabismus operated in adults. The purpose of this work-paper is to evaluate the results for medium term (average 5 years) in operated consecutive exotropia.
Methods: 105 patients operated for consecutive exotropia were studied and followed for a period of minimum 3 years. The following parameters were recorded and analyzed: the early and late postop deviation, amblyopia presence, the previous surgeries accuracy, surgical approach, patient's satisfaction.
Results: 90 % of patients were adults. Significant differences were observed between early and 3-5 years postop deviation in patients with high amblyopia and eccentric fixation and also in patients with residual exodeviation immediately postop over 15 PD- 12 %. The predictability is poor in patients with many previous surgeries, especially in exotropia generated by slipped or "lost" muscle where small vertical deviations are common too. The results are stable and good if analysis of deviation in all gazes and accurate passive duction test are done. The conjunctival restrictions are responsible for some over corrections. Conjunctival recession accompanying muscle surgery was followed by excellent results. In 24 % of cases, a second procedure was needed in few months after the first one and 2/3 of them accepted a tandem adjustable sutures procedure with +/- 10-12 PD postop deviation. In one case a third procedure was necessary. The patient's satisfaction was acceptable in undercorrections and poor in over corrections over 15 PD.
Conclusion: The results are good and stable in most of ortho or slight esotropic patients after one or two surgeries except some high amblyopic patients. The second procedure is necessary if the result after the first surgery is cosmetically unacceptable or/and diplopia is persistent. The tandem adjustable sutures can be successfully used as a second procedure. Surgical experience can create individual algorithm for each patient.

32 ***Infantile esotropia. Influence of the age of treatment in the vertical deviation.***

Marta Vila-Franca, H. Nogueira, R. Dinis da Gama, G. Varandas, M.L. Vieira, A. Castanheira-Dinis
(Instituto de Oftalmologia Dr. Gama Pinto, Lisboa, Portugal)

Introduction: Infantile Esotropia (IE) develops before the first year of life and is often concurrent with vertical deviations by de age of 2 and 3 years of life
Methods: To compare the incidence and the amplitude of vertical deviation between patients submitted to early treatment and patients with late treatment. A retrospective study was carried out. On Group 1 were included children submitted to treatment with Botulinum Toxin (BT) until they reached 4 years of age and on Group 2 children submitted to treatment (surgical and/or BT) after the age of 7 years. The evaluation of the vertical deviation on Group 1 was done after 7 years of age on both groups.
Results: Thirty eight (38) patients were included on Group 1 and 60 children on Group 2. On first group the incidence of vertical deviation was of 57,9 % and on second was of 63 % (p=0,48). On Group 1 the mean of the amplitude of vertical deviation was of 5 prismatic dioptres (PD) and on Group 2 was of 7PD (p=0,016).
Conclusion: The early treatment of IE with BT doesn't change the incidence of the vertical deviation but contributes to reduce the amplitude of the vertical deviations in a significant way.

33 ***Diagnosis and surgical treatment of dissociated horizontal deviation.***

Susana Gamio
(Buenos Aires Children´s Hospital, Buenos Aires, Argentina)

Introduction: Obtaining satisfactory alignment in patients with Dissociated Horizontal Deviation (DHD) requires a proper diagnosis and a specific surgical strategy. Clinical characteristics, surgical treatment and the results obtained in 19 patients with DHD are reported with a mean of 35 months postsurgical follow up.
Methods: Retrospective record review of patients with DHD who underwent surgery between 2000 and 2007. Patient data were recorded, including age, sex, history of prior surgery, visual acuity, pre-operative angle with each eye fixing, Reversed Fixation Test (RFT) when available, type of operation performed, and final alignment.
Results: Nineteen patients were identified, mean age 12 years old, all of them with age < 12 months at the time of strabismus onset. Eleven of them had had prior surgery for congenital esotropia. Ten exhibited exotropia (XT) and 9 esotropia (ET). All of them had associated Dissociated Vertical Deviation (DVD) and underwent bilateral surgery. Four patients had amblyopia in the non-dominant eye. Five patients underwent a single operation, 12 underwent 2 operations and 2 needed 3 surgeries.
Conclusion: Patients with DHD also exhibit bilateral and, very often, asymmetric DVD. Therefore, a surgical plan for the horizontal and vertical drift of the eyes is needed. Bilateral surgery is almost always necessary, even in cases with a strong fixation preference, in order to obtain satisfactory alignment.

Notes

34 ***Long-term follow-up of high accommodative convergence to accommodation (AC/A) ratio in a population-based cohort.***

Brian G. Mohney, C.C. Lilley, N.N. Diehl
(Mayo Clinic, Rochester, USA)

Introduction: Although there are a number of reports on patients with accommodative esotropia and a high accommodative convergence to accommodation (AC/A) ratio, none are from well-defined populations. The purpose of this study was to describe the long term outcomes of high AC/A ratio from a population-based cohort.
Methods: The medical records of all children diagnosed with accommodative esotropia as residents of Olmsted County, Minnesota, from January 1, 1975, through December 31, 1994, were retrospectively reviewed.
Results: Sixty-five (21.2 %) of 306 children with accommodative esotropia had a high AC/A ratio and were initially managed with bifocals at a mean age of 45 months (range, 3 months to 9.6 years). Forty-nine (75 %) were fully accommodative (FAET) while the remaining 16 (25 %) were partially accommodative (PAET). During a mean follow-up of 10.2 years (range, 0 to 25.5 years), 41 (63 %) of the children were able to eliminate their bifocal although one-third of these still required spectacle correction for distance esotropia. Children with PAET were more likely to eliminate their bifocals (P=0.14) than those with FAET during the follow-up period.
Conclusion: One in 5 children with accommodative esotropia had a high AC/A ratio in this population. Two of 3 children were able to eliminate their bifocal after approximately one decade, although many of these patients still required spectacle correction for distance esotropia.
Commercial Relations: none

35 ***Surgical correction of high AC/A ratio associated with accommodative esotropia.***

Ahmed L. Ali
(Tanta University Eye Hospital, Gharbia, Agypt)

Introduction: To evaluate the effectiveness of surgical correction as an alternative treatment of the abnormally high AC/A ratio associated with non-refractive and mixed accommodative esotropia.
Methods: Thirty four patients with accommodative esotropia with high AC/A ratio were included in this study. Twenty four of them were subjected to strabismus surgery in the form of bilateral medial rectus recession with or without Faden suture. The 10 non operated cases had good alignment for distance and near fixation with the executive bifocals.
Results: Esotropia for near and distance fixation could be corrected surgically in 87.75 % of the operated cases without the use of bifocals in cases with mixed accommodative esotropia and without spectacles in cases with non refractive accommodative esotropia.
Conclusion: High AC/A ratio could be corrected surgically with good alignment at near as well as at distance fixation. Surgery eliminates the need for executive bifocals when they fail to control the near-fixation esotropia.
Commercial Relations: none

Notes

9:30 **Session F**

10:30

Graves' orbitopathy, supranuclear motility disorders

Chair: Hermann Dieter Schworm
Moderator: Alain Péchereau

36 ***Retrobulbar irradiation for Graves' ophthalmopathy: a retrospective study, evaluating the efficacy of doses between 12-20Gy.***

Kristian T. M. Johnson[1], C. Loesch[2], J. Esser[2], K. Mann[3], A.K. Eckstein[1]
([1]Department of Ophthalmology, University of Essen, Germany;
[2]Institute for Medical Informatics, Biometry and Epidemiology, University of Essen, Germany
[3]Department of Medicine, Division of Endocrinology, University of Essen, Germany)

Introduction: To investigate differences in the clinical outcome of retrobulbar irradiation at 12, 16 and 20Gy.
Methods: A total of 113 patients (n= 44; 12Gy, n= 43; 16Gy, n=25; 20Gy) were examined prior to (t0) as well as 4-6 months after irradiation. Outcome was evaluated through proptosis, horizontal and vertical ocular motility, oedema status and clinical activity score (CAS). Overall group and individual changes were evaluated. Success was defined as reduction of proptosis by more than 1.5 mm, improvement of horizontal and vertical motility by >=5° or unchanged when normal at t0 and an CAS score of <=3.
Results: Prior to irradiation neither age, disease duration, gender, smoking behaviour, serum TRAb- concentrations nor CAS or NOSPECS stages varied significantly between all groups. Neither did outcome measures differ significantly. After irradiation CAS, oedema status, vertical motility (except for 12 Gy) was reduced significantly in all groups, while proptosis and horizontal motility did not. Inactivity was obtained in 70 %, 69 % and 70 % of the patients respectively. Vertical motility improved by >=5° or remained unchanged when normal in 51 %, 48 % and 36 % and horizontal motility in 72 %, 88 % and 97 % of the patients respectively. Proptosis improved by more than 1.5 mm in 53 %, 43 % and 42 % of the patients respectively. There was a significantly higher amount of improvement in vertical motility at 16 and 20Gy than at 12Gy. No other outcome measure differed significantly between the groups.
Conclusion: Comparison of three different irradiation doses revealed no significant differences in the success rates concerning CAS and proptosis reduction and improvement of ocular motility. The only dose dependant difference was seen for the amount of improvement in vertical motility with a more pronounced effect for at higher doses.
Commercial Relations: none

37 ***Unilateral inferior rectus recession in patients with dysthyroid eye disease.***

Anna P. Maino[1], R. Batra[2], M. Vishwanath[1], I.B. Marsh[2], A.M. Ansons[1]
([1]Royal Eye Hospital, Manchester, UK; [2]Eye Department, Walton Hospital, Walton, UK)

Introduction: Previous studies have reported a high incidence of overcorrection (42-50 %), especially with adjustable sutures, after inferior rectus (IR) recession. We aim to determine the efficacy of the procedure and its long-term results.
Methods: Patients with dysthyroid eye disease that underwent unilateral IR for recession (1993-2006) and had at least 3 months follow-up were included. Patients who underwent previous surgery were excluded. Success was defined as presence of fusion in primary and reading positions with or without prisms. For categorical variables, we calculated odds ratio (OR) for the AS group.
Results: Pre-operative vertical deviation was the same in both groups (21.04 +/- 16.02 vs 21 +/- 6.59, p=.399). Eleven patients underwent surgery with fixed sutures (FS) and 25 with adjustable sutures (AS). No significant difference in the amount of IR recession (3.86 +/- 1.05 mm vs 5 +/- 3.05 mm, p=.108) or in the change in vertical deviation (17.27 δ +/- 9.76 δ vs 21.56 δ +/- 16.30 δ, p=.0.425) was found. Both techniques were equally successful (63.6 % vs 88 %, p=.166, AS group OR=4). Two patients per group presented with IR slippage (18 % in the FS group and 8 % in the AS group, p=0.570, OR = 0.39). Overcorrection was present in 6 patients (24 %) in the AS group and in 2 patients (18 %) in the FS group (p=.999, OR=1.42). Further surgery was required in 3 patients in the FS group (37.5 %, two overcorrected, one undercorrected) and 2 in the AS group (8 %, both overcorrected, p=.154, OR=0.23).
Conclusion: Although there was no statistically significant difference in outcomes, AS patients were four times more likely to achieve fusion, despite a slightly higher risk of overcorrection. A higher number of patients in the FS group, however, required a second surgical procedure.
Commercial Relations: none

38 ***Tendon elongation: a new surgical technique for large convergent squint after three wall orbital decompression in thyroid associated ophthalmopathy.***

Anja K. Eckstein, K.T.M. Johnson, J. Esser
(Department of Ophthalmology, University of Essen, Germany)

Introduction: Large convergent squint angles can occur after three wall orbital decompression in patients with thyroid associated ophthalmopathy and compressive optic neuropathy. These squint angles can be too large to be corrected by a simple recession of the medial rectus muscles. Resection of the lateral rectus muscles is not recommendable, because the medial rectus muscles are trapped in the ethmoid sinus. A new surgical procedure will be introduced.
Methods: Large convergent squint angles have been corrected in 32 patients with a medial rectus muscle tendon elongation using a 9 mm wide Tutoplast® interponate. The length was preoperatively determined. Monocular excursions and squint angles in primary position were evaluated preoperatively and 12 months after the operation.
Results: The median preoperative squint angle in primary position was +25,1° (max: 40°; min 10°). Twelve months after surgery the median squint angle was 2,6° (max: 0°; min +10°). 26 of 32 patients had no double vision in primary position postoperatively. The dose-effect- coefficient (improvement of the squint angle [°]/amount of recession (R) of the muscle [mm]) was lower for the tendon elongation (1.0°/mm R) in comparison to bilateral recession of the medial rectus muscles (in patients without prior orbital decompression: 1.58°/mm R). Abduction improved on average about 14.1° (±9.6°) to 21.8° and adduction deteriorated on average about 15.9° (±6.4°) to 17.8°. A fixation of the interponate 4 mm behind the original insertion of medial rectus muscle resulted in better conjunctival appearance.
Conclusion: The results revealed that medial rectus muscle tendon elongation with a Tutoplast® interponate is a safe method to correct large convergent squint angles after orbital decompression. The low dose-effect-coefficient might be a result of the tendon fixation close to the original insertion which preserves normal leverage due to normal arc of contact. A significant convergence insufficiency did not occur.
Commercial Relations: none

39 ***Surgical treatment of INO.***

Jonathan M. Durnian, F. Jazayeri, V. Trimble, I.B. Marsh
(Walton Hospital, University Hospital Aintree, Liverpool, UK)

Introduction: In this retrospective study of 16 surgeries performed for the relief of the symptoms of INO, we report; (1) the length and type of symptoms experienced prior to surgical intervention, (2) the relative frequency of underlying pathology resulting in INO, (3) the mean pre-operative angles of deviation, (4) any correlation between total muscle movement and corrected angle, (5) success of the surgery in alleviating the symptoms.
Methods: A Retrospective, noncomparative, interventional case series of 13 patients with internuclear ophthalmoplegia who underwent surgery between December 1993 and October 2006. Surgical management was decided on the results of orthoptic measurements and tailored to each individual patient.
Results: Fifteen surgeries of 13 patients were analysed. The underlying pathology in 7 cases was demyelination. The commonest indication for surgery was diplopia. The mean length of symptoms was 60.9 months with mean follow up 6.6 months. The mean maximum angle of deviation corrected was 25.7 prism diopters (PD) esotropia. The mean muscle movement was 8.4 mm. The mean post-operative angle of deviation was 11.2 PD with the mean change in deviation being 14.6 PD. There were no complications noted from the surgeries. Two patients had to have a second operation due to symptoms not being completely alleviated by the primary surgery. All patients have now been discharged from care with no symptoms attributed to INO.
Conclusion: Surgery is an option that should be considered in all patients with INO (or one of its variants) that does not resolve with time. All patients had complete symptomatic relief from their symptoms. In the hands of an experienced strabismus surgeon, the surgery involved is simple but unpredictable. The study does show that patients who are willing for surgical intervention are not being offered the chance of relief quickly.
Commercial Relations: none

40 ***Superior rectus recessions for downbeat nystagmus.***

Mandagere R. Vishwanath, A. Maino, I.B. Marsh
(Walton Day Centre, University Aintree Hospitals, Liverpool, UK)

Introduction: Downbeat nystagmus causes distressing oscillopsia, visual blur and postural instability. Drugs, and suboccipital decompression in certain cases, have shown variable success rate. Patients often adopt a chin down head posture to benefit from the relative null point in upgaze. Extraocular muscle surgery can be done to attempt to move this point into a more usable position.
Methods: This is a retrospective review of all patients who underwent extraocular muscle surgery for downbeat nystagmus over a ten year period from June 1996 to September 2006 in a secondary referral centre.
Results: 14 cases were identified with mean age 44 years (range 23-86). The aetiology included Arnold Chiari malformation (5), multiple sclerosis (2), tectal plate glioma (1), paraneoplastic cerebellar involvement (1), post meningoencephalitis (1).The remaining four cases were of unknown cause. The surgery performed was bilateral symmetrical superior rectus recessions of 4-7 mm, apart from those with any existing vertical misalignment. The follow up period was 1-67 months. Nystagmus was eliminated in primary position and downgaze in 4 patients and reduced in 9 and unchanged in one. Nystagmus persisted in lateral gazes. Subjectively all but two achieved satisfaction and reduction in oscillopsia, with 8 patients needing only one operation. Further surgeries (Re-recessions, Faden or inferior rectus resections) were performed to correct any induced vertical misalignment (2 cases), persistence or recurrence of nystagmus in primary and downgaze positions (2 cases) or any asymmetric response (1). Recurrences took about 12-36 months after primary surgery to manifest.
Conclusion: Superior rectus recessions reduce downbeat nystagmus and oscillopsia thereby improving the quality of sight and life. Patients need to be counselled preoperatively carefully regarding what can be achieved. Problems like asymmetric response, vertical misalignments and recurrences should be discussed. Success can only be judged in the long term as recurrences tend to occur more than a year after surgery.
Commercial Relations: none

Notes

11:00 **Session G**
12:00

High Myopia, Duane Retraction Syndrome

Chair: Olav Henrik Haugen
Moderator: John Sloper

41 ***Surgical treatment of the heavy eye syndrome: long-term results with Yokoyama technique.***

Constantino Schiavi, M. Fresina, E.C. Campos
(Department of Ophthalmology, University of Bologna, Italy)

Introduction: Many hypotheses have been made on the pathophysiology of the progressive restrictive esotropia and hypotropia of high myopes (heavy eye syndrome = HES) and many surgical techniques have been attempted with poor results. In 2000 Yokoyama and co-workers proposed a new theory for the condition: the myopic staphyloma dislocates the eyeball out of the muscle cone in the superotemporal quadrant, pushing aside the superior and lateral rectus muscles. In 2001 they introduced a new surgical technique based on the principle of replacing the globe into the muscle cone by means of a non-absorbable suture put like a bridge between the lateral and superior rectus muscles, combined with a large medial rectus muscle recession. Since 2002 we have been treating patients with HES using the Yokoyama procedure. Here we present our long term results obtained with this technique.
Methods: The charts of 28 patients operated on with Yokoyama technique from 2002 to 2007 were reviewed. The HES was bilateral in 20 patients and monolateral in 8 patients. Dislocation of the globe out of the muscle cone was confirmed in all the eyes operated on with Yokoyama technique by preoperative coronal MR images. Mean follow-up after surgery was 2.5 years (minimum 1.2 years-maximum 5.5 years).
Results: Mean horizontal deviation in primary position changed from +60 PD of esotropia before surgery (range: +45 PD/ +140 PD) to +14 PD of esophoria/esotropia after surgery (range: +16 PD EPH-ET/ –18 PD XPH-XT). Mean abduction of affected eyes changed from –35° before surgery to +25° after surgery. Some degrees of elevation were gained by the affected eyes of almost all the patients. The results remained stable during the whole follow-up period.
Conclusion: At present, Yokoyama procedure is the most effective surgical technique for the HES. The results are stable, despite progression of myopia in some cases.

42 ***A review of the Yokoyama procedure for eso-hypotropia associated with high myopia.***

Chris S. Child, A. Jkawaja, J.J. Sloper, J.P. Lee, G.G. W. Adams
(Moorfields Eye Hospital, London, UK)

Introduction: It is well recognised that patients with high myopia may develop an eso-hypotropia of the affected eye(s). This is suggested to occur because of dislocation of the elongated eye out of the muscle cone or downward displacement of the lateral rectus muscle. Standard recess-resect strabismus surgery is often ineffective to correct this problem. Superior transpositions of the superior recti and lateral rectus "muscle path" surgery have been reported as effective in some cases. We present our experience of the surgical procedure initially described for this condition by Yokoyama at ESA 2001 in which the lateral and superior rectus muscle bellies are sutured together 15mm. behind their insertions, combined with medial rectus recessions in selected cases.
Methods: A retrospective case notes review of 17 patients who underwent the procedure between 2002 and 2007 was performed.
Results: There were 11 female patients, 6 male. All patients had eso-hypotropia in the affected eye associated with high myopia (range -14D to -29D). 14/17 patients (82.4%) had poor vision in the operated eye. Mean age at surgery was 51.9 years (range 18 to 72 years). All patients underwent the Yokoyama muscle binding procedure with or without medial rectus recession. No surgical complications occurred in this small series. Follow-up ranged from 2 months to 4 years. 12/17 (70.6%) of patients had good/ satisfactory alignment post -operatively. Four patients remained esotropic or hypotropic and required further surgery or Botulinim Toxin injection, all with satisfactory outcomes.
Conclusion: We have found this procedure to be effective in treating this unusual and challenging condition.
Commercial Relations: none

43 ***Heavy eye syndrome pulley surgery - yes or no?***

Robert Hörantner, S. Abri, M. Buchberger, T. Kaltofen, B. Neudorfer, C. Priglinger, S. Priglinger
([1]Krankenhaus der "Barmherzigen Schwestern", Ried, Austria
[2]Landeskrankenhaus Salzburg, Salzburg Austria; [3]Upper Austrian Research Corporation, Department for Medical-Informatics Konventhospital Barmherzige Brüder, Linz, Autria [4]Ludwig-Maximilians-University, Munich, Germany)

Introduction: Eye motility disorders with high axial myopia and hypotropia of the affected eye are usually referred to as "heavy eye syndrome". Based on an interpretation of magnetic resonance (MR) images, the cause of the hypotropia has typically been assigned to the displacement of recti muscle pulleys. We want to demonstrate that the oblique muscles play an important role in the "heavy eye syndrome" and that the surgery of displaced pulleys is not an ideal procedure.
Methods: Our hypothesis was tested by a retrospective analysis of surgical results in one patient with high axial myopia (less pronounced in one eye), in MR images of orbital tissues of two further patients with unilateral high axial myopia, in computer modeling with the SEE-KID biomechanical model and in anatomical preparation of recti muscle pulleys.
Results: MR images demonstrated a pattern of extra ocular muscle path displacements, but also a uniform decrease in the cross-sectional area of the inferior oblique muscles. Computer modeling required decreased inferior oblique contractility in addition to displaced extra ocular muscle paths. The dislocation of the pulley positions of the lateral and medial recti pulleys by 3.4 mm into positions lying more temporal-caudal did not recreate the observed motility pattern. Even the dislocation of all four recti muscle pulleys did not show the desired result.
Conclusion: An increase and asymmetric deformation of the globe diameter leaves little space for the muscle bellies especially for the inferior oblique. Therefore, this anatomical situation fundamentally changes the arrangement of the oculomotor plant. As a consequence, surgeons should recess the superior oblique muscle as well as perform a transposition and combined surgery of the horizontal muscle insertions thus preventing pulley interventions.

Notes

44 ***Surgery for esotropia in myopes : results on 44 patients.***

Giovanni B. Marcon
(Head Department of Ophthalmology Public Hospital of Gorizia-Monfalcone, Bassano del Grappa, Italy)

Introduction: Traditionally two types of esotropia in myopes are described in the literature. The Bielschowsky esotropia is a concomitant ,acute esotropia in young, low-medium grade, myopes with a good surgical prognosis; the Hugonnier-Magnard esotropia is a progressive, restrictive, some times fixed esotropia in older, high myopes with, in general, a bad surgical prognosis. However, in clinical practice, the formulation of a correct surgical plan may be difficult because of the mixed characteristics shown by many patients

Methods: 44 myopic esotropic patients operated in the last 6 years were divided into 3 groups according to the following data: age, degree of myopia, ocular motility and beginning. Group 1 (15 patients) included patients with the typical Bielschowsky acute esotropia. Group 2 (11 patients) included the typical progressive, restrictive, Hugonnier-Magnard esotropia. Group 3 (18 patients) included patients showing mixed characteristics (age, myopia and motility) of groups 1 and 2. All patients were diplopic before surgery with a pre-operative angle variable between 15 and 80 PD. Surgical plan was standardized as follows : a) bimedial recession as first surgery b) resection of one or two lateral recti (usually 5-6 mm) if no realignment was obtained after bimedial recession in patients of groups 1 and 3.Orbital coronal MRI was always obtained before the resection. c) a Jenssen procedure on lateral and superior recti or lateral recti re-localization in Group 2.

Results: In group 1 (Bielschowsky esotropia) bimedial recession realigned 11 of 15 patients (73 %). 4 patients were realigned with one lateral rectus resection. All patients of this group were binocular after surgery. In group 3 (mixted) bimedial recession realigned 5 of 18 patients (27.7 %). 7 more patients were realigned after one or two lateral recti resection. A total of 12 patients were binocular after surgery with a mean follow-up of 20 months. 6 patient (35.4 %) were still diplopic after surgery and refused other surgical treatments. In group 2 a combination of a 7 mm bimedial recession with a Jenssen procedure on lateral and superior recti produced great improvement on the motility, the visual field and the symptoms in 9 over 11 patients but they never regained fusion. Relocalization of lateral recti with a faden-like procedure was performed in 2 patients but failed to produce realignment. Intraocular pressure elevation was noted in 3 of 11 patients but was well controlled with topical medication.

Conclusion: Bimedial recession alone realigned 73 % of patients of group 1 (Bielschowsky esotropia) and 27.7 % of patients of group 3 (Mixted type). Normal binocular vision was obtained in 100 % of patients in group 1 and in 64.6 % of patients in group 3; it was never obtained in patients of group 2. Younger age, less myopia, good ocular motility were good pre-operative prognostic factors, in this study, to obtain surgical realignment in particular in patients of group 3. A Jenssen procedure on lateral and superior recti was very effective in patients with the Hugonnier-Magnard esotropia. No lasting effect on the intraocular pressure was noted after this surgical procedure.

Notes

45 ***Duane retraction syndrome, clinical & anatomical study.***

Dalal Shawky
(Faculty of Medicine, Alexandria University, Egypt)

Introduction: Duane Retraction Syndrome is one of the congenital types of squint where the presenting forms and clinical varieties are variable . Sometimes accompanied by congenital anomalies, sometimes reported in families. The decision of surgery and its type is a matter of discussion .
Methods: this study included a large series of DRS including 157 patients of different ages: 114 type I, 9 cases type II and 34 cases type III. All cases were documented by photos and videos, EMG (electromyography) was performed in 5 adult cooperative patients having Upshoot with attempted adduction, surgery was performed in indicated cases and the anatomical changes were documented during surgery.
Results: Results showed most cases occurred in left eye, most type I, least type II. Anatomical changes included scleral indentation by fibrotic muscles, oblique direction of lateral rectus, anterior insertion of medial rectus, Systemic anomalies in chest and extremities are documented.
Cases operated were 78 patients and the anatomical changes were studied during surgery and documented, we had 2 cases in the start complicated with post operative exotropia, so in cases operated we made a special plan for operating the severe globe retraction and or the upshoot by recessing both horizontal recti muscles in the affected eye but in unequal amount, recessing LR 50 % more than MR in order to preserve the same pre operative position of the globe, this to be modified according to pre operative existing deviation and also according to intra operative anatomical findings.
Conclusion: At the end of the study, the surgery when performed is tailored to each patient, primarily recessing both horizontal recti in same eye to ameliorate severe globe retraction and upshoot in a proportion 3:2 (LR:MR) to preserve the same pre operative position of the eye taking into consideration any preoperative deviation in primary position.

46 ***Problems with lateral rectus orbital wall fixation in Duane syndrome.***

Seyhan B. Özkan, I. Isikligil
(Adnan Menderes University Medical School Department of Ophthalmology, Aydin Turkey)

Introduction: Lateral rectus muscle fixation into the lateral orbital wall is a recently described method in limited number of patients for treatment of Duane syndrome. The aim of this presentation is to evaluate the results and the postoperative problems with this surgical method.
Methods: Three patients with type I Duane syndrome with significant up and downshoot were evaluated. Lateral rectus muscle is attached to the lateral orbital wall periosteum in combination with augmented vertical rectus muscle transposition with vessel sparing technique. Two patients underwent orbital MRI examination postoperatively.
Results: All of the patients demonstrated a severe limitation of abduction with disfiguring up and downshoot in combination with globe retraction on adduction. Case 1 had an esodeviation and cases 2 and 3 had exodeviation preoperatively. Up and downshoots were markedly decreased in all of the patients in postoperative period. Case 1 developed an esodeviation and cases 2 and 3 had residual exodeviation following surgery. A residual globe retraction is observed in all of the patients. No abnormality was found in postoperative orbital MRI examination.
Conclusion: Fixation of the lateral rectus muscle into the lateral orbital wall is found effective in control of up and downshoots. However globe retraction does not resolve in total, although the globe is free of LR co-contraction and the postoperative horizontal deviations may require secondary surgery. We suggest that the residual globe retraction may possibly be related to the transposition of the vertical rectus muscles.
Commercial Relations: none

Notes

13:30 **Session H**

Brown's Syndrome and other vertical Strabismus
15:15

Chair: Michael H. Gräf
Moderator: Vincent Paris

47 ***Spontaneous resolution in patients with congenital Brown syndrome.***
Emma L.M. Dawson, J.S. Barry, J.P. Lee
(Moorfields Eye Hospital, London, UK)

Introduction: Brown syndrome was first described in 1958 and is characterised by a restriction of active and passive elevation in adduction and can be congenital, acquired, intermittent or constant. Spontaneous resolution has been reported in all types but is said to be less common in congenital and constant patients.
Methods: A retrospective review was carried out at our tertiary referral centre between 1992 and 2002, of all new referrals with a diagnosis of constant congenital Brown syndrome and no previous treatment. Twenty-five of the patients were referred for a second opinion from another centre.
Results: Thirty-two patients were identified. There were 21 females and 11 males, with an age range at referral of between one year and 14 years. The right eye was affected in 14 patients and 3 patients had bilateral Brown. Twenty-nine (91 %) demonstrated binocular vision. Nineteen patients had an abnormal head posture. Twenty-four (75 %) patients had a spontaneous improvement in their ocular movements without any intervention. The best improvement was from a 3 limitation to full movement. Six patients had a click, 5 of these improved. Pain was a problem in 10 patients, 8 of these improved. Diplopia was a symptom in 13 patients, 11 of these improved. The final review ranged from 6 months to 9.5 years after the first visit. Five patients who had no spontaneous improvement underwent surgery and obtained an improvement.
Conclusion: There was spontaneous resolution in 75 % of patients. Our management is to be cautious with treatment and adopt the wait and see approach with these patients.

48 ***Congenital Brown's syndrome: intraoperative findings and postoperative results.***
Kathi Hartmann
(University-Eye-Clinic RWTH Aachen, Germany)

Introduction: Congenital Brown's syndrome is characterized by restricted elevation in the adducted position. Many surgical procedures exist for treatment of congenital Brown's syndrome with different surgical success rates.
Methods: We retrospectively evaluated 18 patients who received surgery for congenital Brown's syndrome. Surgery was indicated in presence of hypotropia in primary position associated with chin elevation for achieving binocular single vision or remarkable elevation deficit in adduction without spontaneous improvement. Intraoperatively, we explored the superior oblique tendon towards the trochlea region and the globe behind the tendon during temporary desinsertion of the superior rectus. Complete orthoptic and ophthalmologic examination was performed at least two times before and 3 months after surgery.
Results: Five patients showed spindle-shaped thickening of the tendon in the trochlea region. After excision of the thickening (histological findings: tendon) elevation in adduction was free in the forced duction test. In all patients active elevation in adduction was improved at least by 5mm, two patients showed complete free motility. Nine patients demonstrated tight bands reaching from the trochlea region and inserting at the globe behind the posterior border of the tendon insertion, frequently with distance to the tendon. Those strands could only be found when the upper nasal posterior quadrant of the globe was explored. After removal of the bands passive elevation in adduction showed no more limitation, in 6 cases active elevation in adduction was improved at least by 5mm postoperatively. In four patients insertion of the posterior part of the tendon was extended nasally, removal could not satisfactorily improve elevation in adduction. We had no intraoperative complications or generated motility disorders.
Conclusion: Exact exploration of the tendon of the superior oblique reveals inhomogeneous pathological findings, which can partly be removed with considerable improvement of motility.
Commercial Relations: none

49 ***Superior oblique posterior tenectomy in congenital Brown' s syndrome.***

Andreea Ciubotaru[1], K.-P. Boergen[2], O. Ehrt[2]
([1]Infosan Eye Clinic, Bucharest, Romania;
[2]Department of Ophthalmology, Ludwig-Maximilians University, Munich, Germany)

Introduction: Various surgical procedures described for congenital Brown's syndrome showed that it is problematic to operate with high success rates. We have evaluated the effects of superior oblique posterior tenectomy.
Methods: In a retrospective study, we evaluated 21 patients with congenital Brown's syndrome (aged 2 to 28,5 years) who underwent posterior tenectomy of the superior oblique as the primary procedure. Intraoperative forced ductions showed severe restriction of elevation in adduction in all patients. The squint angle (vertical and horizontal deviation in primary position, lateral gaze, up/ down gaze), elevation in adduction, abnormal head posture at distance fixation, binocular vision (in primary position and anomalous head posture) were assessed. The measurements were performed 1 day before and 3 months, respectively 6 months after surgery.
Results: At the end of the operation, elevation of the eye in adduction (passive motility) were significantly improved (9 patients) or free (11 patients). Inspite of free passive motility, the active monocular elevation in adduction was only slightly improved by 1 to 5 mm (mean 1,5 mm). Hypotropia in primary position, which was reduced by 1 to 11 deg (mean 5 deg). Subjectively, the parents have seen good or excellent results (10 cases) or no changes (6 cases). 16 patients had an abnormal head posture and all of them improved their posture postoperatively.
Conclusion: The efficiency of the superior oblique posterior tenectomy in congenital Brown's syndrome is variable. The fact that the passive motility had dramatic improved postoperatively, but the elevation in adduction improved only slightly suggest a heterogeneous aetiology of Brown's syndrome. The hypothesis (Neugebauer A) whether congenital Brown's syndrome might represent a congenital cranial dysinnervation syndrome is discussed.
Commercial Relations: none

50 ***The reasons of second and third operations for patients with Brown syndrome.***

Birsen Gokyigit, S. Akar, P.K. Hekimhan, I. Ozdemir, O.F. Yilmaz
(Beyoglu Education and Research Eye Hospital, Istanbul, Turkey)

Introduction: To investigate the reasons of second and third operations for patients with Brown syndrome.
Methods: This study includes 57 patients who had been diagnosed as Brown syndrome with or without horizontal deviation between 1994-2007 in our clinic. Only 19 of these patients had pure Brown syndrome without any horizontal deviation. The files of patients were investigated retrospectively. Student t test were used for statistical evaluation.
Results: 35 of the patients were female and 22 were male with an average age of 8.14 years. Their mean follow up was 38 months. The Brown syndrome in 33 patients was on right eye, in 17 patients on left eye and in 7 patients bilateral. A second operation was performed on 20 patients. Among these patients, 8 patients underwent surgery for horizontal deviation, 4 for vertical deviation, 6 for removing expander material from superior oblique. Superior oblique surgery for Brown syndrome was performed as a second operation on 2 patients following their horizontal deviation surgery. A third operation was done on 4 patients for their remaining horizontal and vertical deviations. Only 3 patients had Brown syndrome without any other deviation that needed re-operations.
Conclusion: Re-operation more often were needed on patients with Brown syndrome who had additional horizontal deviation.

Notes

51 ***Aetiology of isolated inferior rectus palsy.***

Louise Garnham, J. Lee
(Moorfields Eye Hospital, City Road, London, UK)

Introduction: Isolated inferior rectus palsy is a well recognised but rare disorder of eye movement and is conventionally stated to be associated with Myasthenia Gravis. There is very little in the literature to support this.
Methods: We undertook a 5 year retrospective study of patients attending the orthoptic department with a diagnosis of isolated inferior rectus palsy. Records of 35 patients were available to be reviewed who attended between January 2000 and December 2004. Age, gender, referral source, diagnosis and any other associated ocular signs were analysed.
Results: The mean age at diagnosis was 55 years (range 25 to 89 years). There were 18 males and 17 females. The majority were referred to the orthoptic department from A&E with a sudden onset of diplopia. Others were referred from a variety of sources, including the cataract service. Fourteen (39 %) were suspected of having Myasthenia Gravis and in 8 of these the diagnosis was confirmed. The remaining 6 were referred to other hospitals for further tests. Three cases followed cataract extraction and a further 3 were considered to be idiopathic in origin. One patient was known to have Multiple Sclerosis and in a further case, this was the suspected aetiology. Five cases were due to TIA and in a further 4 the aetiology was suspected but not confirmed including one patient who had taken Ecstasy. Two cases were diagnosed with a brainstem lesion and a further patient had a parasellar meningioma. One case was diagnosed with atypical migraine.
Conclusion: In this group of patients Myasthenia Gravis was found to be the most significant cause of isolated inferior rectus palsy and this had not been previously reported.
Commercial Relations: none

52 ***Bivertical rectus muscle recession for comitant vertical strabismus.***

M. Gabriela Wirth Barben, O. Bergamin, K. Landau,
(Department of Ophthalmology, University Hospital of Zurich, Switzerland)

Introduction: Comitant vertical strabismus is rare. This study determines whether bivertical recession is a suitable surgical approach for patients with comitant vertical strabismus.
Methods: Eight patients with comitant vertical strabismus were included. All patients presented with stable vertical strabismus for at least six months. Vertical and horizontal eye positions were measured with simultaneous and alternate cover test at a viewing distance of 5 meters, and with the two dimensional Hess screen test. The field of single binocular vision was determined with a Goldmann perimeter. Testing took place on the day before surgery, at one of the first three postoperative days, and one year postoperatively. The Lang stereopsis chart was presented at the last visit. Our surgical approach was recession of the superior rectus muscle of the hyper tropic eye combined with an equal or nearly equal recession of the inferior rectus muscle in the hypotropic eye.
Results: All patients were orthotropic at the last visit. In primary gaze, the average angle of vertical and horizontal phoria diminished significantly after bivertical rectus muscle recession. Comitant eye alignment in left, straight ahead, and right gaze was preserved and stereopsis was reestablished. The field of single binocular vision enlarged slightly after the operation and showed further improvement at the one-year follow-up visit.
Conclusion: Bivertical rectus muscle recession is an easy and efficacious surgical approach for treating patients with comitant vertical strabismus.
Commercial Relations: none

Notes

53 ***Superior oblique tucking with vs. without inferior oblique recession for trochlear nerve palsy.***

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Introduction: Recession of the inferior oblique muscle (IOR), tucking or advancement of the superior oblique tendon (SOT), and the combination of both procedures (KOP) are popular for treatment of trochlear nerve palsy. We compared the results of SOT and KOP.
Methods: Patients with pure acquired unilateral trochlear nerve palsy without any additional motility disorder or previous extraocular muscle surgery were examined at the Harms tangent scale (2.5 m, dark red glass in front of the non-paretic eye) before and 3 months after surgery. The head-tilt phenomenon was defined as the difference between the vertical deviations at 45° right and left head-tilt. If the palsy was on the left eye, squint angles were transduced corresponding to trochlear nerve palsy on the right eye. Vertical and cyclodeviations in primary position (PP), in side gaze (25° abduction of the non-paretic eye) and in 25° down gaze were evaluated. Medians and ranges are given in the results section.
Results: There was no significant difference of preoperative deviations between the SOT and KOP group. SOT (n=11): PP +VD 5° (1;13) Ex 4° (0;12), side gaze +VD 11° (4;15) Ex 5° (0;13), down gaze +VD 11° (3;16) Ex 6° (4;15). KOP (n=21): PP +VD5° (2;14) Ex 5° (2;10), side gaze +VD 9° (3;21) Ex 6° (0;10), down gaze +VD 11° (2;21) Ex 8° (4;14). Postoperative residual deviations were as follows. SOT: PP +VD 2° (0;4) Ex 0° (-3;6), side gaze +VD 2° (-2;8) Ex 2° (-9;8), down gaze +VD 3° (1;10) Ex 1° (-4;7). KOP: PP +VD0° (-7;6) Ex 1° (-2;4), side gaze +VD 0° (-8;8) Ex 0° (-3;5), down gaze +VD 1° (-1;15) Ex 1° (-4;10). However, consecutive Brown's syndrome was significantly less after SOT than after KOP. The head-tilt phenomenon was reduced by both SOT and KOP.
Conclusion: While residual deviations after KOP were smaller in the horizontal and inferior gaze directions, SOT induced less Brown's syndrome. Both SOT and KOP require dosage which induces incyclotropia during the initial postoperative period in order to achieve satisfactory long term effect.
Commercial Relations: none

54 ***Surgery for congenital superior oblique palsy in childhood.***

Sebastian Schmidt, M. Gräf, B. Lorenz
(Dept. of Ophthalmology Universitaetsklinikum Giessen and Marburg GmbH Giessen Campus, Germany)

Introduction: Congenital superior oblique palsy is characterized by hyperdeviation of the affected eye which increases both in contralateral side gaze and ipsilateral head-tilt while contralateral head-tilt diminishes the deviation. Frequently, the first symptom is an abnormal contralateral head tilt. Surgical treatment may be sensible already in childhood, since spontaneous recovery is unlikely. In this study, results of surgery were evaluated.
Methods: Thirty-six children were included who received surgery for unilateral congenital superior oblique palsy at an age of up to 10 years. Exclusively inferior oblique recession was performed. Squint angles were measured at the Harms tangent screen, if possible, otherwise by the alternate prism and cover test, and in toddlers by corneal light reflexes. Results are given in medians (min; max).
Results: Children's age at surgery was 6 (2;10) years. There was no significant laterality (OD 20 vs. OS 16). The group contained significantly more boys (n=27) than girls ($p<0.002$). The dose of surgery was 10 (6;12) mm. The vertical deviation of 5 (0;11)° in primary position and 12 (3;20)° in contralateral side gaze was reduced to 0 (-2;8)° and 1 (-5;13)°, respectively, and from 10 (0;20)° to 2.5 (-3;15)° when the head was tilted to the ipsilateral side. The abnormal head-tilt was reduced from 10 (0;20)° to 0 (-5;10)°. There was no significant V-incomitancy, neither pre- with 2 (-5;6)° nor postoperatively with 0 (-3;7)°. There was no significant change in binocular functions. Three children received further surgery within 1-2 years.
Conclusion: Successful treatment of decompensating congenital superior oblique palsy can already be performed in childhood. Early surgery may be advantageous compared to later surgery due to better sensory-motor adaptation.
Commercial Relations: none

55 ***Unilateral Superior Rectus Contracture related to Extorsional Syndrome: Partner or Enemy?***

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Introduction: When a contracture of the superior rectus (SR) muscle develops in association with a primary excyclotorsion it constitutes a significant incyclocompensation process. We propose a study including retrospective (group 1 & 2) and prospective (groups 3 & 4) parts of 4 groups of patients demonstrating that weakening the SR is more dangerous that useful in that type of clinical situation.
Methods: Group 1 (N=4) were initially treated by simple recession of SR. Group 2 (N=5) received a torsional surgery associated with SR recession. Group 3 (N=3) were wearing simple prisms. In Group 4 (N=5), we performed only torsional surgery. All patients met the criteria of SR contracture such are: vertical incomitance in downgaze, pseudo overaction of contralateral superior oblique (SO), persistence of hypertropia of the contralateral position of the head tilt test and maximal subjective excyclotorsion <9°. Subjective torsion was assessed by Gracis torsionometer and by the linear pointer of Krats and objective torsion by fundus photograph or ophthalmoscopy.
Results: All patient of group 1 had to be operated for torsion after a period of good result of 8 months to 8 years. All patients of group 2 have presented a significant hypotropia after a mean period of 2 months, leading to 1 to 5 additional procedures to achieve a stable and good result. Patients of group 3 refused surgery and developed significant vertical amplitude of fusion. All patients of group 4 decreased their SR overaction within a few days after appropriate pure oblique surgery. In 2 cases objective preoperative incyclotorsion normalized after surgery reducing extorsion.
Conclusion: SR contracture is a consequence of the initial extorsion. This study demonstrates that weakening this muscle is not appropriate to get a long term torsional stability in that type of situation.
Commercial Relations:

56 ***Adaptation to distinct torsion in monocular patients after macular translocation.***

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Introduction: Sensory adaptation to image tilt in the sagittal axis is a physiological phenomenon and can be observed during head tilt to the shoulder. Oculomotor adaptation has found to have a minor influence compensating about 10 % of head tilt, nevertheless, images are perceived as vertically and horizontally aligned even though they do not fall on the vertical and horizontal anatomic-geometric retinal meridians. Comparable sensory adaptation to tilted images has been demonstrated in patients with superior oblique paresis when occluding the non-paretic eye.
Methods: Unilateral macular translocation with surgical rotation of the macula around the optic nerve head on to a healthier retinal pigment epithelium leads to similar torsional misalignment of the retinal meridians as in superior oblique paresis. However, the monocular retinal image tilt caused by a macular rotation of 30 to 50 degrees is much larger than occurs under any other pathophysiologic entity and leads, under binocular conditions of seeing, to severe disturbances in peripheral visual orientation. To analyze adaptation mechanisms to image tilt without superimposition of binocular problems we followed two monocular patients after macular translocation due to macular degeneration.
Results: Each subject developed a complete monocular sensory adaptation to retinal image tilt within days after macular translocation. Even though, distinct head and body tilt occurred after several weeks and patients complained of dizziness and imbalance during walking. After counterrotation of the globe head and trunk tilt reduced dramatically indicating the fast re-adaptation of the vestibular system.
Conclusion: To our knowledge this is the first report on a medical procedure demonstrating sensory and motor compensation to a large image tilt under "true" monocular conditions. Apart from this we recommend a counterrotation of the globe by muscle surgery along with any macular translocation.
Commercial Relations: none

Amblyopia, Diagnostics

P01 ***Thickness of superior, temporal, inferior and nasal macula, foveal thickness and foveal volume in patients with anisometropic amblyopia.***

B.-Y. Chun, J.-Y. Kwon
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Introduction: To compare the thickness of superior, temporal, inferior and nasal macula, foveal thickness and foveal volume of the amblyopic eye with sound eye using optical coherence tomography (OCT)
Methods: OCT was performed on 70 patients with unilateral anisometropic amblyopia. Retinal thickness measurements were done from the fovea and superior, temporal, inferior and nasal quadrants of macula. We compared data between amblyopic eye and sound eye.
Results: Mean age of the patients was 6.4 years. Average thickness of the fovea was 165.06um in amblyopic eyes and 164.11 um in sound eyes. There was no difference between the two groups($p>0.05$). Thickness of superior, inferior and temporal macula was not significantly different. However, there was a significant difference in nasal macular thickness between two groups ($p=0.035$).
Conclusion: We postulate this difference in nasal macular thickness as amblyopia process might had some effect on papillomacular bundle area.

P02 ***Refractive error of amblyopic children.***

Vesna Kostovska, G. Stankovic-Babic, K. Smiljkovic-Radovanovic, M. Vujanovic
(Clinic of ophthalmology, Clinical center Nis, Serbia)

Introduction: Refractive errors occur when the ratio of the refraction ability and the eye length is disturbed. Amblyopia is understood as dimness of vision without detectable lesions of the eye.
Methods: We analyzed refractive anomalies in 243 children treated for amblyopia in five years.
Results: Out of 243 children there are 153 without strabismus (91M: 62F; the majority of them reported for examination at the age of seven), and 90 with strabismus (43M: 47F; the majority of them reported at the age of five). In both the groups bilateral and unilateral amblyopia was registered so that the overall number of the observed amblyopic eyes was 369. In the children without strabismus we mostly found light amblyopia while in the group of children with strabismus we found, in a great number, medium serious amblyopia while the presence of serious amblyopia was also detected. As for refractive error in both the groups of amblyopic children the most frequent were hyperopic astigmatism and hyperopia. (Hyperopia 116, hyperopic astigmatism 207, myopia 5, myopic astigmatism 23, mixed astigmatism 18).
Conclusion: Because of refractive error as well as with strabismus with small angle, amblyopia are often discovered only when visual acuity is being checked; therefore, of great importance are regular systematic examinations of vision sharpness of younger children.

P03 ***Monozygotic twins with mirror image myopic anisometropia case report.***

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Introduction: Twin studies have been described as the perfect natural experiment to study the relative importance of genetic and environmental factors. The aetiology of myopia is multifactorial and both genes and environment play important roles. Monozygotic twins with mirror image myopic anisometropia are extremely rare.
Methods: We report twelve years old monozygotic twins with "mirror image" myopic anisometropia.
Results: The right eye had myopic anisometropia in one twin, while the left eye was affected in the other. The differences in refractive power between both eyes were 4 dsph and 6 dsph. Measurement of axial length by A scan were 26,22 mm / 23,29 mm in one twin and 26,67 mm / 23,61 mm in the other. Keratometry were 41,00 / 43,25 for right eye and 42,00 / 42,50 for left eye in one twin and 41,00 / 44, 50 for right eye and 41,12 / 42,25 for left eye. The best corrected visual acuity were 0,5 in one twin and 0,3 in the other.
Conclusion: The exact nature and interplay of genetic and environmental factors is not known and data suggest that environmental factors may interact with genetic factors to increase the risks of developing myopia.

P04 ***Possible role of higher-order aberrations in idiopathic amblyopia.***

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Introduction: The recognized causative factors of amblyopia are strabismus, uncorrected anisometropia, high astigmatic refractive errors, severe bilateral amblyopia, nystagmus and deprivation related to numerous factors. However there is a rare group of patients who are diagnosed as amblyopia with no known causative factors. In recent years wavefront technology provided the measurement of higher order aberrations (HOA) in the human eye that cannot be quantified previously. In an attempt to find out the possible role of HOA we report the results of wavefront analysis in two cases with idiopathic amblyopia.
Methods: Two patients at 9 and 11 years of age were diagnosed as unilateral idiopathic amblyopia. Both patients underwent a comprehensive ophthalmological examination and no known cause of amblyopia could be demonstrated.
Results: The visual acuity in amblyopic eyes were 0.5 and 0.2 and the visual acuity improved to 1.0 and 1.0 respectively following patching. The Wasca analyzer of the CRS master system (Carl Zeiss Meditec) was used for wavefront analysis. We found significant levels of coma aberration in case 1 and coma with trefoil aberration in case 2. The RMS values for coma aberration in the amblyopic eye were higher than that of the fellow eye in both of the cases. The trefoil aberration did not differ in both eyes of case 1, whereas the trefoil aberration in the amblyopic eye was lower than fellow eye in case 2.
Conclusion: Previously, asymmetrical trefoil aberrations were claimed to have a role in idiopathic amblyopia in the only reported case in literature. Our results suggested that asymmetrical coma aberrations may have some role in development of amblyopia but large controlled series are required for significance of this type of aberration as an amblyogenic factor.
Commercial Relations: none

P05 ***Risk factors in subtypes of anisometropic amblyopia.***

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Introduction: To determine the impact of amblyopiogenic risk factors in subtypes of anisometropic amblyopia
Methods: A total of 106 patients with anisometropic amblyopia without strabismus were retrospectively analyzed. The risk factors assessed for the severity of amblyopia included amount and type of anisometropia, spherical equivalent (SE) of the amblyopic eye, visual acuity (VA) difference and SE value difference between two eyes at the first visit.
Results: The mean duration of follow-up of the total study group was 31.47±27.08 months (6-120) and the mean age at the first visit was 6.8±2.86 years (2-12). Myopic anisometropia in 6.6 % of patients (n=7, Group 1), hypermetropic anisometropia in 61.3 % of patients (n=65, Group 2), hypermetropic astigmatic anisometropia in 21.7 % of patients (n=23, Group 3), and myopic astigmatic anisometropia in 10.4 % of patients (n=11, Group 4) was found. Anisometropic refractive difference was evaluated in 4 groups; 1.00-1.75 D (Group A), 2.00-2.75 D (Group B), 3.00-3.75 D (Group C), and $\geq$ 4.00 D (Group D). The highest amount of anisometropia and SE value difference between two eyes was found in Group 1 (3.4±1.9 and 5.8±3.5 D) and the lowest value was found in Group 3 (1.8±0.7 and 1.1±0.8 D). The highest SE value in amblyopic eye was found in Group 1 (-6.3±3.02; range -1.75 to -10.5 D) and the lowest SE value was found in Group 4 (-1.45±2.2; range -1.0 to -6.25). At the first visit, the worst mean VA was found in Group 2-D as 0.82±0.28 LogMAR (0.3-1.30) and the best mean VA was in Group 4-B as 0.16±0.05 LogMAR (0.1-0.2). The highest amblyopia depth was found in Group 2-D in the first and last visit (7.2±2.4 lines versus 3.3±2.3 lines) and the lowest amblyopia depth was found in Group 3-A (2.5±2.5 lines) in the first visit and Group 3-C (0.2±0.4 lines) in the last visit ($p<0.05$ in all).
Conclusion: The depth of amblyopia was greatest in hyperopic amblyopia patients with a refraction difference of $\geq$ 4.00 D. Amblyopia due to hypermetropic astigmatic anisometropia can be caused by lowest inter-ocular refraction differences.

P06 ***A comparison of photorefraction with plusoptix S 04 and retinoscopy in children.***

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Introduction: In order to assess the predictive value of photorefraction with Plus Optix S 04, we compared the results of refraction measurement obtained with Plus Optix S 04 to those of a standard refraction method (cycloplegic retinoscopy) in children.
Methods: One hundred and ninety-six eyes of 98 children were included in the study. Cycloplegic and noncycloplegic refraction values acquired via Plus Optix S 04 device were compared with those obtained via cycloplegic retinoscopy. Spherical refractive error, cylinder power and axis were recorded in both eyes for each child. All refraction measurement values were converted to minus cylinder form. Success criteria for spherical refraction and cylinder power measurements acquired via Plus Optix S 04 was a difference less than 0.50 D between values acquired via Plus Optix S 04 and cycloplegic retinoscopy. Success criteria for cylinder axis were a difference less than 10° between values acquired via Plus Optix S 04 and cycloplegic retinoscopy.
Results: The success rate of Plus Optix S 04 without cycloplegia for spherical refraction was 34.6 % (68 eyes). The device underestimated hyperopic refractive error in 100 eyes (51 %). With cycloplegia, the device overestimated hyperopic refractive error in 147 eyes (75 %) and the success rate was only15.8 % (31 eyes). Regarding cylinder power, the success rate of Plus Optix S 04 was 85.2 % (167 eyes) without cycloplegia and 88.2 % (173 eyes) with cycloplegia. Regarding cylinder axis, success rates were 66.3 % (130 eyes) and 62.2 % (122 eyes) respectively.
Conclusion: The predictive value of Plus Optix S 04 is poor in children. It is not wise to validate this device as a refraction measurement tool.

P07 ***Screening for amblyogenic refractive errors with the VisionScreener® in a paediatricians' population.***

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(Department of Ophthalmology, Ludwig-Maximilians University Munich, Germany)

Introduction: Last year we presented our results of non-cycloplegic screening for refractive errors with the VisionScreener (plusoptix, Nuernberg, Germany) in a population of children seen in our tertiary eye hospital. Because the prevalence of amblyopia (30 %) and large refractive errors was high, the sensitivity of 90 % and specificity of 80 % may be different in an unselected screening population.
Methods: 296 children age 0.5 - 7 years of age from 6 paediatric offices were included. They underwent 3 measurements with the VisionScreener S04 without cycloplegia and cycloplegic retinoscopy. Referral criteria for hyperopia and astigmatism were changed to optimize sensitivity and specificity.
Results: The second measurement was as good as the mean or the maximum of all three measurements with the Visionscreener. The first and third measurement gave less reliable results. Sensitivity and specificity were 87 % and 82 % if thresholds were set at +1,00 dpt sphere and 0,75 dpt astigmatism or 83 % and 92 % with +2,00dpt and 0,75dpt respectively. All children showed good compliance and only in 2 children (0,7 %) the VisionScreener did not give any quantitative reading. They both had amblyogenic refractive errors.
Conclusion: The VisionScreener showed good sensitivity and specificity in this paediatricians' population of 0,5 to 7 year old children. The results were very similar to our previous study in a selected population of children in a tertiary referral center.
Commercial Relations: none

Notes

P08 ***Screening for small angle strabismus with the VisionScreener®.***

Silke Kirchhoff, A.-K. Joost, O. Ehrt
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Introduction: The Vision Screener was built to screen for amblyogenic refractive errors. However it also shows the position of the corneal reflex relative to the centre of the pupil. The software detects any deviation of more than 10 degrees as "pathological" because refraction readings would be inaccurate in these circumstances. The aim of this study was to determine whether manual analysis of the corneal reflex would allow reliable detection of even smaller manifest deviations as another cause of amblyopia. Last year we presented preliminary results of 8 esotropes and found that 7 of them showed abnormal corneal reflexes.
Methods: 155 normal subjects with orthotropia (age 1 - 60 y) and 48 patients with manifest strabismus < 10° (age 3 - 61 y) had 3 measurements with the VisionScreener. The "clouds" of marks from the corneal reflex were manually analyzed: the horizontal and vertical distance of the centre of the "cloud" from the center of the pupil was measured. Prism covertest s.c. was performed at 1m.
Results: 19 of 42 patients with manifest horizontal deviation (45 %) had an asymmetry of the corneal reflex outside the normal range (+/- 2 SD). Vertical deviations were smaller and only 7 of 20 patients were outside the normal range (35 %). There was no statistical difference between the 3 measurements.
Conclusion: Sensitivity to detect small angle deviation is less than in the pilot study. A higher percentage of small deviations and exodeviations have contributed to this. If only deviations of > 3° on covertest are considered, sensitivity is 60 % for horizontal and 56 % for vertical deviations <10°. A project to automatically measure the deviation is on the way.
Commercial Relations: none

P09 ***A new method of strabismic angle measurement with a single photograph using horizontal corneal diameters.***

Young-Woo Suh, J. Rhim, S. Kim, Y.A. Cho
(Department of Ophthalmology, Korea University Anam Hospital Department of Ophthalmology, Korea University Ansan Hospital, Seoul, South Korea)

Introduction: The Corneal reflection tests such as Hirschberg and Krimsky test are valuable methods to obtain angles of strabismus, when a patient cannot maintain fixation. However, those methods have limitations for the patient with corneal opacities or pupil anomalies. The purpose of this study is to report a new method of measuring strabismic angle, using the difference between horizontal corneal diameters of deviating eye and fixating eye in primary gaze photograph.
Methods: Twenty-one exotropic patients were enrolled in the study. With a camera placed at 1 m in front of patients, pictures were taken when the patients fixated the object at 6 m, 1 m and 33 cm. The strabismic angles were also measured at each distance with alternate prism cover test. After the photographs were enlarged 8 to 10 times, the horizontal corneal diameters of fixating eye (A) and deviating eye (B) were measured. The strabismic angles were calculated by simplified equation, strabismic angle = cos-1(B/A). The calculated angles were compared to measured angle using Wilcoxon signed rank test in SPSS 10.0.
Results: The mean exotropic angles at 6 m, 1 m and 33 cm measured by alternate prism cover test were 31.5 δ, 32.8 δ and 31.3 δ, respectively. The deviating angles at each distance calculated by the new method were 31.5 δ, 32.1 δ and 31.5 δ. In 95.3 % of measurements, the differences between the two values of each method were within 10 δ, and in 73 %, within 5 δ. There is no statistically significant difference between the two methods (P=0.14).
Conclusion: A new method of measuring strabismic angle with a single photograph using the equation of horizontal corneal diameter is considered as a simple and useful tool in the patients not only with sensory strabismus, poor cooperation, but also with pupil anomaly and corneal opacities to which Hirschberg and Krimsky test can be hardly applied.

P10 ***Amblyopia therapy: Clinical practice and visual outcome.***

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Introduction: A number of reviews have challenged the effectiveness of the treatment of amblyopia. This is a pragmatic study aimed at evaluating current clinical practice, reviewing the treatment outcome of amblyopes in relation to the literature.
Methods: New patients (2004-2005) fulfilling the selection criteria: amblyopia (strabismic/anisometropic), full attendance, recorded compliance, logMAR visual acuity, and records available, were included. Diagnosis, refractive error, visual acuity, and occlusion hours were all recorded and results analysed.
Results: 29 children fulfilled all the criteria, 16 male 13 female, 9 anisometropes (ANI), 15 accommodative esotropes (ESA) and 5 non-accommodative esotropes (ESO). Occlusion ranged from 0 - 966 hours (mean 304.5). 8 children (28 %) 3 ANI, 3 ESA, 2 ESO received refractive correction only. All improved within 156 days (22 weeks), range 0.25 - 0.50 log (mean = 0.25) 25 %-100 % (mean = 79 %). 21 children received occlusion, only one child showed no improvement after 879 hours of occlusion despite compliance being recorded. Improvement was demonstrated in the other children, optimum visual improvement achieved between 400-500 (mean 457) hours of occlusion. 2 children continued to improve to 966 hours. Amblyopia of 0.2 or better in the amblyopic eye demonstrated the least amount of visual improvement, those prescribed 400 hours of occlusion only obtained improvement of 17-35 %. (0.05 log)
Conclusion: 63 % of amblyopes demonstrated improved visual outcome using proportional improvement criteria (Stewart et al., 2003). Amblyopia can improve with glasses wear alone reflecting Moseley et al 2002 and Holmes and Clarke, 2006. Of those occluded maximum VA was achieved between 400-500 (mean 457) hrs, reflecting Cleary, 2000. Occlusion outcome in amblyopes with 0.2 or better is poor therefore occlusion therapy is not recommended, reflecting Clarke et al 2003.
Commercial Relations: A Bruce is supported by a Personal Award Scheme from the NIHR, UK.

P11 ***The influence of the method of treatment cessation in amblyopia treatment.***

Leah Walsh, R. LaRoche
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Introduction: To date, much of the research regarding amblyopia has been focused on which therapeutic modality is the most efficacious in amblyopia management. Unfortunately, there is a lack of research into which method of treatment cessation is the most appropriate once therapy has been completed. The purpose of this study is to investigate if the cessation method affects the recurrence rate of amblyopia.
Methods: This study was a prospective randomized clinical trial of 20 subjects who were wearing full time occlusion (FTO), and were at the endpoint of their therapy. The subjects were randomized into one of two groups: abrupt cessation or therapy tapering. All subjects were followed for 3 consecutive 4-week intervals, for a total of 12 weeks, to assess the short-term recurrence rate of amblyopia. Additional assessments at the 26 and 52 week post therapy cessation were also conducted to determine the longer term amblyopia regression rate. For the purposes of this study, recurrence was defined as a 0.2 or more logarithm of the minimum angle of resolution (logMAR) (10 letters) loss of visual acuity.
Results: A recurrence of amblyopia occurred in 24 % of the subjects by the 52 week study endpoint. This occurred with the same frequency with each method of cessation.
Conclusion: The cessation method chosen does not seem to affect the rate of amblyopia recurrence after completed full time occlusion therapy.
Commercial Relations: none

P12 ***Sweep-VEP, a method to assess vision in children.***

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Introduction: Sweep-VEP is a simple, objective, painless and safe method to assess vision in children, unable to cooperate in other acuity tests, and has been successfully used in research settings. The aim of the study was to find out if sweep-VEP could be a reliable method to assess vision in a clinical setting in young children.
Methods: Electrodes are put on the scalp and the subject then has to fixate a grating pattern on a monitor during 10 seconds. The spatial frequency of the grating changes in a sweep from 32-2 cycles per degree. The pattern is presented as on-off or as pattern reversal, with such a high frequency that a "steady state" response is obtained. The amplitude is plotted and the visual acuity is obtained in cycles per degree. Material. 50 normal subjects age 6 months-50 years have been tested. Five patients have been tested twice to assess the test-retest reliability.
Results: In the adults and older children reliable distinct answers were obtained. A good test-retest reliability was obtained in the 5 adults who were tested twice. In the younger children the results were more variable.
Conclusion: Sweep-VEP could be a valuable test in the future to assess vision in young children.

P13 ***Functional and electrophysiological correlation in disbinocular amblyopia.***

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Introduction: Amblyopia is a developmental disorder of the central visual pathways (L. Kiorpes, J.A. Movshon 2003). Abnormal visual development in strabismic amblyopia significantly affects visual perception and properties of neurons in primary visual cortex (V1). But results of visual evoked potentials (VEP) in patients with amblyopia are usually normal. The pronounced light sensitivity reduction, its nasal-temporal asymmetry in the visual field periphery in strabismus of early onset was found (V. Herzau, 1998). There are no changes in ERG and almost no changes in Mf ERG in amblyopic patients. To find any correlation between light sensitivity of temporal and nasal retinal segments, Mf ERG and VEP in children with disbinocular amblyopia (DA) and to elucidate privilege level of visual impairment in this kind of amblyopia the study was conducted.
Methods: 35children with DA 5-8 years old with visual acuity of 0, 04 - 0,1 with eccentric fixation, without ocular fundus disturbances and 15 normal children were examined. Light sensitivity thresholds were measured with the help of Automatic Perimeter. Mf ERG and VEP were performed using Retiscan Roland System (Germany). Using ISCEV guides for VEP, Mf ERG – N1, P1, N2, P2 were evaluated.
Results: The significant P1 amplitude decrease and latency increase was found in VEP of DA children in comparison with normal group. Changes in Mf ERG correlated significantly (especially in second (2,3-8 centigrade) and 5th (24-32 circles, centigrade) in those children who had lower nasal periphery light sensitivity at 25-30 degrees eccentricity and lower temporal periphery light sensitivity at above 30 degrees eccentricity. In normal children peripheral light sensitivity did not correlate with Mf ERG amplitudes or latencies.
Conclusion: It is suggested that developmental impairments in children with high amblyopia are not only in primary cortex but in retina as well.

Notes

P14 ***Correlation between VA measurements with LEA symbols and ETDRS for 3-7 year old normal children.***

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Introduction: This study compares Visual Acuity (VA) measurements obtained by the preliterate LogMAR LEA symbols VA chart, known for some validity limitations, to those obtained by the standardized Early Treatments for Diabetic Retinopathy Study VA chart.
Methods: 40 healthy and visually normal children age 40 to 83 months were recruited in a cross-sectional prospective study. Participants required being able to recognize the 10 Sloan letters. Under a standardized and controlled clinical setting, VA was measured monocularly and randomly using both the LEA and the ETDRS charts.
Results: VA scores of the two charts were highly correlated with a clinically insignificant over-estimation of 0.04 LogMAR in the LEA chart scores regardless of the subjects' age or gender. The two charts were in total agreements in the detection of subjects' inter-ocular difference. Data were analyzed following the Bland and Altman guidelines for assessment of agreements between two methods of clinical measurements
Conclusion: This study indicates that the preliterate LEA chart can provide a valid alternative to the ETDRS chart among normal preschooler.

P15 ***Clinical predictive factors for stereoacuity in children older than 7 years with refractive accommodative esotropia.***

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Introduction: To evaluate factors related to stereoacuity in children over age 7 when normal visual acuity was achieved and in whom school life was begun with refractive accommodative esotropia
Methods: We retrospectively reviewed the records of 42 children over age 7 years with refractive accommodative esotropia. All clinical data were reviewed, including sex, time of onset, initiation time of spectacles correction, presence of anisometropia, amount of deviation with or without spectacle correction, history of occlusion treatment, fusion and stereoacuity.
Results: The mean age at the time of esotropia diagnosis was 3.43±1.82 years, and the mean age of initiation time of spectacle correction was 3.35±1.71 years, the mean refractive error was 4.69±1.69 diopters. The amount of esodeviation with or without spectacle was 26.55±11.19 prism diopters (PD) and 1.33±0.56 PD, respectively. Stereoacuity was measured by Titmus Stereo Test at 20-70 second of arc in 5 patients, 100-140 second of arc in 7 patients, 200-400 second of arc in 12 patients, 3000 second of arc in 7 patients, and non in 11 patients. The corrected visual acuities were 0.94±0.17 for right and 0.92±0.13 for the left eye. Fusion measured by distant Worth four-dot test was present more often in the patient with orthophoria (77.8 %) than in the patient with microtropia (22.2 %) (p=0.481). At presentation, the presence of fusion was the only significant factor related to stereoacuity (p=0.026)
Conclusion: The presence of fusion appears to be the only statistically significant factor related to stereoacuity in patient over age 7 years with refractive accommodative esotropia.

Notes

P16 ***Stereopsis according to the type of intermittent exotropia in patients showing orthophoria after strabismus surgery.***

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Introduction: To evaluate preoperative and postoperative stereopsis according to the type of intermittent exotropia among patients showing orthophoria after strabismus surgery.
Methods: 24 patients showing orthophoria over 6 months after surgery for intermittent exotropia were divided into three groups: group 1, basic type (26 patients); group 2, convergence insufficiency type (13 patients); group 3, pseudodivergence excess type (14 patients); group 4, divergence excess type (10 patient). Titmus test and Randot test were performed to investigate near stereopsis before and after strabismus surgery.
Results: In Titmus test, preoperative and postoperative near stereopsis were 128, 99 seconds of arc in group 1; 1153, 320 seconds of arc in group 2; 105, 75 seconds of arc in group 3; 200, 200 seconds of arc in group 4, respectively. In Randot test, preoperative and postoperative near stereopsis were 85, 76 seconds of arc in group 1; 263, 87 seconds of arc in group 2; 60, 50 seconds of arc in group 3; 140, 100 seconds of arc in group 4, respectively. Group 2 showed a significant improvement in near stereopsis by Titmus and Randot test after surgery. Group 2 showed significantly poor near stereopsis before surgery when compared with the other types.
Conclusion: Patients with convergence insufficiency type among the patients with intermittent exotropia showing orthophoria after surgery achieved significant improvement in postoperative near stereopsis. A poorer near stereopsis was observed in the patients with convergence insufficiency type.

P17 ***Objective and subjective measures of fixation disparity in relation to heterophoria.***

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Introduction: The relation between heterophoria and fixation disparity has been described in the classical work of Ogle who used dichoptic nonius lines for measuring vergence. This subjective test procedure, however, may not indicate the full fixation disparity, as suggested by studies including objective measurements with eye-trackers. Therefore we compared objective measures of both fixation disparity and heterophoria. Further, we measured subjective fixation disparity with nonius lines.
Methods: In 25 subjects, we measured fixation disparity with a central fusion stimulus at a 60 cm viewing distance without forced vergence. We used a mirror haploscope for dichoptic presentation of nonius lines and for monocular calibration of the Eye-LinkII eye-tracker. The vergence state during the monocular calibration phases represented the objective heterophoria. We included two conditions: subjects either performed saccades between targets that they shortly fixated for about 1.5 seconds, or they steadily fixated the target for 120 seconds.
Results: For both short and steady fixations, we found a similar relation between objective fixation disparity (OFD in min arc) and heterophoria (OHP in degree) as described by the regression equation OFD = 16 + 10 OHP, with a correlation of r=0.74 ($p< 0.001$). While subjective fixation disparity showed typical values with a group mean ± SD = 0.5 ± 4 min arc, objective fixation disparity had a much wider distribution, i.e. mean ± SD = -2 ± 24 min arc. Objective and subjective fixation disparity were only moderately correlated (up to r=0.60).
Conclusion: Our objective recordings showed the expected correlation between fixation disparity and heterophoria, but subjects with a zero heterophoria do not necessarily have a zero fixation disparity in near vision. The substantial discrepancy between objective and subjective fixation disparity is interpreted as a sensory shift in retinal correspondence, as previously demonstrated under forced vergence.

Notes

P18 ***Accommodation (and ocular asymmetries) mediate the difference between objective and subjective measures of the convergence.***

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Introduction: Dichoptic nonius lines are often used for subjectively (psychophysically) measuring vergence states; these nonius tests have been questioned as valid vergence indicators since they overestimate vergence relative to objective eye-tracker measurements. We tried to reduce the overestimation by considering accommodation and possible individual asymmetries in binocularity.
Methods: In a mirror-stereoscope, we estimated convergence with nonius lines flashed at 1000 ms after a disparity step-stimulus; for comparison, we made objective recordings (Eyelink II; N=6). We presented a vertical bar or a DOG-pattern (difference-of-Gaussians) for 2 step responses: 60 and 180 minarc.; in forced-vergence viewing conditions, DOG-pattern are supposed to disentangle accommodation and vergence. In 2 separate runs, we 1. measured the change of accommodation (Handy-Ref; N=6) and 2. checked subjects' asymmetry in binocularity for intermediate step-responses (90 minarc; N=14).
Results: For 180 minarc vergence steps, the subjective measures revealed a larger final vergence response than the objective measures; for the vertical line this overestimation was 20 minarc, while it was significantly smaller (12 minarc) for the DOG-pattern. For 60 minarc step-responses no overestimation was observed. Accommodation changes were larger for the DOG-pattern relative to the line-stimulus; this relative increase in accommodation correlated with the decrease of subjective-objective difference in vergence (r= -0.80). Additionally, the asymmetry in binocularity correlated moderately with the subjective-objective difference in vergence (r=0.66).
Conclusion: Both, no overestimation for small steps and a weaker one for the DOG-pattern, reflect lesser conflicting demands on the coupling of accommodation and vergence under forced-vergence; consequently, sensory compensation is reduced and subjective and objective measures are more similar. Additionally, the bigger the asymmetry in binocularity, the more likely is a sensory compensation. Even though the nonius method is questioned, there might be test conditions (special DOG-patterns) which allow for correct vergence estimates; further, checking subjects' asymmetry in binocularity might help estimating the likelihood of sensory compensation, which undercuts psychophysical testing.
Commercial Relations: Even though the nonius method is questioned, there might be test conditions (special DOG-patterns) which allow for correct vergence estimates; further, checking subjects' asymmetry in binocularity might help estimating the likelihood of sensory compensation.

P19 ***Convergence accommodation does regress with vergence adaptation.***

Alison Y. Firth
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Introduction: Convergence of the eyes produces convergence accommodation which is inhibited in closed loop conditions by blur. The extent of the inhibition is limited and blur may be noticed with higher levels of convergence. In open loop conditions, the level of convergence accommodation may be measured. The aim of this study is to investigate the effect of vergence adaptation on convergence accommodation.
Methods: Participants with normal binocular single vision were recruited. Objective refraction measurements were taken using the Shin-Nippon SRW-5000 autorefractor in open loop conditions using a pseudo-Gaussian target, prior to, immediately on introduction of a 10PD base-out prism and after a 10 minute adaptation period. Vergence adaptation took place under normal room lighting conditions, and a modified Maddox rod test was used to determine the level of adaptation. At a separate visit, the response AC/A ratio was measured.
Results: Eight participants took part, one was excluded due to a decrease in level of accommodation on introduction of prism. The mean age of the remaining seven was 20.02 (SD 1.44) years. At the end of the adaptation period the level of induced convergence accommodation, mean 0.55 (SD0.51) D, had dropped by a mean of 0.48 (SD 0.56) D and was not significantly different to the baseline measurement prior to the introduction of the prism (p=0.456). However, one participant did not show any reduction in level of accommodation during the adaptation period; another showed minimal adaptation to the induced deviation. The mean CA/C ratio was 0.055 (SD0.05):1 and there was no correlation between the CA/C ratio and response AC/A ratio (p=0.786).
Conclusion: Despite some varying responses, the level of convergence accommodation did seem to abate during the adaptation to the 10PD prism. Despite previous suggestions in the literature that there is an inverse relationship between AC/A and CA/C ratios, this was not supported.
Commercial Relations: none

P20 ***Gradient versus heterophoria measurement of AC/A ratio: does a difference occur i n strabismic cases?***

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Introduction: The aim of this study has been to evaluate the AC/A ratio as measured by gradient and heterophoria methods in a cohort of patients with intermittent distance exotropia.
Methods: 24 patients were followed prospectively whilst being treated for their intermittent exo deviation using minus lenses. AC/A ratio was assessed by the gradient method using +3.00DS lenses at near fixation. The AC/A ratio was also measured with the heterophoria method taking into consideration the angle of deviation measurements at near and distance fixation plus the interpupillary distance.
Results: There were 17 females and 7 males with mean age at assessment of AC/A ratio of 5 years (range:1 to 9, SD 2.1). Median heterophoria ratio was 6.2 (range: 1 to 13.4). Median gradient ratio was 6 (range: 2 to 12). There was no statistical significance between the two measurement options, p=0.294 (Pearson correlation).
Conclusion: The gradient method is reportedly the more accurate measurement for AC/A ratio. However compliance is not always possible due to age and patient co-operation. The AC/A ratio measured by heterophoria method is traditionally thought to provide higher values than that measured by gradient method. This was not found in this study with no significance found between the median and ranges for each measurement method. The heterophoria method is easily determined compared to the gradient method and should be considered a useful measure in these circumstances and where used repeatedly over follow-up, can indicate change in ratio status.
Commercial Relations: none

P21 ***Field of single binocular vision, using the Matta map (modification of the Lancaster test) in Lancaster, Pennsylvania, USA.***

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Introduction: To determine the efficiency of mapping out the field of single binocular vision in patients with incomitant strabismus using a modification of the Lancaster Test (Matta Map).
Methods: The Matta Map is a simple variant of the Lancaster Screen in which a patient does not use the red-green fusion-dissociating spectacles while tracking a projected target and reporting if it is single or doubled in the nine cardinal positions of gaze. With this tool, we are able to map out the field of single binocular vision. Multiple patients with various types of incomitant strabismus were evaluated. Some patients with stable incomitant strabismus underwent multiple evaluations over time to assess reproducibility of results.
Results: The Matta Map appears to be very useful in measuring the field of single binocular vision. The results are reproducible and consistent with the patient's incomitant strabismus and symptoms.
Conclusion: The Matta Map is a rapid, quick, inexpensive and reliable method for measuring a patient's field of single binocular vision and to follow a patient's symptoms and their progress over time.

Notes

P22 ***Lee screen test versus the ocular motility analyser (OMA): comparison of technical features and testing methods***.

Ahmed Assaf
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Introduction: The Ocular Motility Analyser (OMA) has been in use buy several Hospitals in the UK for several years. This will be compared with the Lee Screen test, the established traditional method for plotting ocular movements the UK.
Methods: Experience of various units and adaptations of the OMA will be discussed
Results: 1. Screen size and testing distance * The screen size in the Hess test is important, it directly affects the testing distance. In the Lee screen test the large screen size (approximately 78 cm) allows a testing distance of approximately 50 cm. It tests 37 degrees of the of the ocular motility field which is fixed. *In the OMA the currently used vertical screen dimension is 52 cm (42 screen). The testing distance will depend on the degrees tested away from the primary position. For example, if testing 45 degrees of the motility field, the testing distance is approximately 26 cm; while at 37 degrees, the testing distance is around 35 cm. 2. Method of dissociation: * Free space for the Lee Screen * R/G goggles for the OMA - fitting of goggles is important 3. Mobility: * The Lee Screen is fixed while OMA is mobile * The OMA uses a motorised adjustable height table with a chin rest 4. Flexibility * Lee is a rigid un-flexible test * OMA uses computer technology therefore it is flexible . It is possible to implement variations in the Hess test by changing the software. Several ocular motility tests (torsion, field of BSB and UFF) are already implemented using the same hardware 5. Ease of Use * Lee test uses a pointing hand held stick * OMA uses a mouse/track ball to move the ball * OMA allows wheel chair access 6. Reproducibility and Comparability The Lee Screen and the OMA tests are reproducible. However both are not directly comparable since they use different testing distance and different method of dissociation.
Conclusion: In the computerized age, the OMA is the natural progression from the Lee screen test. Additionally, the OMA reflects the deviation measurements more accurately than the Lee's when compared to that of the cover test measurements carried out at 1/3 meter.
Commercial Relations: As the OMA creator, I have financial interest in this device.

P23 ***An improved visualization of oculodynamic eye movement recordings: Comparison of two patients with horizontal motility impairment.***

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Introduction: As part of routine MRI examinations, oculodynamic MRI (od-MRI) movies offer a new fast (<30s) means to visualize eye movements in living patients. The objective of this pilot study is to apply improved visualization techniques to analyze causes of impaired horizontal eye movement.
Methods: In a high myope, a patient with palsy and paralysis of the VI nerve and a control a 1.5T od-MRI was obtained with a TrueFISP sequence (180ms/image, 1.3x1.3 mm spatial resolution). Horizontal eye movements were assessed using a sagittal slice with a thickness of 5 mm. The information was computed and visualized, using special image processing procedures in combination with direct volume rendering.
Results: The improved visualization technique increased the borders of tissue contrast and thus facilitated identification of sclera, periost and muscle structures. In particular, an orbital layer could be distinguished from a global layer in the both rectus muscles. Also, changes consistent with passive velocity induced movement of the vitreous were seen. Od-MRI movies correlated well with the clinical findings. In the myope patient (-20dpt) abduction stopped at midline, where the posterior pole of the eye was constrained by orbital tissue, i.e. the medial rectus muscle and the periost. This correlated well with her esotropia of + 20° and her clinical examination of ocular motility which was impaired in all directions of gaze, in particular: abduction was only possible to midline. A 48 y old man had suffered a head trauma. When he first presented to our clinic, neither eye could abduct past midline. The od-MRI showed no active lateral rectus muscle contraction on the right side and only very little contraction of the left lateral rectus muscle. The MRI also showed a unilateral avulsion of the right VI nerve intracranialy. Consistent with this finding, there was some clinical recovery of the left lateral rectus function with an abduction 3.5 mm past midline.
Conclusion: Od-MRI imaging with improved visualization offers a potential clinical application to help differentiate between different causes of motility impairment.
Commercial Relations: none

P24 ***A step backwards can be a step forward: a new view of the slitlamp.***

Marcus-Matthias Gellrich
(Practice of ophthalmology, Kellinghusen, Germany)

Introduction: The idea of photography of strabological patients is very old. Taking photographs with a digital photo camera in our hands, however, causes irritation, especially in children, and therefore often gives poor results. We suggest a new method to photograph strabological patients with only minimal change of the familiar setting of examination.
Methods: By placing minus lenses (and thus correcting for the "myopic situation" of the slitlamp) in front of the objective of a video-slitlamp it is possible - at a larger distance to the patient - to take pictures of a whole face or parts of it in reasonable quality. Applying this method also other picture material (e.g. old photographs) may be "scanned" with the slitlamp. It is also shown how 9 gaze composites can be extracted quickly from a short video sequence.
Results: Within two years 2.923 out of 10.122 patients (28.9 %) in a rural ophthalmological practice had received photodocumentation with the slit lamp. Altogether 13.980 JPG-images were taken: 21.3 % showed full face photographs, 26.8 % classical anterior segment and 51.9 % fundus pictures. Approximately 2/3 of the patients with a newly diagnosed squint had received slitlamp-photography. In strabological patients correctional prisms, refractive errors, influence of accommodation and fixation sometimes were visualized and included in the photographic arrangement to get as much information from a stored image as possible.
Conclusion: With digital imaging technique and slight technical modifications a video-slitlamp may be used for effective documentation of nearly all strabological findings. It is particularly helpful for daily work in a general ophthalmological practice with rapidly changing diseases of the eyes.
Commercial Relations: none

P25 ***The "Menke-Saddle" improves conditions in children´s ophthalmological examination.***

Tim B. Menke, B. Neppert
(Department of Ophthalmology, Medical University of Lübeck, Lübeck, Germany)

Introduction: Ophthalmological examinations of small children (ages 2-6) often bear the problem of how to place the child on the examination chair. Most children are too small or afraid to be seated by themselves. Placing the child on a parent's lap either squeezes the child's legs under the slitlamp table or does not allow the child's head to be brought high enough to be sufficiently placed on the chinrest or against the headrest. Accurate examination is compromised by these facts.
Methods: We have designed a newly shaped seat called the "Menke-Saddle" that can be put on top of the adult's examination chair. Infants are seated astraddle onto it and are thereby seated higher, legs do not get squeezed and the parent can stand next to the examination chair and assist with whatever is needed.
The surface of the saddle is covered with synthetic leather to allow regular cleaning with water and common disinfectants.
Results: Having gained experience from more than 100 children on top of the "Menke-Saddle", we find our young patients get enthusiastic when they simulate sitting on a motorbike or horseback.
Conclusion: The stable sitting position improves the child's compliance with the examination and reduces stress for everybody involved.
The benefits of the new device will be shown in a short video clip. -> Rapid fire poster
Commercial Relations: yes

Notes

P26 ***Practic education at the university of applied science, institute for allied health care professions: orthoptic department.***

Esma Aygun, J.C. van Petegem-Hellemans
(University of Applied Sciences Institute for Allied Health Care Professions, Orthoptic Department, Utrecht, The Netherlands)

Introduction: The skillslab method was developed within the University, to come to handle professional competences so that patients won't be treated unnecessary as study objects. This way those skills can be integrated. Skills lab is a method based on three pillars 1) to learn independent from the lecturer 2) the student's own responsibility 3) to obtain education in small groups
Methods: The skillslab goes through tree phases: 1. the orientation phase (cognitive component) 2. the practise phase (psychomotor component) 3. the master (control) phase (psychosocial component) To make the mutual context (links) clearer, all the skills are worked out (developed) by themes in the skillslab method. In the progressive structure an activity is described step by step and is shown to and practiced by the student. Theory lessons become more relevant by this. This method's starting point concludes that an orthoptic skill consists of four components: 1. cognitive component - foreknowledge - material knowledge - procedure knowledge - operation knowledge 2. Motorial component - verbalisation - stabilisation - generalisation - evaluation 3. Social-physiological component - integration 4. Competence component
Results: Students start their education directly with preparing in their future part and to arrive well in practise - Students who use the skillslab method develop a perceptible practical advantage - Students become more independent en self-conscious - Lecturer obtain the part of stimulator and process accompanist - The pressure being put on practise institutions decreases and the quality of the courses improves considerably - Patients no longer serve as practise objects
Conclusion: To let the skillslab method reach its right it is essential to pass through the right phases in above manner.

P27 ***Orthoptic handbook practical skills.***

Mari Gutter, J.C. van Petegem-Hellemans, I.J. van Wijnen-Segeren, H.M. Jellema
(University of Applied Sciences Institute for Allied Health Care Professions, Orthoptic Department, Utrecht, The Netherlands)

Introduction: We introduce a new orthoptic handbook. In this new orthoptic handbook the orthoptic tests involved with orthoptic investigation are discribed.
Methods: The orthoptic tests are described in detail with regards to:
purpose, application, principle, equipment, realization, interpretation, remarks
Results: With this orthoptic guide students can learn orthoptic tests using "skillslab method" in an independent way. This guide is especially suitable for self teaching because all test are described in detail. Each action which has to be performed is described step by step. So all the tests can be learned by experience.
Conclusion: This book is a good practical guide for orthoptic students, ophthalmic trainees and others who are interested in orthoptics. They can use this handbook as a guide through all orthoptic tests. And make themselves familiar with all those tests.

Notes

P28 ***The difference between parental chief complaints and clinical diagnosis of pediatric strabismus.***

Kyung-Eun Han, K. H. Lim
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Introduction: Parents' observation is often different from the clinical diagnosis in pediatric strabismus. Some parents even cannot detect any abnormality of their children's ocular alignment. The present study was undertaken to compare parental chief complaints with clinical diagnosis of pediatric strabismus.
Methods: Medical records of children younger than 15 years of age who visited for strabismus evaluation at the ophthalmologic department of Ewha Womans University Hospital from January 2002 to May 2007 were reviewed. The questionnaires for parents' observation were obtained. We analyzed the subjective parental complaints (direction of deviation, frequency of deviation, deviated eye, onset age) and the objective results of ocular motility assessment (type of strabismus, angle of deviation, fixation pattern). Concordance rate was calculated in patients who complained about horizontal deviation of the eye. Patients who had already undergone any strabismus surgery were excluded.
Results: Two hundred and ninety five children were included in this study. Mean age was 3.99 ± 2.88 years. Strabismus was diagnosed in 230 children (78 %) and 65 (22 %) were normal. 113 of 295 patients complained about inward deviation of the eye; but 46 (40.7 %) were normal and only 34 (30 %) had esotropia. 127 of 295 patients who complained about outward deviation of the eye; 120 (94.5 %) had exotropia, 4 (3.1 %) had esotropia and 3 (2.4 %) were normal. The concordance rate between parental chief complaints and the type of strabismus was 65.7 %. The concordance rate was lower in male patients, patients who complained about inward deviation of the eye, developed symptom younger than 1-year-old, visited clinic younger than 1-year-old, had under 30 prism diopter angle of deviation and complained about frequent deviation.
Conclusion: The objective clinical diagnosis and subjective parental chief complaint could be different from each other in pediatric strabismus. Therefore, precise diagnosis by ophthalmologist would be necessary to evaluate and manage pediatric strabismus.
Commercial Relations: none

Notes

Esotropia

P29 ***Frequency of refractive error in children with esotropia in the five year period.***
Milena Vujanovic, V. Kostovska, G. Stankovic-Babic, K. Smiljkovic-Radovanovic
(Clinic of ophthalmology, Clinical Center Nis)

Introduction: Concomitant esodeviations is most frequent in children. Also concomitant esodeviation is associated with refractive error.
Methods: In a prospective study we examined frequency of refractive error in children with esotropia in five year period.
Results: In five year period 215 infants we examined with esotropia. The ages of patients at the time of examination were 1-18 years and the youngest patient had 8 months. Most frequent refractive error was hyperopic astigmatism (55,81 %) and hyperopia (36,28 %); myopia, myopic astigmatism and mixed astigmatism we found in 7,91 %.
Conclusion: Early examination and correction refractive error was necessary in children with esotropia.

P30 ***Analysis, in terms of millimeters, of different surgical approaches in infantile esotropia.***
Adriano Magli, R. Carelli, A. Iovine, F. Fimiani
(Department of Ophthalmology, University Federico II, Naples, Italy)

Introduction: Analysis of surgical amplitude in different approaches and possible alteration of surgical numbers in case of simultaneous horizontal and inferior oblique surgery.
Methods: This retrospective study evaluated 863 patients affected by infantile esotropia, with a stable angle > 30 PD who underwent surgery before 7 years of age. Millimeters of recession/resection/anteriorization in different approaches were evaluated: type 1 (bilateral MR recession), type 2 (bilateral MR recession + monolateral LR resection), type 3 (bilateral MR recession + bilateral LR resection), type 4 (type 3 + conjunctival recession), type 5 (bilateral MR recession + recession/anteriorization IO), type 6 (type 3+ recession/anteriorization IO), type 7 (type 6 + conjunctival recession),
Results: In type 1, the mean recession of MR was 5,55 (RE) and 5,67 (LE); 4,32 (RE) and 4,38 (LE) in type 2, associated to a LR monolateral resection of 8,09 in patient treated at RE, while 7,76 in those treated at LE. In type 3 the mean recession of MR was 3,99 (RE and LE), while the resection on LR was 6,79 (RE) and 6,82 (LE). The analysis of type 5 showed that in simultaneous horizontal and oblique surgery, the surgical numbers of MR (5,42 RE and 5,41 LE) were increased compared to type 3 (3,99 RE and 3,98 LE), in which the surgical technique didn't include an approach on oblique muscles.
Conclusion: Surgery on multiple muscles offers a reduction of incomitances in extreme gaze positions and a greater surgical choice in case of reoperation. The millimeters analysis might confirm the hypothesis that it is necessary to increase the horizontal numbers (in case of simultaneous approach on oblique muscles) in order to obtain a satisfying result.

Notes

P31 ***Evaluation of the sensory status in patients affected by infantile esotropia, who underwent surgery before and after 2 years of age.***

Adriano Magli, R. Carelli, A. Iovine, F. Fimiani
(Department of Ophthalmology, University Federico II, Naples, Italy)

Introduction: This retrospective study from the University of Naples, evaluates the sensory status before and after surgery in patients affected by Infantile Esotropia in function of the age at the operation.
Methods: Inclusion criteria were: diagnosis of infantile esotropia discovered before 1 year, a stable angle $\geq$ 30 PD, absence of ocular and/or neurological impairment, hypermetropia < 3 Diopters, surgery before age 7. The sensory status was evaluated in 92 patients before surgery. 239 patients were evaluated after surgery, and thus divided in 2 groups depending on the different age at surgery: < 2 years (82 patients) or > 2 years (157 patients). A z-test was used to evaluate the possible differences between the two study groups concerning 6 categories of sensory dysfunction: monolateral exclusion, alternating exclusion, central suppression with stereopsis, BSV without stereopsis, BSV with low-degree stereopsis and BSV with medium-degree stereopsis. P-values < 0,01 were considered statistically significant.
Results: We compared sensory parameters after surgery in the two study groups (exclusion, central suppression and BSV with the different stereopsis degrees). No statistically significant difference was observed in terms of alternating exclusion (p=0,47), central suppression with low-grade stereopsis (p=0,08), BSV without stereopsis (p=0,79), BSV with low-grade stereopsis (p=0,26) and BSV with intermediate stereopsis (p=0,29). The only difference was in the frequency of monolateral exclusion (p=0,003).
Conclusion: The present analysis suggests no significant difference in terms of sensory function in patients who underwent surgery before and after 2 years of age.

P32 ***Clinical evaluation of infantile esotropia patients maintaining orthophoria for a long term more than 5 years after surgery.***

Yoonae A. Cho, S. Kwon, J. Rhim, Y.-W. Suh
(Department of Ophthalmology, Korea University Anam Hospital, Seoul, South Korea)

Introduction: The purpose of this study is to investigate the clinical characteristics in the patients maintaining orthophoria for long term after surgical correction of infantile esotropia (ET).
Methods: This study included 48 patients who underwent surgical correction of infantile esotropia and maintained orthophoria within ± 8 prism diopters (PD) for more than 5 years after surgery. Their medical records were reviewed retrospectively. During pre- and post-operative period, part-time patching for 1-3 hours was forced to be performed. Glasses were prescribed when needed. We analyzed ET angle, refractive errors, stereopsis, and presence of dissociated vertical deviation (DVD) or interior oblique overaction (IOOA).
Results: At initial visit, mean ET angle was 47.0 ± 18.37 PD. Refractive errors were +1.64 ± 1.14 diopters. The mean age at surgery was 30.8 ± 19.77 months. Follow-up period was 10.2 ± 4.00 years on the average. Thirty-three patients remained orthophoric with one surgery and 15 patients obtained orthophoria after second surgery. DVD or IOOA was shown in 15 patients preoperatively and in another 4 patients postoperatively. At last visit, 1 patient had manifest DVD and no patient was amblyopic. Among 41 patients, who were tested for stereopsis, 90.2% of the patients showed stereopsis more than 3000 seconds of arc (sec), and 34.1% of the patients better than 200 sec. The mean age at surgery in the patients with stereopsis better than 200 sec was 28.9 ± 18.67 months.
Conclusion: The meticulous part-time patching before and after surgery may be helpful to maintain orthophoria for a long term in infantile ET. Favourable stereopsis was obtained although the mean age at surgery was more than 2 years.

P33 ***Childhood esotropia: outcomes of management in a Greek referral centre.***

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(1st Department of Ophthalmology, Aristotle University of Thessaloniki, Greece)

Introduction: To assess the visual and cosmetic outcome of children with esotropia treated orthoptically and surgically at our unit.
Methods: A retrospective case note review of all new esotropes attending our strabismus service from January 2001 until February 2008. Patients were excluded if there was incomplete follow-up.
Results: 72 out of 111 patients were eligible with a median follow-up period of four years. 44 (61 %) had accommodative esotropia (13 fully accommodative and 31 partial or decompensated accommodative esotropia) and 28 (39 %) had non-accommodative esotropia (25 congenital/ infantile esotropia, 1 microtropia, 2 sensory deprivation esotropia). Regarding the 13 patients suffering from fully accommodative esotropia due to hyperopia, 3 (23 %) were treated with occlusion therapy and 1 (7.6 %) with penalization due to amblyopia with a mean VA improvement from 3/10 to 5/10 in the amblyopic eye. Regarding the 31 patients with partial or decompensated accommodative esotropia, 12 (38.7 %) underwent occlusion therapy due to amblyopia with a mean VA improvement from 0.4LogMAR to 0.1LogMAR. There was overaction of the superior or inferior oblique muscles in 10 patients (32.2 %). 5 patients (16.1 %) underwent surgical treatment. The median age at surgery was 8.5 years. The mean angle of deviation was reduced from 28D pre-operatively to 17.5D post-operatively. Regarding the 25 patients with congenital/infantile esotropia, 9 (36 %) underwent occlusion therapy with a mean VA improvement from 0.4LogMAR to 0.1LogMAR. 11 patients (44 %) had oblique muscles overaction. 16 patients (64 %) underwent surgical treatment. The median age at surgery was 5.3 years. The mean angle of deviation was 46.13D pre-operatively and 12D at final review. 1 patient (4 %) developed consecutive exotropia and 3 (12 %) dissociated vertical deviation.
Conclusion: The study provides important documentation of orthoptic and surgical outcomes for childhood esotropia at our unit. It appears that surgical management of both congenital and accommodative esotropia takes place later than it should according to international standards. This is due to late presentations and parents being hesitant to surgical intervention. Despite this the results are visually and cosmetically satisfactory.

P34 ***Effectiveness of surgical management for small angles alternating nonaccommodative esotropia.***

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Introduction: The results of surgical management in 75 esotropes with small angles deviation of (18-30 PD) evaluated. The 3-18-years-old patients had surgery for comitant alternating squint. The same refraction and visual acuity at distance and near of both eyes were inclusion criteria. Patients were divided by into two groups.
Methods: The first group was formed 30 patient with prevalence of deviated eye, which determined by Worth's test and parent's assertion. 29 patient of this group were operated on by a recess-resect procedure on more often deviated eye. One patient received recession on single medial rectus on more often deviated eye. 45 esotropes without prevalence of the eye were included in the second group. The conditions of the extraocular rectus muscles in these patients were investigated by own elaborated thermometric diagnostic method (Pat. ?30075 A Ukr. 17.12.1997). We determined the eye with hyperthermia (hyperfunction) of medial rectus (MR) or hypothermia (hypofunction) of lateral rectus (LR), using this method for the same muscles of both eyes. Recession of MR with hyperthermia or resection of LR with hypothermia was performed in the dose of 3-6 mm in accordance with value of angle esodeviation, convergence and anatomic condition of the muscles.
Results: All patients were observed 3-12 month after surgery. In the first group orthotropia have achieved in (80,0±7,3) % of cases, in the second (92,3±4,0) %. Binocular vision recovered in (26,7±8,1) % of cases of the first group and (22,2±6,2) % in the second. The range of fusion in haploscopic conditions was increased in (73,3±8,0) % patients in the first and in (77,8±6,2) % in the second groups. Exponent differences in the both groups is not significant.
Conclusion: Thermometry of the extraocular rectus muscles permits to decrease amount of surgery (only recession or resection single muscles on the single eye) in planning of surgical management for small angles alternating nonaccommodative esotropia.

P35 ***Factors affecting long-term changes of the cylindrical power in children with accommodative esotropia.***

Mo Sae Kim, S.J. Song, C.Y. Choi, J.M. Kim, H.R. Chang
(Department of Ophthalmology, Kangbuk Samsung Hospital, Sungkyunkwan University School of Medicine, Seoul, Korea)

Introduction: To evaluate the factors affecting long-term changes of the cylindrical power in children with accommodative esotropia in the aspects of age when initial glasses were prescribed, initial amount of spherical refractive error and presence of amblyopia.
Methods: Amount of cylinder was followed up longitudinally in 84 patients with accommodative esotropia for a mean of 4.8 ± 1.4 years. Amount of cylinder was measured with cycloplegic refraction using autorefractor (RK-3, Cannon, Tochigiken, Japan) every 6 month for the first year and annually thereafter. Changes in cylindrical power over time were analyzed according to age when initial glasses were prescribed (<2 years, 2 to <4 years, 4 to < 6 years and ≥6 years), initial amount of spherical refractive error (<4 D, 4 to < 6D, ≥6 D) and presence of amblyopia.
Results: The mean age when initial glasses were prescribed was 4.0 ± 2.0 years. The amount of initial and final cylinder were 1.20 ± 0.83 D and 1.34 ± 0.98 D. Patients of three younger age groups showed gradually increasing cylindrical power over time, but the oldest age group demonstrated no remarkable changes. Linear mixed model analysis revealed that younger age when initial spectacles were prescribed was significantly associated with greater increases in cylindrical power over time (age*time interaction, p=0.046). Initial amount of spherical refractive error and presence of amblyopia had no significant association with changes in cylindrical power over time (p>0.05).
Conclusion: Long-term changes of the cylindrical power in children with accommodative esotropia showed relatively stable pattern, however, younger age when initial spectacles were prescribed was significantly associated with greater increases in cylindrical power over time.

P36 ***The outcome after unusual augmented surgery in partially accommodative esotropia.***

Hoondong Kim, D. Lee, S. Park
(Department of Ophthalmology, Soonchunhyang University Hospital, Seoul, South Korea)

Introduction: To study the outcome after unusual augmented surgery in partially accommodative esotropia (PAET)
Methods: Twenty one patients with PAET who underwent augmented surgery were studied retrospectively. The amount of medial rectus recession was measured based on the near deviation with spectacle correction at best vision. The refractive change and angle of deviation were evaluated over 1 year.
Results: Mean age was 6.5±2.4 years old. Mean follow up period was 25.7±18.0 months. Preoperative cycloplegic refractive error was +4.14±1.64 D. Spherical equivalent of spectacle at best vision was +2.72±2.08D. And mean difference of two values was 1.42D. Preoperative deviation with cycloplegic refractive correction was 28.6±13.5 PD. Deviation with spectacle correction at best vision was 35.4±10.9 PD. And mean difference of two values was 6.8 PD. After 1 year, the overcorrection >10 PD was only 1 patient (4.8 %) and hyperopia decreased at the rate of -2.08±1.59 D.
Conclusion: The unusual augmented surgery in this study provided the low rate of surgical overcorrection and the faster rate of hyperopic reduction
Commercial Relations: none

Notes

P37 ***Accommodative esotropia, surgical management.***

Ana M. Rivera
(Clìnica Privada Pueyrredón, Mar del Plata, Argentina)

Introduction: Patients with partially accommodative esotropia with high CA/A ratio are a controversial group. Different treatments may be used against this deviation but they are sometimes unsuccessful. We carry out surgery in this group and get good results.
Methods: 12 patients were studied with an average age of 7.5 (5-12). All of them had a microstabismus in long distance and a bigger angle at near. They were emmetropes or had a low hypermetropia in few cases. As they all had a partially accommodative esotropia none of them had stereopsis. We practice a double recession of both medial rectus (between 3.5 -5 mm).The group was followed up the next two years.
Results: After the surgery all of the patients conserved the microstrabismus in long distance but they sensible correct the bigger near angle. None of them got any disturbance for reading, or double vision, because none had stereo before. We did not find any hypercorrection.
Conclusion: This is a selected group of patients, with special points that can be considered. First this is not a fully accommodative esotropia because the patients have no stereo, so the risk of double vision is low. Second this patients can not use glasses because they have no refraction defects. Third they can not do orthoptic because no there is no stereopsis. So we don not have many solutions and they feel uncomfortable with the big deviation in the near vision. Considering the refracion, the absence of stereopsis and the high CA/A ratio we can carry out small recessions of the medial rectus with good results.
Commercial Relations: none

P38 ***A comparison of children with fully and partially accommodative esotropia in Singapore.***

Audrey Chia, B.-E. Lim, S. Khan, L. Seenyen
(Singapore National Eye Centre KK Children's Hospital, Singapore, Singapore)

Introduction: The aim of this study is to determine if differences exist over time between children with fully and partially accommodative esotropia in Singapore.
Methods: A retrospective review was performed on children (aged < 10 years) presenting with accommodative esotropia between 2000-2004. Children were diagnosed as having accommodative esotropia if esotropia was reduced by >10PD with full cycloplegic refraction. At the end of 1 year, children had fully accommodative esotropia (FAE) if esotropia was < 10PD, and partially accommodative esotropia (PAE) if it was > 10PD. Those who had less than 1 year of follow-up, dense intractable amblyopia, ocular disorders, syndromes or neurological disorders were excluded from the study.
Results: 107 children were enrolled into the study (64 FAE and 43 PAE). Children with PAE presented significantly younger (3.7+/-1.7 vs 4.5+/-1.7 years), with larger initial uncorrected esotropia (31.1+/-13.1 vs 22.3+/-14PD) and less hyperopia (2.7+/-1.8 vs 3.6+/-2.1D). Amblyopia, anisometropia and high AC/A rates were not significantly different between the groups. The mean duration of follow-up was 3.3+/-2.1 and 3.8+/-4.8 years in the FAE and PAE groups respectively (p=0.68). At last follow-up, the increase in ET without and with glasses was significantly greater in the PAE group. The mean change in distance ET without and with spectacles was 22.7+/-22 and 14.4+/-17.3PD in the PAE children, compared to 2.3+/- 17.4 and –5.1+/-12.0 in the FAE. The mean change in near ET without and with spectacles was 8.3+/-21.7 and –1.5+/-15.2 PD in the PAE children, compared to –8.4+/-18/1 and –13.7+/-12.1 in the FAE. Twenty children with PAE underwent surgery at the mean age of 6.0+/-1.8 years and success (ET ←10PD) was obtained in 68 % at end of 1 year.
Conclusion: Children who presented younger, with larger esotropia, less hyperopia, and whose esotropia progressively increased over time were more likely to have partially accommodative esotropia.
Commercial Relations: none

P39 ***Surgical treatment of myopic strabismus fixus: a graded approach.***

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Introduction: Surgical treatment of myopic strabismus fixus is challenging. Options for its correction range from conventional combined recession-resection surgery to innovative surgical procedures aiming to correct the deviated muscle paths. In this report we review our experience and compare the results of various surgical options for treatment of strabismus fixus.
Methods: We report the surgical outcomes of nine adults with acquired strabismus fixus due to myopia. Patients were enrolled between May 2003 and April 2007 in this retrospective study. The surgical procedure was determined depending on the angle of deviation and extent of motility impairment. A new transposition technique was performed in one patient who had an extreme variant of strabismus fixus.
Results: Combined recession-resection surgery was performed in four patients with resulting small-angle esotropia. In patients with both esotropia and hypotropia due to muscle alignment we performed an additional upward displacement of both horizontal recti muscles combined with a myopexy of the lateral rectus muscle. Results were satisfying; in particular in one patient who had a transposition procedure a significant improvement was achieved.
Conclusion: For treatment of myopic strabismus fixus a graded approach seems advisable. Combined recession-resection surgery yields good results for smaller deviations with mildly impaired motility, additional fixation techniques need to be applied once the horizontal muscle paths are deviated and in extreme cases a transposition procedure is required.
Commercial Relations: none

P40 ***Surgical correction of myopic strabismus fixus by modified loop transposition with scleral myopexy.***

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Introduction: In myopic strabismus fixus, there is large angle esotropia and hypotropia with marked limitation of elevation and abduction. The presumed pathophysiology involves the elongated globe herniating superotemporally and retroequatorially through the muscle cone. The cause of esotropia and hypotropia is a combination of restriction due to massive expansion of the posterior globe against tight medial rectus and displaced lateral and superior rectus muscles which change the vector forces. Surgical treatment is difficult. Recession-resection and transposition procedures have been described. We describe a case of severe myopic strabismus fixus treated successfully with new modified loop transposition with scleral myopexy.
Methods: This is a modification of Yokoyama's technique. Preoperative alignment was esotropia greater than 95 PD and hyoptropia of 35 PD. Orbital MRI showed classic findings of inferior displacement of lateral rectus and nasal displacement of superior rectus. We performed medial rectus and inferior rectus recessions. The superior rectus and lateral rectus were looped together with 5/0 mersilene suture and the junction sutured to sclera at a point 15 mm posterior to the limbus. The transposition was further stabilized by anchoring the nasal border of superior rectus and the inferior border of lateral rectus to sclera 12mm posterior to insertions.
Results: Ocular alignment and motility was remarkably improved in our patient, as documented by preop and postop photography. Even at 2 years postop, alignment remained good. MRI showed the normalisation of the pathway of the lateral and superior recti.
Conclusion: Successful treatment of myopic strabismus fixus must include realigning displaced muscles (lateral rectus, superior rectus) and releasing tight muscles (medial rectus, inferior rectus) to restore more normal force vectors on the globe. We have described a new modified loop transposition with scleral myopexy.
Commercial Relations: none

P41 ***Rare form of acquired esotropia: divergence weakness.***

Andrea Szigeti, M. Fodor
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Introduction: To remind of this rare unusual form of esotropia with uncrossed diplopia at distance, and no deviation at near with full abduction bilaterally.
Methods: Retrospective survey of patients was performed between 1997 and 2007. The deviation was measured at distance (D: 5 m) and at near (N: 0.33 m fixation) using prism cover test. Fusional amplitudes at distance fixation were measured with a prism bar. The presence or absence of associated neurologic diseases or events and the results of neurological consultations and neuroimaging were noted.
Results: The average age of 12 patients (5 men, 7 women) was 69.2±12.8 years, the average follow-up period was 2.0 years (min:0.5 year). The D-deviation was 5.25°±1.90° in average. The divergence fusion amplitude was measured in average 1.4°±0.55°, the convergence fusion amplitude: 8.5°±2.17°. 10 patients underwent neurological examination, 9 patients had previously undergone neuroimaging, in 8 cases vascular lesion and in 1 case growth of liquor field was found. In 10 cases the treatment consisted of prescribing the minimum prismatic correction that successfully eliminated distance diplopia.
Conclusion: Divergence weakness is a distinct clinical entity. Fusional divergence amplitudes were reduced in all cases. Prismatic correction successfully eliminated the symptoms in most cases. It is important to exclude the neurological disorders being possibly at the background.

P42 ***Sensorial strabismus due to congenital toxoplasmosis. Eso o exotropia?***

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Introduction: To evaluate sensorial strabismus due to congenital toxoplasmosis in order to elucidate differences and similarities between cases with esotropia(ET) and those with exotropia (XT).
Methods: Retrospective analysis of data charts of 49 patients with congenital toxoplasmosis seen at the Ophthalmology Unit of the Buenos Aires Children´s Hospital from 2002 to 2007. Visual acuity, cycloplegic refraction, strabismus patterns (ET, XT, Vertical Deviations) presence of nystagmus, site of chorioretinal scar, type of surgery performed and final alignment were evaluated.
Results: Mean age was 5 years old (6 months to 15 years old). We did not find difference between sex. 25 patients had bilateral involvement: 10 patients had ET, 10 others XT and 4 were aligned. Among the 24 unilateral cases, 15 presented XT, 7 ET and the other 2 had orthotropia. The remarkable fact was that 6/8 patients that had the macular scar in the right eye, manifested ET and 14/16 patients with their left eye affected presented XT.
Conclusion: Ocular toxoplasmosis is a common cause of sensorial strabismus amongst our population. In bilateral cases we found ET and XT in similar proportions, but in unilateral cases, XT is more frequent and the left eye is affected in most cases. Our findings suggest that when the right eye is affected an ET is more likely to occur and when the left eye is affected an XT results.

P43 ***Survey of congenital exotropia.***

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Introduction: Our aim was to evaluate the epidemiologic data & surgical results of congenital exotropia.
Methods: This retrospective study was done in 30 subjects of congenital exotropia. Patients data such as age, sex, cycloplegic refraction, amount of deviation, amblyopia, central nervous system status, amount of surgery & postoperative deviation extracted from files and then analyzed with SPSS software. Success rate was defied as esotropia or exotropia less than 8 prism diopter.
Results: Total cases were 30 subjects that equally were male & female. average age was 1.5 year (6month-10year), average preoperative deviation cycloplegic refraction were 50 prism (45-75) & +2.5 diopter respectively. About 80 % of patients showed central nervous system (CNS) anomaly in brain MRI. 50 % of cases had history of difficult delivery or complicated pregnancy. The most common surgery was bilateral rectus recess that according of deviation, ranged 8-10 mm from limbus. 80 % of cases showed improvement of deviation (less than 8pris). 10 % were overcorrected and 20 showed under correction.
Conclusion: This study showed that congenital exotropia is usually associated with CNS anomaly and early surgery results in good motor alignment.

P44 ***Clinical characteristics of exotropic patients with hyperopia.***

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Introduction: There are few published studies of exotropic patients with hyperopia. Although hyperopia is routinely corrected in patient with esotropia, hyperopic spectacle correction for patients with exotropia is still controversial. The aim of this study was to investigate the clinical characteristics and the effects of full or partial correction of hyperopia in patients with exotropia.
Methods: There are few published studies of exotropic patients with hyperopia. Although hyperopia is routinely corrected in patient with esotropia, hyperopic spectacle correction for patients with exotropia is still controversial. The aim of this study was to investigate the clinical characteristics and the effects of full or partial correction of hyperopia in patients with exotropia. Corrected visual acuity and angle of deviation before and within 1-2 months after correction of their refractive error. All subsequent examinations were performed in 2-3 months intervals thereafter. Those undergoing surgery were examined pre-operatively and 3 months postoperatively. 18 patients underwent recessions of both lateral rectus muscles and one patient, who previously had underwent bilateral medial rectus recessions underwent right medial rectus advancement to the original insertion site. A satisfactory surgical outcome was considered to be alignment within 8 prism diopters (delta).
Results: Mean refraction of both eyes (mean value of spherical equivalent of both eyes) was +2.57(range, sph +2.00 to +5.00 diopters, cyl +1.50 to +4.00 diopters). Mean refraction of prescribed glasses was +2.03. In all patients a significant improvement of visual acuity could be seen. The AC/A ratios were low (-5.82 to +2.15) in 20 patients, normal (3.12 to 4.44) in 6 patients and high (5.20 to 8.50) in 4 patients. 10 patients were fully corrected and 20 patients were partially corrected for their hyperopia. With hyperopic correction, there was no significant change of the angle of deviation at distance in all patients regardless of the proportion of hyperopic correction. However exodeviation at near was significantly increased at 1-2 months after hyperopic correction (2.76 prism diopter (delta), p=0.045). Among 19 patients who underwent surgery, postoperative deviations less than 8 PD were achieved in 15 at 3 months. The remaining 4 patients had low AC/A ratios.
Conclusion: Two thirds of the patients with hyperopia had low accommodative convergence/accommodation ratio or evidence of hypoaccommodation. This suggested that correction of hyperopic refractive errors did not lead to significant change of the angle of deviation.
Commercial Relations: none

P45 ***Sensory spontaneous consecutive exotropia in children with esotropia.***

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Introduction: To report three cases of spontaneous evolution of esotropia to consecutive exotropia in childhood strabismus
Methods: Three children aged 6 -18 months, at the time of first attendance, had significant esotropia (up to 80 prism dioptre). This was followed by spontaneous consecutive large exotropia which required surgical correction
Results: All three children were esotropic and developed spontaneous consecutive exotropia over a period of 4 months, 6 months, and 3 years. No records of amblyopia, diplopia or significant ocular motility defect. Two children had hypermetropia (partially accommodative esotropia) and the third was emmetropic. None of them had any surgical correction prior to exotropia development. All of them had corrective squint surgery for exotropia with good cosmetic outcomes
Conclusion: Certain patients with significant esotropia might divert spontaneously to significant exotropia over a period of few months to few years. The aetiology of which is uncertain, but appears to be non-sensory. We postulate that this. might be due to changes in accommodation/ and or convergence mechanisms during the period of postnatal visual development. This mechanism of divergence should be kept in mind when dealing with significant unexpected overcorrection of esotropia which is not explained by the amount of surgery performed
Commercial Relations: none

P46 ***New opportunity in exotropia surgery.***

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Introduction: To evaluate the effect of a piece of silicone band addition located at the front of insertion of the neotendon to reduce and delay the relapse in the surgical treatment of exotropia
Methods: We collected data among 12 patients (8 male and 4 female) between 7 and 54 years old with diagnosis of constant and declared exotropia and mid angle of diversion in PP PV 26,3 δ (ds 7,2), PP PL 22,5 δ (ds 11,3). All patients were submitted to a surgical intervention of recession of RL muscles and apposition of a piece of silicone band at the front of insertion of the neotendon
Results: After surgery we observed an improvement of the clinical situation in all patients. The follow up at 18 months pointed out a mid angle of diversion in PP PV 6,6 δ (ds 2,7), PP PL 6,3 δ (ds 3,6), without side effects induced by the silicone band
Conclusion: The silicone, thanks to its physical and structural features, could be a useful aid to delay the relapse in the surgical treatment of exotropia.

P47 ***The effects of unilateral lateral rectus recession for intermittent exotropia under 25 prism diopters.***

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Introduction: The purpose of this study is to assess the effects of unilateral lateral rectus (LR) recession in the treatment of intermittent exotropia under 25 prism diopters (δ).
Methods: The 137 patients who had undergone recession of unilateral LR for intermittent exotropia and had been followed up for longer than 6 months were examined. Their medical records were retrospectively reviewed. Comparative analysis was performed against the two groups of patients such as a) 73 patients with exotropia less than 20 δ and b) 64 patients between 20 δ and 25 δ he amount of LR recession was 6.5 – 9.5 mm depending on the exotropic angle. Pre- and post-operative angle of exotropia, lateral incomitancy, and the surgical success rate were the main outcome measures. Esophoria less than 5 δ and exophoria less than 10 δ were considered as surgical success.
Results: The average age of the patients was 8.65 years (5~17), and the mean follow-up time was 29.4 months (6~121). The mean preoperative deviation was 18.2 ± 2.54 δ (14~25). The deviation angle at the last follow up was 1.3±10.27 δ (-22~25). The success rate was 89.9% at 6 months, 79.8% at I year, and 76.1% at the last follow up. Out of the unsuccessful cases, one patient showed consecutive esotropia and the others were recurred exotropia. The immediate postoperative overcorrection was 3.0 ± 6.31 δ in a group and 4.1 ± 5.69 δ in b group, respectively, and showed no significant statistical difference. (P=0.39) At the last follow up, however, the success rates were significantly different as 84.7% and 66.0% respectively. (P=0.04)
Conclusion: The unilateral LR recession is an effective procedure in the treatment of intermittent exotropia under 20 δ. The possibility of recurrence should be awared of, especially for exotropia more than 20 δ.

Notes

P48 ***Bilateral lateral rectus recession considering the tendon width in intermittent exotropia.***

Seung-Hyun Kim, H. Lee
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Introduction: The tendon width of lateral rectus muscle can be a useful indicator to estimate the effect of unilateral lateral rectus recession in intermittent exotropia. The aim of this study is to investigate whether the tendon width of lateral rectus as a useful indicator for predicting the effects would be applicable in performing bilateral lateral rectus(BLR) recession.
Methods: A total of 45 patients of 3 to 15 years of age who had undergone bilateral rectus recession for basic type of intermittent exotropia were included. Under general anaesthesia, the tendon width of the lateral rectus of both eyes near its insertion was measured with calipers, prior to dissection of the muscle tendon from the sclera. The actual effect of lateral recession was calculated by the absolute value of the angle of preoperative deviation plus postoperative deviation on the postoperative second day divided by the total amount of recession of both eyes. And then we calculated the hypothetical effect of lateral rectus recession considering the tendon width per each eye and summed up the effects of both eyes. The hypothetical effects were defined as 3 PD when the tendon width ranged 8-8.5mm; 3.5 PD, 7-7.5 mm; 2.5 PD, 9-9.5 mm based upon the previously identified facts for statistical analysis. We compared the both effects using a paired T test.
Results: Mean tendon width of the lateral recti was 8.14 mm (OD) and 8.02 mm (OS), respectively (p= 0.357 range: 7-9.5). Mean difference between the actual and hypothetical effects of BLR recession for all patients was 2.88 PD (p=0.001, range: 0-5.50). However, when the amount of preoperative exodeviation was below 25 PD, the differences were not statistically significant (p= 0.086).
Conclusion: The previous suggestion that the effect of unilateral rectus recession is larger in cases in which the tendon width of the lateral rectus is narrower may also be applied to bilateral lateral rectus recession if the preoperative exodeviation is below 25 PD.
Commercial Relations: none

P49 ***More than 9 mm medial rectus muscle resection and more than 10 mm lateral rectus muscle recession in large angle sensory exotropia.***

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Cancelled

Notes

P50 ***Diagnostic problems in vertical strabismus - torsion is the clue.***

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Introduction: The aim of our study is to present three cases of vertical strabismus with coexisting neurological pathology (head trauma, cerebellar astrocytoma and multiple sclerosis), which were initially misdiagnosed.
Methods: The three-step test was suggestive of superior oblique palsy in two patients. Nevertheless, we found a subjective and objective intorsion of the hypertropic eye instead of expected extorsion. Because such findings were consistent with ocular tilt reaction, we decided to waive the surgery and to prolong the follow-up. The third patient was referred to us with cyclotorsional diplopia which appeared after the right inferior oblique muscle weakening procedure. We found that the surgery was performed because of left hypertropia due to supposed superior oblique palsy. Carefully analyzed preoperative data occurred to be suggestive of ocular tilt reaction. The surgery resulted in fairly good reduction of vertical deviation, but had a paradoxical effect on torsion. Either subjective and objective measurements showed a substantial left incyclotorsion. It occurred to be large enough to prevent fusion and to cause disturbing diplopia.
Conclusion: In cases of vertical strabismus accompanied with neurological signs one should always carefully assess subjective and objective torsion. Incyclotorsion of the higher eye, inconsistent with superior oblique palsy, give rise to the diagnosis of ocular tilt reaction. Inferior oblique weakening is contraindicated in such cases, because of its paradoxical effect on torsion.
Commercial Relations: none

P51 ***Ocular torticollis caused by paresis of n. trochlearis.***

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Introduction: Ocular torticollis is abnormal head position caused by fourth or trochlear nerve palsy.
Methods: During the examination we used: anamnesis (heteroanamnesis) and objective examination: visual acuity, cycloplegic refraction, cover-uncover test, evaluation of eye motility, right and left Bielschowsky head tilt test, prism- alternate cover test, evaluation of RKK.
Results: We show the case of a child R. D. female, 5 years old, with abnormal head position test toward the left shoulder that was noticed in the first year of life. Visual acuity of both eyes is 1.0, without refraction anomaly, cower-uncower test show deviation, Bielschowski head tilt test was positive toward right shoulder, Deviation measured with prism was 8-10 p.d., Evaluation of eye motility show hyperfunction of m.obliqus inferior of the right eye, there is NRK. Because of the presens of anomaly, the patient had an operation weakening of the inf. oblique muscle.
Conclusion: Ocular torticollis caused by fourth nerv palsy needs adequate preoperativ evaluation, surgical treatment and postoperativ follow-up.

Notes

P52 ***Superior oblique posterior tenectomy – Is it really safe?***

Pinar Apaydin, S.B. Özkan, I. Berkit
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Introduction: Superior oblique (SO) posterior tenectomy is a surgical method that selectively weakens the function of the muscle with sparing the anterior torsional fibers. The aim of this study is to evaluate the efficacy and also the rate of overcorrection in SO posterior tenectomy.
Methods: In our clinical records 20 patients were identified who underwent SO posterior tenectomy. In 18 of the patients bilateral surgery was performed for A-pattern deviation with SO overaction and 2 of the patients underwent SO posterior tenectomy because of their vertical deviation with overacting SO muscle. The mean age of the patients were 10.50±11.11 years (range between 2-50). The mean postoperative follow up of the patients was 39.75±40.09 months (range between 6-128).
Results: The mean preoperative amount of A-pattern was 19.62±8.08 prism dioptres (PD) and 28.40±20.98 PD in exodeviations and esodeviations respectively. Postoperative A-pattern measurements were 1.38±2.99 PD (p=0.001) for exodeviations and 2.40±3.28 PD (p=0.043) for esodeviations. The collapse of A-pattern was 20.94±11.10 PD in overall of the patients. Three patients developed overcorrection and inferior oblique overaction with a reversal into a 'V' pattern 3 to 74 months, after surgery. The patients who underwent unilateral SO posterior tenectomy for their vertical deviations did not develop overcorrection. Ten patients had dissociated vertical deviation (DVD) and all of the overcorrected patients were the ones with DVD.
Conclusion: Our results suggested that SO posterior tenectomy is effective to control A-pattern deviations however it is not a totally safe procedure to prevent overcorrections.
Commercial Relations: none

P53 ***Clinical outcomes after inferior oblique muscle Z myotomy in patients with inferior oblique overaction under +2.***

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Introduction: To investigate the clinical outcomes after inferior oblique muscle Z myotomy in patients with inferior oblique overaction(IOOA)
Methods: A prospective study was done in 21 patients (primary IOOA; 13 patients, secondary IOOA; 8 patients) who underwent inferior oblique muscle Z myotomy. Patients with IOOA under +2 IOOA were included. 70% Z myotomy was performed at 6mm distance after grasping the inferior oblique muscle through inferotemporal fornix incision. Comparison was made at before operation and 3 months postoperative for degree of IOOA, vertical deviation and cyclotorsion
Results: We corrected horizontal deviation at the same time with inferior oblique muscle Z myotomy because all patients had horizontal deviation. Pre and postoperative IOOA was +1.9±0.32 and +0.7±0.67 in the primary IOOA group, and +1.83±0.41 and +0.17±0.41 in secondary IOOA group. 8 out of 13 patients of primary IOOA group showed V pattern strabismus and corrected in 7 patients. 7 out of 8 patients with secondary IOOA had hypertropia at primary position. Change of pre and postoperative hypertropia and cyclodeviation in secondary IOOA was from 7.75±6.64PD and 7.0+-±2.31° to 1.2±3.35 PD and 4.7±2.02°. Complete myotomy was occurred in 1 patient due to excessive traction during procedure.
Conclusion: Inferior oblique muscle Z myotomy was a effective surgical procedure in patients with IOOA under +2 in primary and secondary IOO
Commercial Relations: none

P54 ***Efficiency of bilateral inferior oblique weakening procedures in V pattern strabismus.***

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Introduction: To evaluated efficiency of bilateral inferior oblique weakening procedures in V pattern strabismus
Methods: 28 patients who had been followed at the Strabismus Department of our hospital with the diagnosis of V pattern strabismus who had undergone surgical treatment between 2002-2006 were analysed retrospectively. 12 (42.8 %) of the 28 patients were V pattern esotropia and 16 (57.2 %) were V pattern exotropia. All of cases had bilateral inferior oblique hyperfunction (+3,+4). The mean age was 6.57 (1-17) years. A weakening procedure on the inferior oblique muscles was performed as first operation. Second operation was performed on the horizontal muscle. Cases had a postoperative V pattern of 15 pd or more were performed vertical shift of the horizontal rectus muscles during second operation. The mean follow up period was 8.71 (6-24) months.
Results: Preoperative findings: The distribution of V patterns showed 67 % in the range of 15 to 25 prism diopters (pd) and 33 % in the range 26 to 35 pd for esotropia cases. The distribution of V patterns showed 37 % in the range of 15 to 25 pd and 13 % in the range 26 to 35 pd, 50 % in the range of 35 pd or more for exotropia cases. After surgery, 34 % had less than 15 pd of V pattern and 33 % had the V pattern fully corrected; 33 % had more than 15 pd of V pattern for esotropia cases. 13 % had less than 15 pd of V pattern and 50 % had the V pattern fully corrected; 37 % had more than 15 pd of V pattern for exotropia cases. There were statistically significant difference between preoperative and postoperative V patterns for esotropia and exotropia cases(p=0.027, p=0.018). Cases had large angle of the preoperative V pattern had less reduction in angle of V pattern after IO weakening surgery (r=0.53 p=0.050).
Conclusion: IO weakening procedures are effective and safe in reducing "V" pattern but sometimes, they aren't enough especially, in cases of large angle of V pattern.
Commercial Relations: none

P55 ***The effect of reoperation in inferior oblique overaction.***

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Introduction: To evaluate the efficacy of re-recession or extirpation of inferior oblique (IO) muscle in recurrent or undercorrected IO overaction (IOOA).
Methods: We reviewed the records of 26 patients (33 eyes) with the recurrent or undercorrected IOOA after the graded recession of IO muscle, who underwent re-recession or extirpation of IO muscle, and was followed up for at least 6 months. We performed extirpation of IO muscle overacting larger than +2 after 14mm recession of IO muscle or larger than +3 after 10mm recession of IO muscle. In case of +2 IOOA after 10 or 8mm recession of IO muscle, we carried out 14mm re-recession of IO muscle. IOOA under +1 was defined as a successful case after re-operation.
Results: Thirty-one of 33 eyes (93.9 %) were corrected successfully after re-operation; 24 eyes with extirpation of IO muscle (96.0 %) and 7 eyes with 14mm re-reccession of IO muscle (87.5 %) were successful.
Conclusion: One of the advantages of graded recession of IO muscle is that additional re-recession or extirpation of IO muscle can be preformed if needed. We could manage successfully recurred or undercorrected IOOA with re-recession or extirpation of IO muscle. Extirpation or 14mm re-recession of IO muscle was effective re-operation procedure to correct a recurred or undercorrected IOOA.
Commercial Relations: none

Notes

P56 ***Congenital fibrosis of the inferior rectus muscle: a case report.***

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Introduction: We report on a 11-months-old boy with severe amblyopia caused by left sided hypotropia, esotropia and retraction of the lower lid due to congenital fibrosis of the inferior rectus muscle. Family history was negative.
Methods: Hypotropia of 25° and esotropia of 45° in OS were estimated by corneal light reflexes. There was no vertical and nearly no horizontal motility of OS while motility of OD was normal. Occlusion of OS did not evoke any resistance whereas occlusion of OD provoked severe resistance, denoting severe amblyopia of OS. On the basis of clinical findings and MRI, fibrosis of the inferior rectus muscle was diagnosed. In general anesthesia, elevation was also impossible and the esoposition could not be reduced by more than 5° by forced duction. The stiff inferior rectus could be taken on a hook so that the temporal part of the insertion could be visualized and the tendon could be severed from the globe after preparation on the orbital surface of the muscle. Forced elevation immediately improved up to 30°. Since abduction was still limited, the medial rectus muscle which did not show any morphological pathology was recessed by 5 mm.
Results: Five months after surgery, corneal light reflexes showed left esotropia and hypertropia of not more than 5°. Active motility of OS was characterized by adduction of 30°, abduction of 30°, elevation of 10° and depression of 15°. Lid retraction was unchanged and the boy was still completely apathetic when OD was patched.
Conclusion: In this patient, the result can be considered aesthetically satisfactory. However, surgery came too late to avoid severe amblyopia. It should be emphasized that extraocular muscle surgery is indicated within the first weeks of life together with occlusion therapy to prevent irreversible deprivation amblyopia when extreme eye position impedes adequate visual stimulation of the central retina
Commercial Relations: none

P57 ***Clinical characteristics of Duane's retraction syndrome and analysis of surgical results.***

Seung Ah Chung, S.B. Park, Y.H. Chang, J.B. Lee
(The Institute of Vision Research, Seoul, South Korea)

Introduction: Duane's retraction syndrome (DRS) is a congenital ocular motility disorder characterized by marked limitation or absence of abduction, restriction of adduction, retraction of the globe, narrowing of the palpebral fissure on adduction, and frequent association with elevation or depression on adduction. Because analysis of preoperative abnormal head posture and abnormal vertical movement, and selection of proper surgical method are critical in achieving good results, it is very important to evaluate the results of various surgical treatments.
Methods: We reviewed 38 patients with the diagnosis of Duane's retraction syndrome. The patients were treated with horizontal muscle recession, lateral muscle Y-splitting and recession, medial muscle recession and lateral muscle resection.
Results: There were 10 (26.3 %) affected males and 28 (73.7 %) females. The left eye was involved in 24 patients and the right in 12 of the unilateral cases. Type 1 was the most common type (83.3 %) and esodeviation was the most frequent in primary position. The esotropic patients with DRS turned their face toward the affected eye while the exotropic patients with DRS turned theirs away from the affected eye. Anomalous vertical movements, including upshoot and downshoot which are a prominent feature of DRS, were found in most cases (92.1 %). The deviation in primary position was reduced by an average of 13.5 prism diopters. The face turn was reduced from an average of 17.5 degrees to an average of 1.2 degrees.
Conclusion: In conclusions, the primary deviation, abnormal head posture, and upshoot and downshoot found in Duane's retraction syndrome can be corrected with proper surgical method.

P58 ***Strabismus surgery in Duane syndrome.***

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Introduction: Duane retraction syndrome has a prevalence of 0.1 percent in the general population. The common features of Duane retraction syndrome are retraction of the globe and narrowing of the lid fissure, both occurring on attempted adduction of the involved eye. These result from connatal ocular misinnervation. Indications for strabismus surgery include: strabismus in the primary position of gaze, abnormal head posture, significant upshot or downshoot of the eye in adduction and significant enophthalmus in adduction.
Methods: In this retrospective study we analyse the pre- and postoperative findings of 40 patients with Duane´s retraction syndrome who underwent surgery during the years 1998 to 2008. The type of retraction syndrome, the angle reduction in primary position, the angle reduction in 30° right and 30° left gaze and the reduction of head posture were evaluated.
Results: In 35 patients surgery was primary. A single recession was performed in 11 cases (recession of medial rectus (8 cases), recession of lateral rectus (3 cases)). 29 patients underwent a recession-resection procedure. 4 patients required reoperation. A dose-response relationship of the one muscle recessions and the combined surgery and the mean angle reduction in the primary position and the mean reduction of head posture will be performed.
Conclusion: Single recession and recession-resection are surgical options with a dose-response relationship in Duane Syndrome, but with a broad distribution.
Commercial Relations: none

P59 ***Patients operated for Duane's retraction syndrome. Overview of the results in the last 10 years.***

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Introduction: The surgery in Duane's retraction syndrome is indicated only in patients where eyes are not straight in the primary position and the patient has to adopt an abnormal head posture to achieve fusion.
Methods: 12 patients (2 male, 10 female) were operated for Duane's retraction syndrome in the last 10 years at our clinic. All the patients had Duane's Type 1 (in 9 patients left eye was affected, in 2 right eye was affected, one had bilateral Duane's syndrome). The visual acuity was normal in 7 of them. 5 of the patients had amblyopia, mostly because of anisometropia, 7 of the patients were wearing hypermetropic correction, 2 had myopic correction, others were without glasses. The average angle before operation was +15,8 ±10,1 degrees
Results: The retroposition of internal rectus of the affected eye was done in all except one patient, 2 operations were needed in one patient. The average angle one year after operation was +9,7±7,3 degrees, the angle at the last visit at our department was +10,4±7,5 degrees. The head posture was much better after the operation in most of them. Normal binocular functions (normal fusion or normal stereovision) was achieved in 8 out of 12 patients.
Conclusion: In patients with Duane's retraction syndrome abnormal head posture is indication for surgery. After surgery there was smaller and stable angle of deviation in all our patients, they all had less problems with abnormal head posture. 8 out of 12 patients achieved normal binocular vision with normal head posture after the operation.

Notes

P60 ***Surgical treatment of atypical form of strabismus at Duane syndrome.***

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Introduction: Tactics and methods used for treatment of strabismus at Duane syndrome rather disputable, and their choice depend on type of a syndrome and a degree of its manifestation. The purpose of our study was to estimate results of surgical treatment of patients with strabismus at Duane syndrome (type 1) depending on size of deviation and degree of restriction of eye motility.
Methods: The study group included 30 patients, age range 1-34 years. Depending on amount and a kind of the treatment the patients have been divided into 5 groups: recession of the medial rectus muscle (1), recession of the medial rectus and partial lateral transposition of the superior and inferior rectus muscles (2), the tendon-sclera-plasty of the medial rectus and lateral transposition (3), recession of the medial rectus and resection of the lateral rectus muscle (4), chemodenervation of the medial rectus by the intraoperational Dysport injection at a dose of 15 IU (5).
Results: The mean primary deviation was significantly decreased in all tested groups. At all patients the compensatory head turn has been eliminated or remains minimal in which diplopia was compensated. Results of treatment in group 5 are estimated after cancellation of a chemodenervation (1.2±0.3 years). The average volume of abduction in this group has been increased from 3.6±2.6° to 28.8±17.9°.
Conclusion: The chemodenervation of hyperinnervational muscle allows to eliminate strabismus without surgical treatment or to reduce its volume. At a primary deviation up to 7-8° performance of weakening operation of a medial muscle is recommended: recession or tendon-sclera-plasty. In other cases weakening operation should be added by partial lateral transposition of the superior and inferior rectus muscles.

P61 ***Vertical rectus muscle transposition surgery for esotropic Stilling-Türk-Duane syndrome.***

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Introduction: The purpose of this study is to inform the effect of vertical rectus muscle (VRM) transposition for face turn and esotropia (ET) in esotropic Stilling-Türk-Duane syndrome. (Duane sd)
Methods: This study included 15 patients (17 eyes) who had at least 2 years of follow-up period after VRM transposition surgery for esotropic Duane sd. Patients with eyeball retraction more than +2 were excluded. Small recession of medial rectus (MR) was combined when severe restriction to abduction was present on forced duction test. Orthophoria was defined as deviation angle within ± 8 PD. The limitation of abduction was divided into -1~ -5 and eyeball retraction on adduction +1 ~ +4. Pre- and post-operative deviation angle, corrected ET angle after surgery and clinical characteristics were analyzed through retrospective review of patients' records.
Results: The mean age was 6.1 years (2-12). Two patients showed bilateral Duane sd. Pre-operative angle of ET averaged 28.6 PD (16-50) and post-operative angle 1.4 PD. VRM transposition only corrected ET of 18.8 ± 11.81 PD. Twelve of 17 patients obtained orthophoria. Pre-operatively head turn of 5-45° was shown in 13 patients and post-operatively it disappeared in 9 patients (P=0.002). The aggravation of eyeball retraction was mild from pre-operative +0.97 ± 2.98 to postoperative +1.26 ± 0.69 (P=0.06). One patient obtained improvement of eyeball retraction. Abduction of eyeball in 15 eyes was improved by 1.5 (from preoperative -4.0 ± 0.28 to postoperative –2.5 ± 0.73, P=0.000). Two patients maintained orthophoria wtihout improvement of abduction.
Conclusion: VRM transposition surgery was effective for eliminating ET and head turn. Mild aggravation of eyeball retraction on adduction following VRM transposition did not cause noticeable cosmetic problem.

P62 ***Congenital Brown´s syndrome is caused by missing fourth cranial nerve in some cases.***

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Introduction: The aetiology of congenital Brown´s syndrome is still unknown. Some clinical signs support the thesis of absent fourth cranial nerve not yet being demonstrated directly to the best of our knowledge.
Methods: Four patients suffering from congenital Brown´s syndrome were examined by MRI in high resolution technique. In another case planimetric measurements of superior oblique muscle on MRI´s were carried out looking in nine positions of gaze.
Results: In two of four patients, only, unilateral lacking of fourth cranial nerve was identified causing Brown´s syndrome. In two others, specific anatomical conditions prohibited the identification of fourth nerve of both sides, unfortunately. On MRI measurements of superior oblique muscle itself, direct evidence of misdirection of superior oblique muscle was observed in one case: superior oblique muscle did not obey Hering´s law, but remained contracted even looking upwards in adduction.
Conclusion: Direct evidence of unilateral lacking of fourth cranial nerve in congenital Brown´s syndrome was possible. The relaxation of superior oblique muscle in adduction during upgaze was missing in another case supporting theory of misdirection as causing element of Brown´s motility disorder.
Commercial Relations: none

P63 ***Can extraocular muscle volume measured on MRI be used to determine dysmotility in Graves Orbitopathy?***

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Introduction: For patients with Graves Orbitopathy (GO), some investigators have suggested that longitudinal changes in the MRI appearance of extraocular muscles can be used to predict changes in ocular motility. We compared the changes in extraocular muscle volume to changes in ductions.
Methods: Extraocular muscle volumes were assessed by a 3-Dimensional MRI technique in 48 eyes of 24 patients with GO. Ductions were assessed by uniocular fields of fixation. Assessments were repeated 6 months apart (range 5 to 7 months). Changes in extraocular muscle volume and ductions were calculated and compared by rank correlation methods.
Results: Increase in Medial Rectus (MR) volume was modestly correlated with decrease in horizontal paired ductions (rs= -0.28, p=0.05). Increase in Inferior Rectus (IR) or Superior Rectus (SR) volume was not correlated to change in vertical paired ductions (rs =-0.1, p=0.4 and rs =0 p>0.9 respectively). Changes in individual muscle volumes were poorly correlated with the changes in the ductions of the antagonist muscle (p=0.06 for MR effect on abduction, p=0.5 for LR effect on adduction, p=0.7 for SR effect on depression, p=0.4 for IR effect on elevation).
Conclusion: Overall, there was poor correlation of changes in muscle volume measured using MRI, with changes in motility, either by paired ductions or by individual antagonist ductions. Changes in motility in Graves Orbitopathy cannot be solely assessed by MRI of extraocular muscles. Changes such as contracture, fibrosis and muscle activity should be assessed by other clinical methods.
Commercial Relations: none

Notes

P64 ***Natural course of deviation angle of strabismus associated with thyroid ophthalmopathy and its association with thyrotophin binding inhibiting immunoglobulins***

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Introduction: To investigate the natural course of strabismus patients associated with thyroid ophthalmopathy with stable angle and the relationship between the change in angle of strabismus and the TSH binding inhibitory immunoglobulin (TBII).
Methods: Medical records were retrospectively reviewed for strabismus patients associated with thyroid ophthalmopathy patient whose deviation angle was stable for 6 months. Among these patients, the cases who have additional follow-up periods more than 6 months were selected. We serially assessed the distant deviation angle in primary position, the change of motility, the TBII titer of the subjects.
Results: Sixteen patients are enrolled. 5 patients (32.3 %) presented significant change of deviation angle after stable periods more than 6 months. two patients (11.8 %) show the changing strabismus angle after having a stable period for 1 year. Only 9 patients among the subjects had serial TBII for evaluation. 4 of the 9 patients had a significant change in deviation angle. An increased TBII was observed in all of them. 3 of the 9 patients had a normal TBII. All of them showed a stable deviation angle.
Conclusion: A part of patients of strabismus associated with thyroid ophthalmopathy have unstable deviation angle even after stable periods more than 6 months. The unstable deviation angle may be associated with an increased TBII.
Commercial Relations: none

P65 ***Results of lower lid lengthening after inferior rectus muscle recession with and without tarsorraphy in patients with Graves' ophthalmopathy.***

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Introduction: Retrospective, observational study to compare clinical results of lower lid lengthening with and without tarsorraphy in patients with Graves' ophthalmopathy (GO) and lower lid retraction and lagophthalmus after inferior rectus muscle recession.
Methods: Lower lid lengthening was performed in 30 patients with lower lid retraction following inferior rectus muscle recession between 2001 and 2007 via a posterior subtarsal transconjunctival approach. Following conjunctival detachment the lower lid retractor was stripped from the inferior tarsal border and dissected downwards so that the lid could be easily raised to cover the inferior cornea. A bovine pericardial transplant (Tutopatch) (6 mm) was placed between the recessed retractors and then to the inferior tarsal border. Finally the conjunctiva was reattached. From 1/01 to 6/04 lower lid lengthening was performed without (group 1) and from 6/04 until late 2007 concurrent with a 3 - 4 mm tarsorraphy (group 2). The effect of lower lid lengthening on reducing lid retraction and completing eyelid closure was evaluated.
Results: Mean preoperative lid retraction was 2.3mm [1.5 - 3.0] in group 1 and 2.8mm [1.5 - 6.0] in group 2 (n.s.). Lower lid lengthening and simultaneous tarsorraphy resulted in significantly (p=0.004) more reduction of lower lid retraction (2.5 mm [1.5 - 4.5]) compared to patients without tarsorraphy (1.4 mm [0 - 3.0]). Patients with tarsorraphy presented a higher success rate (p=0.02) concerning the elimination of lagophthalmus (success = lagophthalmus <=0.5mm: 14/16 (87.5 %)) in comparison to patients without tarsorraphy (8/16 (50 %)). The same was seen for aesthetic improvement (success = lower lid retraction <= 0.5mm): with tarsorraphy: 12/16 (75 %) and without tarsorraphy 8/16 (50 %) (n.s.).
Conclusion: In patients with lower lid retraction exceeding 1.5mm the results of lower lid lengthening can be improved with simultaneous tarsorraphy of 3-4 mm, as this additional minor procedure results in significantly more reduction of lower lid retraction and in significantly higher success rates of lagophthalmus elimination.
Commercial Relations: none

P66 ***A surgical case of iatrogenic medial rectus rupture and orbital wall fracture developed by functional endoscopic sinus surgery.***

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Introduction: We report a surgical case of iatrogenic medial rectus rupture and medial orbital wall fracture developed by functional endoscopic sinus surgery. We undertook reconstruction of medial orbital wall and strabismus surgery for large fixed exotropia.
Methods: A 53-year-old man was referred for injury of right medial rectus and medial orbit wall fracture during endoscopic ethmoid sinus surgery. At the time of injury, right eye showed depression and fixed exodeviation of 45-50 PD (prism diopter). The best corrected visual acuity of right eye was 0.3. The pupil was fixed, mid-dilated with relative afferent pupillary defect. On funduscopic examination, superior temporal branch retinal artery was obstructed. The MRI showed medial rectus rupture and medial orbit wall fracture. Three weeks after the injury , we reconstructed medial orbit wall with artificial bone. Simultaneously we did right lateral rectus recession of 8 mm and fixed the stump of medial rectus to periosteum around the lacrimal crest.
Results: Immediately after the surgery, right eye showed esodeviation of 5 PD at primary gaze and the CT scan showed the closure of the lesion of medial orbital wall fracture. After surgery at six months, right eyeball movement was still limited (-2) and 5 PD exodeviation was found at primary position.
Conclusion: During functional endoscopic sinus surgery, medial rectus injury could be concurred with orbital wall fracture. In this case we had a satisfactory result from the concomitant surgery of strabismus and reconstruction of orbital wall fracture.

P67 ***Another reason for vertical diplopia after orbital floor fracture.***

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Introduction: We present a case of a fourty-two-year-old man, injured in the left orbit by the chain of a tractor a year ago. Conjunctival and lower lid lacerations were immediately repaired. The orbital floor reconstruction was done six months later and no muscle entrapment was found. The patient had vertical diplopia since the trauma, but it worsened in primary position, near and distant, after the fracture repair.
Results: On revision, a massive fibrous scar was found between the conjunctiva and inferior rectus muscle of the left eye. The double vision for near was eliminated and the patient compensated for distant with a slight chin lift.

Notes

P68 ***Diplopia after refractive surgery.***

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Introduction: The aim of our study is to underline the need for a proper orthoptic examination before refractive surgery to avoid postoperative binocular vision impairment.
Methods: We present three cases of diplopia after otherwise uneventful refractive surgery. The first patient underwent bilateral laser in situ keratomileusis (LASIK) for myopia and was referred to us with vertical diplopia. We found that it was due to decompensated IVth nerve palsy. In the second patient, with preexisting esotropia and hypotropia, the laser-assisted subepithelial keratectomy (LASEK) for hyperopia was performed on the nondominant eye, causing fixation switch and subsequent diplopia. The third patient was referred with intermittent diplopia due to decompensated exodeviation after LASIK for moderate myopia. In order to evaluate the degree of binocular visual impairment in those cases, complete orthoptic examination was performed.
Results: It seems clear that diplopia, or other symptoms of binocular decompensation, may manifest after refractive surgery. Such complications are more likely if there was a preoperative history of strabismus and/or strabismus surgery, an overcorrection in glasses or intolerance of contact lenses.
Conclusion: In our opinion, at least the careful prismatic cover test and the red filter test should be performed at each preliminary examination for refractive surgery. In patients with manifest strabismus, it is important to determine which eye is the dominant one, to prevent fixation switch. Patients who are at high risk for postoperative diplopia should be carefully examined and given a trial contact lenses.
Commercial Relations: none

P69 ***The intensity of downbeat nystagmus during daytime.***

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Introduction: Downbeat nystagmus (DBN) is the most common form of acquired persisting nystagmus. It is associated with postural imbalance and oscillopsia, which have considerable impact on daily activities like reading. Given that there is still no cure for DBN, it is important to concentrate on mechanisms that mitigate the symptoms. One such approach has been demonstrated by numerous clinical studies that have analyzed the effects of 4-aminopyridine and 3,4 diaminopyridine on DBN (Kalla et al. 2007, Kalla et al. 2004, Strupp et al. 2004, Strupp et al. 2003). On the basis of reports by DBN patients that their symptoms were worse during the morning but better during the daytime, we investigated whether the intensity of DBN changes during the daytime.
Methods: DBN was measured at 9.00 am, 11.00 am, and 1.00 pm. The slow-phase velocity of DBN was determined in different eye positions, with and without fixation as well as in three different body positions: sitting upright, lying supine with the nose up, and lying prone with the nose down.
Results: The major findings of this study were as follows. First, the intensity of DBN significantly decreased during the daytime. Second, this change did not depend on fixation, neither between nor during the measurements. Third, this effect was not influenced by the eye position during the measurements (upward, downward, straight ahead). Fourth, a detailed analysis, however, showed that the changes of intensity of DBN during the daytime was dependent on body positions between the measurements: only when the subjects sat upright was there a decrease during the daytime.
Conclusion: Our data show that the intensity of DBN decreases during the daytime. This decrease correlates with the symptoms of the patients. Further, the changes over time are influenced by otolith input. As an immediate therapeutic consequence of this finding, we recommend that patients sleep in an upright position for one or two hours in the morning to minimize the intensity of DBN and associated symptoms during this time.

P70 ***Interest of cerebral MRI in congenital nystagmus.***

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Introduction: Infantile nystagmus syndrome (INS) may be present at birth but usually develops during infancy. The aim of this study is to present the result of MRI in the INS.
Methods: it's a prospective study from 2000 to 20007, 48 children with INS are included. Each child underwent a medical history, ocular examination and brain MRI under general anesthesia. Three groups of nystagmus are individualized : group 1 (n=26) neurologic nystagmus (associated with neurological context : fetal suffering, psychomotor retardation, epilepsy...), group 2 (n=15) sensory nystagmus (with disease of visual system), group 3 (n=7) isolated (idiopathic and hereditary) nystagmus. Nystagmus (waveform, orientation) and MRI signs are analysed. MRI is interpreted by a single neuroradiologist experienced in pediatric MRI. MRI results are classified in : cerebral atrophy, metabolique disease, enlarged subarachnoid space and Virchow-Robin spaces, white and gray matter signal abnormalities, developmental malformations (corpus callosum, septum pellucidum), brainstem signal abnormalities, destructive lesions.
Results: The mean age of the onset of nystagmus is 2,8 months, of the first appointment 8,3 months, of MRI 11 months. The nystagmus is always conjugate and mainly horizontal 81,2 %, vertical 14,5 %, torsional 4,3 %. The waveform of the nystagmus is pendular in 60,5 %, jerk in 18,7% combined pendular-jerk in 20,8 %. MRI showed 1. 16,6 % cerebral atrophy (6,25 % neurologic, 10,4 % sensory), 2. 4,16 % metabolique disease (4,16 % sensory). 3. 35,4 % developmental malformations (22,9 % neurologic, 6.25 % sensory, 6,25 % isolated) ; 6.43,7 % brainstem signal abnormalities (25 % neurologic, 12,5 % sensory, 6,25 % isolated); 7. 8,3 % destructive lesions (8,6 % neurologic). MRI results according to the three groups show a statistical correlation between the rate of pathologica MRI and each group. Discussion : the MRI abnormalities described concern the saccadic system pathways.
Conclusion: This study shows fundamental contribution of the cerebral MRI in infantile nystagmus syndrome.

P71 ***Surgical options in congenital nystagmus (Ny).***

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Introduction: Surgical treatment in congenital Ny has 2 goals: A. To improve the head position - to shift the null zone toward the primary position B. To improve the VA
Methods: We reviewed 37 cases of congenital Ny. Age: 4 and 32 years, VA 20/25 to 20/100, follow-up 6 months to 7 years. A. 31 cases showed torticollis. a)15 Orthotropic In torticollis 20- 30 degrees we used "Large Anderson" procedure: 10 mm lateral rectus (LR) recession of the abducted eye and 7 mm medial rectus (MR) recession of the adducted eye (15 cases) In 40 degrees torticollis: increase surgery with 20% (2) b)10 Esotropic Esotropia 16-25 PD: reduce LR recession, increase MR recession (5) Esotropia 30-45 PD: MR recession 7mm, LR resection 10-13 mm in the fixing eye, LR recession 5-6 mm in the other (5) c) 2 Exotropic 40 PD: MR resection 6 mm, LR recession 13 mm in the fixing eye, MR recession 4 mm in the other. d) 4 horizontal Ny with null point in down gaze: inferior rectus recession 4 mm, superior recti resection 6 mm B. 6 patients had sensory Ny, no torticollis. VA: 20/100 to 20/300 1 orthotropic: Four muscle recession: 7 mm MR, 10 mm LR 4 exotropic: reduced MR recession, increase LR recession, MR 2 mm less than the LR. 1 esotropic: increase the MR recession, decrease the LR recession.
Results: a) Torticollis correction: 30,3 to 6 degree b) Correction 28,5 to 6,5 degree, residual esotropia 0-20 PD c)Correction: 35 to 5 degree, orthotropia d) One undercorrection: 40to 20 degree B. VA gained 1-3 lines, the amplitude of Ny was reduced.
Conclusion: Large Anderson gives satisfactory results in treating torticollis in Ny, no overcorrection, no complication, 2 muscles are left un-operated allowing re-operations. Four muscle recession procedure increases visual efficiency, improves vision slightly in most patients.

P72 ***Unilateral vertical nystagmus: The Heimann-Bielschowsky phenomenon.***

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Introduction: The Heimann-Bielschowsky phenomenon (HBP) is an unilateral vertical nystagmus with coarse, slow pendular movement that typically occurs in an eye with profound visual loss.
Methods: Retrospective case series. Medical records were reviewed from January 2004 to January 2008.
Results: Six cases were male. Two cases were female. Age at presentation was ranged from 4 to 45 years old. Seven cases had vision of 6/60 or worse. Only one case had visual acuity 6/36. Strabismus was seen in 5 cases (exotropia 4 cases and esotropia 1 case). No one had symptoms of diplopia or oscillopsia. All cases had unilateral coarse, slow, pendular vertical oscillations occurring in the poor vision eye.
Conclusion: Monocular vertical oscillation may develop in an eye with reduced vision. It may be a common condition but under diagnosed.
Commercial Relations: none

P73 ***Central fusion disruption syndrome after closed-head trauma***

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Introduction: To report a case of central fusion disruption syndrome after closed -head trauma
Methods: A 35-year-old man suffered from torsional diplopia after closed head trauma. He was diagnosed as bilateral superior oblique palsy. We performed bilateral Harada-Ito operation after 6 months waiting.
Results: The result of surgery was quite successful. Orthotropia was achieved at primary gaze. Excyclotorsion of his fundus returned to normal and subjective torsion was disappeared with double Maddox rod test. But he still had difficulty in fixing target and he complaint of cental diplopia. He had no diplopia in peripheral vision. With central partial field occlusion, his symptom was relieved. The symptom was not disappeared after 1 year waiting.
Conclusion: Central fusion disruption syndrome is rare and most of acquired cases result from serious head injury. It may be bothersome and intractable in most cases.
Commercial Relations: none

P74 ***Abducens nerve palsy induced by chemotherapeutic agents***

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Introduction: We report two cases of abducens nerve palsy occurring after administration of chemotherapeutic agents.
Methods: (Case 1) A 49-year-old woman with breast cancer presented with acute onset of diplopia 6 weeks after the beginning of combination chemotherapy with cyclophosphamide and doxorubicin. She had a left esotropia of 20 prism diopters (PD) with mild decrease in abduction of the left eye. A left abducens nerve palsy was diagnosed. (Case 2) A 28-year-old man with non-Hodgkin's lymphoma presented with diplopia 6 months after combination chemotherapy including cyclophosphamide, doxorubicin, vincristine, and prednisolone. He had 20 PD esotropia in primary position with slight decrease in abduction of both eyes. He was diagnosed with bilateral abducens nerve palsy.
Results: They had no lesion in abducens nerve pathway on MRI and they had normal CSF findings. Their chemotherapy regimen were discontinued. Her diplopia improved 4 months after cessation of therapy with complete recovery within 5 months. His diplopia improved 1 month after cessation of therapy.
Conclusion: Chemotherapeutic toxicity is an uncommon cause of ocular motility disorders. Abducens nerve palsy developed after chemotherapy with cyclophosphamide, doxorubicin, and vincristine. These three agents can cause diplopia and strabismus. Among these, vincristine is the only drug whose major dose-limiting toxicity is neurologic. Until now, eight cranial nerves (numbers II, VIII, and X) have been reported to be involved in vincristine-associated neurotoxicity. Diplopia improved without specific treatment after discontinuation of therapy in our two cases. Chemotherapeutic agents should be considered as the possible aetiology of the ocular motility disorders and toxic cranial neuropathy.

P75 ***Vertical rectus muscle transpositon with recession of medial rectus at six nerve palsy***

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Introduction: Common indication for rectus muscle transposition surgery includes treatment of six nerve palsy, including Duane syndrome with severe abduction limitation, and paralysis of any single rectus muscle that is innervated by the third cranial nerve. The goal of transposition surgery is primarily to realign the deviating eye, optimally to the primary position and hopefully achieving single vision without the aid of prism spectacles after surgery. The aim of this study is to investigate the cumulative effects of these two different surgical approaches applied to the same patients.
Methods: To review the results of a muscle transposition procedure in which the halves of the vertical rectus muscle bellies are sutured onto the sclera adjacent to the paralysed lateral rectus muscle insertion and recession(resection) of medial rectus muscle. Eleven patients with abducens palsy received the (Hummelsheim) procedure Hummelsheim with recession of medial rectus, at the same surgery, in last two years (2006 in 2007). We measured the ocular deviation, before and after surgery and presence of single vision in primary position after surgery.
Results: At 7 cases alignment was achieved in the primary position with single vision with transposition of vertical recti as Hummelsheim procedure and recession of medial recti on involved eye. At one patient just transposition of vertical recti as Hummelsheim procedure was performed, but another recession of medial recti have (had) to be done. At one patient Transposition of vertical recti as Hummelsheim procedure with recession of medial rectus and resection of lateral rectus of involved eye was performed. At two cases at first procedure recession and resection of horizontal recti was performed. Because that was not enough (Because of insufficient final outcome), transpositon of vertical recti as Hummelsheim procedure was added. All patients have single vision in primary position except one who will have another surgery and one who needs spectacles with 5 prism diopters.
Conclusion: Transposition of vertical recti as Hummelshaim procedure combined with recession of medial recti improves ductions and stability of single vision in primary position.

P76 ***NIII palsy with aberrant regeneration: 2 Case reports.***

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Introduction: We present the results, after strabismus surgery, of 2 patients suffering from third nerve palsy with aberrant regeneration.
Methods: The first patient, a 20-year-old man, developed right sixth and third nerve palsy with aberrant regeneration secondary to an aneurysm of the distal part of the right internal carotid artery in the cavernous sinus. He had a right esotropia and hypotropia with partial ptosis and permanent horizontal and vertical diplopia in all directions of gaze. The elevation and abduction of the right eye were limited. Adduction of the right eye was seen on attempted elevation and depression along with elevation of the right upper eyelid upon down-gaze. The second patient, a 54-year-old lady, developed a complete NIII palsy with aberrant regeneration after an aneurysm of the right posterior communicating artery. She also had permanent diplopia, partial ptosis and mydriasis of the right eye. The adduction, elevation and depression of the right eye were limited. Adduction of the right eye was seen on attempted elevation, pupil constriction on attempted adduction and elevation of the right upper eyelid on attempted down-gaze, more pronounced on down-gaze adduction.
Results: In the first patient, straight eyes in primary position with a useful field of binocular single vision were obtained after weakening of both medial rectus muscles and both elevators of the sound eye. In the second patient similar results were seen after weakening of inferior rectus, inferior oblique and the superior rectus muscle of the sound eye.
Conclusion: In certain cases of aberrant regeneration of the oculomotor nerve, strabismus surgery may prove successful.
Commercial Relations: none

P77 ***Pituitary tumor apoplexy – case report.***

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Introduction: To report a case of rare pituitary apoplexy: an acute haemorrhagic infarction of pituitary adenoma
Methods: A 53- year old man developed sudden massive headache with nausea, vomiting and altered consciousness. Total paresis of the third and the sixth cranial nerve developed very fast, visual functions were normal. MRI imaging revealed suprasellar macroadenoma, with an area of central necrosis, spreading into the right cavernous sinus. After immediate initiation of steroid replacement, resection of tumor and decompression of constricted cavernous structures were performed.
Results: Three weeks after surgery, motility is normal, visual acuity and visual field as well. Corneal hypaesthesia of the right eye has remained. The need for hormone replacement is minimal.
Conclusion: Pituitary apoplexy is a rare but life-threatening condition. Swift recognition of an accurate diagnosis allows prompt steroid administration and surgical decompression.
Commercial Relations: none

P78 ***Periosteal fixation in bilateral total third nerve palsy.***

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Introduction: We present a new technique of anchoring the eyeball to the nasal periosteum with supramaximal recession of the lateral rectus muscle in one eye for the management of exotropia in bilateral total third nerve palsy combined with trochlear nerve palsy.
Methods: A 38-year-old man presented with drooping of both upper lids and exodeviation of the left eye with history of intraventricular hemorrhage 9 months back. He had bilateral ptosis, dilated pupil and left 100PD exotropia in primary position with inability to move both eyes except abduction. He was diagnosed with bilateral total third nerve palsy and trochlear nerve palsy. We fixated the globe (sclera anterior to the insertion of the medial rectus muscle) to the nasal periosteum including medial palpebral ligament using nonabsorbable suture. A large recession of the left lateral rectus muscle (14mm) was also performed.
Results: Ocular alignment in the primary position was a exotropia of 25PD and a hypotropia of 20 PD. Superior rectus resection of the left eye was performed at 2 months postoperatively. Ocular alignment was cosmetically satisfactory at 6 months of follow up.
Conclusion: Supramaximal recession of lateral rectus muscle and periosteal fixation using nonabsorbable suture is an effective technique for the management of exotropia secondary to total third nerve palsy. But there is a possibility of the vertical deviation according to the position of the periosteal fixation.
Commercial Relations: none

Notes

P79 ***Predictability of strabismus surgery in children with developmental delays and/or psychomotoric disorders compared to normally developed children.***

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Introduction: Children with developmental disorders and/or psychomotoric delay may show a response to strabismus surgery that is different from children who developed normally. The literature on this topic is conflicting.
Methods: We studied 37 patients with spasm, trisomy 21, prematurity, epilepsy, psychomotoric retardation and/or hydrocephalus (study group) and 69 control patients, all between 14 months and 14 years of age. All received recession of one or both medial rectus muscles (Rc-surgery) or a monocular recession-resection of medial-lateral rectus muscles (RcRs-surgery), for esotropia. Spectacles were prescribed prior to surgery for all hyperopia >2D, all partly accommodative esotropia and all myopia.
Results: Effect per mm of surgery: After two months, the effects (degrees change of strabismus angle per millimeter of surgery, (mean(SE(mean))) for Rc-surgery were 2.45(0.14)º/mm (study group) and 1.50(012)º/mm (control group) (P←0.001) and for RcRs-surgery 1.87(0.13)º/mm (study group) and 1.80(0.12)º/mm (control group) (P=0.725). After one year, differences were similar. Success of surgery: Esotropia between 0-6º after two months was present for Rc-surgery in 87 % in the study group (with adjusted dosages) and 87 % in the control group and for RcRs-surgery in 44 % in the study group and 88 % in the control group.
Conclusion: Rc-surgery in children with developmental disorders and/or psychomotoric disorders should be dosed lower than in children who developed normally, RcRs-surgery may be dosed normally.
Commercial Relations: none

P80 ***Congenital ocular motor apraxia associated with idiopathic generalised epilepsy in monozygotic twins.***

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Introduction: Identical female twins (age 11 years) with congenital ocular motor apraxia and idiopathic generalised epilepsy (IGE) are reported. Their presenting symptoms were a long history of abnormal head and eye movements.
Methods: The patients underwent 16-channel EEG, electro-oculographic recordings, MRI of the brain and genetic and metabolic investigations
Results: EEG findings were consistent with IGE, electro-oculographic recordings of the saccades confirmed inability to generate horizontal saccades without preceding head movement. MRI were normal. DNA analysis confirmed monozygocity. White blood cell analysis excluded other metabolic diseases (Sandhoff's Tay Sachs, GM-1 Gangliosidosis, Metachromatic Leuco dystrophy, Gauchers, Nieman Pick A & B and Krabbe's leucodystrophy)
Conclusion: This is the first report of Congenital Ocular Motor Apraxia in association with Idiopathic Generalised Epilepsy. Autosomal Recessive Inheritance seems the most likely explanation here.
Commercial Relations: none

Notes

P81 ***Neurodevelopmental outcomes in children with congenital ocular motor apraxia.***

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Introduction: Ocular motility abnormalities in patients with congenital ocular motor apraxia (COMA) are well described in the literature. However, the neurodevelopmental profile of these patients has not been systematically investigated. The purpose of this study is to characterize the neurodevelopmental outcome of patients with COMA.
Methods: Retrospective analysis of medical records of all children diagnosed with COMA at Arkansas Children's Hospital between 1993 and 2007. Each patient had a complete ophthalmologic examination and developmental history, including questions regarding motor coordination, language development, intellectual ability and school performance. Patients with associated neurological disorders were excluded from the analysis.
Results: Twenty-five patients were diagnosed with COMA based on the presence of characteristic clinical findings including horizontal head thrusting, inability to generate horizontal saccades and relative preservation of vertical eye movements. All patients had hypotonia during infancy. Thirteen patients continued to have motor developmental delay and did not start walking until after 18 months. Eleven patients had speech delay and all patients had reading difficulties. Fifteen patients had cranial magnetic resonance imaging and two had cranial computed tomography. Abnormalities included vermis hypoplasia (6 patients), cerebral atrophy (2 patients), and cortical heterotopia (2 patients). All patients with abnormal neuro-imaging had developmental delay. Among the 7 patients with normal neuro-imaging, 6 had developmental delay.
Conclusion: Patients with COMA frequently have delayed speech, reading, and motor development. Neuroimaging abnormalities are common, but developmental delay is common even in the absence of neuroimaging abnormalities. Notwithstanding the presence of neuroimaging abnormalities, COMA seems to represent the salient abnormality in a broad spectrum of neurodevelopmental disturbance.

P82 ***Strabismus in premature children.***

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Introduction: The developments in neonatology have resulted in an increasing number of deliveries of extremely immature infants that are associated with high morbidity. The main cause of eye disorders is the retinopathy of prematurity (ROP) and neurological diseases. Eye disorders related to the retinopathy of premature infants may be presumed and examined very early after birth. Many of the eye disorders appear, however, later in life. The aim of this study is to document the incidence of strabismus in a group of premature infants with the birth weight less than 1500g and to compare it with the incidence of strabismus in a group of full-term healthy children.
Methods: The research was carried out on 37 children at the age of 8, who were born prematurely with a weight below 1500 g. The visual acuity, strabismus and refraction errors were examined. Similar qualities of vision were examined in the group of full-term born children of the same age.
Results: The visual acuity in the group of premature infants was in the range of 1.0 – 0.8 in 80.6 % eyes, 0.7 – 0.5 in 6.9 % eyes, 0.4 – 0.3 in 2.8 % eyes, 0.2 – 0.1 in 8.3 % eyes, less than 0.1 in 1.4 % eyes. 48.6 % of examined children wear glasses, and hypermetropic correction prevails in 28.4 % eyes. Strabismus was found in 7 children (18.9 %). In 3 cases (8.1 %) it was exotropia, in 4 cases (10.8 %) esotropia. 3 children (8.1 %) had been operated for strabismus. Nystagmus was detected in 1 child (2.7 %). In the control group neither strabismus or nystagmus had occurred.
Conclusion: The results of our study, namely a higher occurrence of refractive errors and strabismus, show the necessity of following regularly premature infants with a low birth weight to prevent amblyopia and disturbance of binocular single vision. Follow-ups even in later age, together with the attempt to overcome and compensate these errors, are very important, especially in children with neurological problems, who have frequent vision complications as well.
Commercial Relations: none

P83 ***Ophthalmic Findings in children with Periventricular Leucomalacia.***

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Introduction: To evaluate the spectrum of visual and ocular motility dysfunctions in children diagnosed as periventricular leucomalacia (PVL).
Methods: Twelve consecutive patients with PVL documented by Magnetic Resonance Imaging (MRI) were evaluated. All patients underwent complete ophthalmologic examination. Visual acuity was assessed by optokinetic nystagmus test in pre-verbal children.
Results: Mean age of the study group was 3.54±2.4 years (range; 1-7), mean birth weight was 2233±753 gm (range; 1240 to 3500) and mean gestational age was found as 32.6±3.2 (range; 28-38) weeks. Seven children had a gestational age less than 32 weeks. No child had visually impairing retinopathy of prematurity. Six patients had mental retardation and 3 patients were under treatment for epilepsy. No patients had high myopia; astigmatism was the most prevalent refractive error in children. Seven patients had hypermetropic astigmatism, 2 patients had myopic astigmatism and 2 patients had mixed astigmatism. Only one patient had amblyopia due to hypermetropic astigmatic anisometropia. Manifest strabismus was present in 10 patients (83 %), 3 patients had esotropia (20-40 PD), 6 patients had exotropia (15-50 PD), and 1 patient had vertical deviation (10 PD). Manifest nystagmus was detected in 7 patients. Fundus examination revealed 2 patients with small hypoplastic optic disks; optic disk pallor was seen in one patient and large cups in 3 patients.
Conclusion: Periventricular leukomalacia results in a wide range of ocular manifestations. Early diagnosis of these children will facilitate the visual rehabilitation.

P84 ***Surgical treatment of esotropia and entropion in Hallerman-Streiff syndrome.***

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Introduction: Hallerman-Streiff syndrome is reported in rare occasion and most of the them are focused at congenital cataract and spontaneous lens resorption. We performed surgery for large angle esotropia and entropion of upper and lower lids in Hallerman-Streiff syndrome patient.
Methods: The patient was 54 years old and had characteristic feature of Hallerman-Streiff syndrome which are bird- beak nose, short stature, mandible hypoplasia and hypotrichosis of hair and eyebrows. He had microphthalmos, aphakia, esotropia of 100 prism diopter, ptosis and entropion of upper and lower lids. We did bimedial rectus recession of 7.5mm and left lateral rectus resection at the same time and corrective surgery of upper and lower lid consecutively.
Results: Ptosis and entropion of upper and lower lids were corrected successfully and esotropia was reduced to 15 prism diopter which showed good cosmesis.
Conclusion: Strabismus surgery of Hallerman-Streiff syndrome is not reported yet and its particular facts of large angle strabismus and microphthalmos often make the surgery challenging.
Commercial Relations: none

Notes

P85 ***Ophthalmological data of 110 pediatric patients with fabry disease: Latest analysis from the fabry outcome survey (FOS).***

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Introduction: Fabry disease is an X-linked lysosomal storage disorder caused by deficient activity of the lysosomal enzyme alpha-galactosidase A. Progressive accumulation of the enzyme substrate in cells throughout the body leads to organ failure and premature death. Treatment for this disease has recently become available in the form of enzyme replacement therapy. To determine the efficacy and safety of ERT with agalsidase alpha, FOS – the Fabry outcome survey – has been established. The present analysis of the FOS database aims to provide ophthalmological data on the natural history of Fabry disease in children.
Methods: The FOS database was analysed in terms of ophthalmological findings in Fabry disease in patients under 18 years of age.
Results: As of March 2008, 110 children (59 girls, 51 boys) were enrolled in FOS from 11 European countries. 48 % of them were on enzyme replacement therapy. While the ophthalmological hallmark of the disease, the cornea verticillata, was more prevalent in females (80 % of the females vs. 55 % of the males affected), this did not hold true for the other ophthalmological features of this condition. 25 % of the males showed either conjunctival or retinal vessels tortuosity, this sign being found in 33 % of the affected female patients. 13 % of the male Fabry patients suffered from the typical Fabry cataract, while this peculiar form of posterior lens opacification was noted in 7 % of female patients.
Conclusion: FOS is providing valuable information on the prevalence of ophthalmological signs in the to date largest data base on this orphan disease. Since the advent of enzyme replacement therapy, early diagnosis is of utmost importance. The high prevalence of cornea verticillata in this pediatric patient population emphasises the value of ophthalmological screening for this disease.
Commercial Relations: none

P86 ***Comparison of fibrin glue and sutures for conjunctival closure in strabismus surgery.***

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Introduction: The adhesive properties of fibrin glue have proven useful in preventing excessive bleeding and enhancing tissue adhesion in ophthalmic surgeries. The purpose of this study is to investigate and compare the clinical efficacy and tolerance of fibrin glue versus 8-0 polyglactin sutures for conjunctival wound closure in strabismus surgery.
Methods: In a prospective randomized study, we performed primary strabismus surgery using 8 mm radial limbal conjunctival incisions. The conjunctival wounds were closed with commercial fibrin glue (Greenplast®) in 33 eyes of 20 patients (fibrin group) or 8-0 polyglactin suture in 32 eyes of 20 patients (suture group). Postoperative pain, tearing, and the extent of inflammation (hyperemia, chemosis, discharge) were analyzed and compared at one day, 1 week, 3weeks, and 6weeks after surgery in both groups. Conjunctival incisional healing was also investigated.
Results: One day postoperative, the scores of pain ($P<0.01$) and tearing ($P<0.01$), were significantly lower in fibrin glue group. One week postoperative, the scores of pain ($P=0.01$) and tearing ($P=0.01$) were significantly lower in fibrin group. Mean surgery time in fibrin group (40±8min) was significantly shorter than suture group (50±10min) ($P<0.01$). The extent of inflammation and overall incisional healing were not significantly different in both groups throughout the time ($P>0.1$, respectively). Conjunctival hyperemia appeared more prominent in fibrin group throughout the time but statistically insignificant ($P=0.68$). Two eyes (6 %) in fibrin group showed conjunctival gap more than 2 mm, but closed without sutures at the end of 3rd week after surgery. No allergic reactions or infections were developed.
Conclusion: Fibrin glue was proved to be as effective as sutures in healing of conjunctival wound. It provides safe and more comfortable early postoperative courses and might be considered as an alternative method to sutures in strabismus surgery. For application it in children with extensive Tenon's capsule, flat rearrangement of anterior Tenon was crucial.
Commercial Relations: none

P87 ***Innovative non-invasive method of strengthening rectus muscles in concomitant strabismus surgery.***

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Introduction: The well-known traumatic character of rectus muscles resection imposes the necessity of searching for new non-invasive methods of surgery. Such methods must be equal in its efficiency to the standard resection technique but devoid of its destructive consequences for the eye tissues.
Methods: We have developed a new non-invasive method of rectus muscles surgery. The essence of this method is layer-by-layer approach to the muscle without damaging the muscle sheath. Then the muscle is sutured according to the standard technique in the dosage location and fixed to the end without resection. Thus, a tendinous/muscular fold with a preserved anatomic structure is formed. This method has been used for treating 112 patients with horizontal concomitant strabismus, with deviation of 15º ±6º, the average age of the children was 7±4 years. The control group consisted of 26 children, who underwent muscles resection according to the generally accepted method.
Results: The method efficiency was compared to the standard one by the following criteria: - frequency of postoperative orthotropia - frequency of cyclotropia - frequency of postoperative edema - healing period - degree of ocular motility at the operated side at early postoperative period Analysis of results revealed that the main group patients demonstrated a better functional and rehabilitation effect of surgery for all the foregoing criteria, as compared to the control group in the ratio of 2:1 and 4:1 respectively.
Conclusion: Our method of strengthening rectus muscles allows to: - preserve the muscles sheath and tendon - avoid cutting ciliary arteries and nerves, preserving normal innervation and vascularization of the eye - ensure adapted application of the muscle to the end - preserve anatomical structure of the muscle and the investing tissues.
Commercial Relations: According to our data, usage of the new method allows to decrease the cost price of surgeries by 25-28% due to decreasing the surgery time, reducing the rehabilitation period and duration of hospital stay.

P88 ***The surgical results of the slipped medial rectus muscle after hang back recession surgery.***

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Introduction: Slipped muscle is known surgically disinserted rectus muscle that its capsule in the subtenon space. This is potentially serious and under recognised complication of strabismus surgery.
Methods: During the course of 5 years eleven patients who underwent re-exploration for slipped muscle by a single consultant (YD) were included in this study. Preoperative evaluation included ocular motility assessment with prism and cover test in all positions, intraoperative forced duction testing and active force generation different intraocularvpressure measurements performed if possible. A orbital imaging studies may aid in identifying slipped muscle. Resection of empty sheath of the slipped medial rectus muscle with advancement to the original site of insertion was performed in all cases. The antagonist muscle was recessed only if medial rectus muscle was tight in one patient.
Results: The average age of the patients at the time of the presentation was 17.3 years (from 6 to 50 years).The average duration between the time of first operation and that lead to the slipped muscle was 2.1 years (from 1 to 3 years).The mean duration of follow up after surgery 2.3 years. Preoperatively, the mean duction limitation in the field of action of the slipped muscle was -1.1. After this second procedure, the eyes became orthotropic and the adduction disorder, large widening the lid fissure and mild exophthalmos resolved.
Conclusion: The diagnosis of slipped muscle should be confirmed during strabismus surgery. The slipped muscle may have been caused by insufficient suture and excessive rubbing of the eye by the patient. When divergent strabismus is observed after recession of the medial rectus muscle, a slipped muscle should be considered as a differential diagnosis.
Commercial Relations: none

P89 ***Treatment of the paralytic strabismus with marginal transposition of vertical rectus muscles.***

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Introduction: The purpose of our study was to estimate efficiency of marginal transposition (MT) at surgical treatment of abducens palsy, carried out on rectus muscles of vertical action.
Methods: The study group included 8 patients with paralytic esotropia. All patients were underwent operation on the novel technique in a combination with recession of medial rectus. MT consists from following steps. Superior and inferior rectus muscles are divided on two longitudinal parts. The lateral part (1/3 width of a muscle) is sutured to sclera between superior (inferior) and lateral rectus muscles on equatorial zone of an eye.
Results: At all patients orthotropia has been achieved. The compensatory head turn has been eliminated.
Conclusion: The marginal transposition performed in combination with weakening operation allows achieving good stabile results. The technique of the proposed operation is easy in performance and little traumatic.

P90 ***Strabismus surgery for sensory heterotropia in Asian patients.***

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Introduction: Sensory heterotropia occurs secondary to unilateral poor vision. Surgery for sensory heterotropia is a recession and resection of the non-fixing eye. The aims of our study are to: 1. characterise sensory heterotropia in our population 2. analyse the results of our surgery 3. determine if there are any associations between success and factors such as gender, age, vision in non-fixing eye, type and amount of sensory heterotropia, and whether the strabismus surgery was a primary or repeat operation.
Methods: Retrospective review of cases performed by a single surgeon over a 3-year period.
Results: 13 cases of sensory heterotropia were operated from 2004 to 2007, with 8 cases of sensory exotropia (XT) and 5 cases of sensory esotropia (ET). Mean pre-operative deviation was 35.8 prism dioptres (PD) for sensory XT, and 42.1PD for sensory ET. Post-operative mean deviation was 3PD for sensory XT and 10PD for sensory ET. For sensory XT, the mean amount of lateral rectus (LR) recession and medial rectus (MR) resection was 7.2 mm and 5.9 mm respectively. The mean amount of MR recession and LR resection for sensory ET was 7.4 mm and 6.6 mm respectively. 3 cases had associated vertical surgery, with 1 case each of superior rectus recession, supra-placement of horizontal muscles and inferior oblique full anteriorisation. Success was defined as orthophoria within 10PD, which was cosmetically acceptable. Overall we achieved success in 9/13 patients (69.2 %). Patients with sensory XT had better success [87.5 % (7/8cases)] than patients with sensory ET [40 % (2/5cases)]. Failures were in 1 case of sensory XT that had previously undergone strabismus surgery, and 3 cases of sensory ET with pre-operative deviations larger than 50PD. All 4 failures were under-corrected. There was no case of over-correction. Females had a better success rate [100 % (6/6 patients)] compared to males [42.9 % (3/7 cases)]. Interestingly, patients with visual acuity of counting fingers and poorer had a better success rate [100 % (8/8 cases)] than those with visual acuity better than counting fingers [71.4 % (5/7 cases)]. Unsurprisingly, success for patients undergoing primary strabismus surgery [75 % (6/8cases)] was better than for patients undergoing repeat surgery [60 % (3/5 cases]. The mean age was similar in successful cases (37 years old) and failures (32 years old). Patients with pre-operative deviations of 40PD or less had a similar success rate [71.4 % (5/7 cases)] to patients with larger pre-operative deviations [66.7 % (4/6)].
Conclusion: Unilateral recession and resection is a viable option for sensory heterotropia. Factors associated with success are female gender, poorer vision in the non-fixing eye, sensory exotropia and primary strabismus surgery. Age and the amount of pre-operative deviation did not seem to affect the success of surgery. Further studies with more patients and longer follow-up duration will be needed to validate the findings of this study.
Commercial Relations: none

P91 ***Effects of botulinum toxin chemodenervation of medial rectus muscle on ocular deviation and saccadic characteristics.***

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Introduction: To study the changes in saccade characteristics of eye movement and distance esotropia in response to botulinum toxin chemodenervation of the medial rectus muscle
Methods: Measurement of ocular deviation and saccadic eye movement recorded with infrared oculography were made before injection and after 2, 6, 12, 24 weeks after injection in a patient with chronic lateral rectus palsy
Results: Changes in saccadic function were observed in both eyes. At 2 weeks after injection ocular deviation changed of 35 prism dioptres and adduction saccades were slowed in eye with injected muscle. By the second examination the adducting saccade velocity increased. A difference persisted between the two eyes
Conclusion: The ocular alignment after injection persisted after the saccadic function was nearly restored.

P92 ***Effects of botulinum a toxin injection on the extraocular muscle fiber layers: Comparison between subtenon injection and intramuscular injection.***

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Introduction: Botulinum Toxin A has been widely used for the treatment of strabismus as an alternative to conventional incisional surgery since 1989 with FDA approval. Usually in the clinical field, injection of purified BTX-A to extraocular muscles are performed under audible EMG guidance using Teflon coated 27 gage needle to ensure accurate injection into the muscle. This procedure have been proved to be a relatively easy procedure. But the complications with this intramuscular BTX injection may range from conjunctival haemorrhage up to more serious complication such as scleral perforation. To avoid these unnecessary complications, subtenon injection of BTX was tried in the limited clinical cases. The effects of subtenon injection of BTX to extraocular muscle needed to be defined in order to broaden its application in ophthalmology. In this study, we have evaluated the effects of subtenon injection of BTX-A to determine its effects in the extraocular muscles in the orbital and global layer, both. And comparison between the effect of subtenon injection and direct intramuscular injection of BTX-A was also performed according the times through after treatment.
Methods: Twelve New Zealand white rabbits were divided into 2 groups. In the first group (containing 6 rabbits), 4 of which were injected with 10 units of BTX-A into the subtenon space of superior rectus of rt. eye. On the Lt. eye, the same dosage of BTX-A was injected into the SR muscle directly. The other 2 rabbits in the first group were labelled as control with 0.1mi normal saline injected into the subtenon of rt. eye while direct intramuscular injection was performed on the opposite eye. The animals in the first group were sacrificed after 4Wks to measure average cross-sectional area of muscle fiber-both in orbital and global layer. In the second group(containing 6 rabbits), the same procedures were performed and the animals were sacrificed 12 Wks after treatment.
Results: Four weeks later after treatmet, the average cross-sectional area of muscle fibers in orbital and global layer was markedly reduced in BTX injected group, compared to control group. There was no difference between the average cross-sectional area of muscle fibers in the orbital layer of the subtenon and that of intramuscular injected group. But the average cross-sectional area of muscle fibers in the global layer of intramuscular injected group was significantly more reduced than that of subtenon group. At 12 Wks, there was no difference found between BTX injected group and the control group, which was not dependent on where the toxin was injected.
Conclusion: Compared to direct intramuscular injection, subtenon injection of BTX-A induces similar morphological changes in the extraocular muscle fiber layers both in the orbital and global layer. Theses results suggest the possibility of clinical applications of subtenon BTX-A injection for the treatment of strabismus.
Commercial Relations: none

P93 ***Dose effect of botulinum toxin A in heterotropia and heterophoria.***

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Introduction: To purpose of this study is to evaluate the dose of effect of botulinum toxin in manifest and intermittent strabismus types.
Methods: Dysport (TM) of 2 mouse units was injected into a single muscle in cases of constant esotropia and exotropia plus decompensating esophoria and exophoria. EMG signal was recorded during each procedure. Angle of deviation was measured in each case pre treatment and post treatment at 2 weeks by prism cover test for near and distance fixation. Change in deviation was evaluated by non parametric statistical evaluation.
Results: 19 cases of esotropia: 12 female, 7 male, 9 with injection to left medial rectus muscle and 10 to right medial rectus muscle. Change in angle of deviation from median of 40 PD to 18 PD at near fixation and 35 PD to 14 PD at distance fixation. 12 cases if exotropia: 8 female, 4 male, 7 with injection to right lateral rectus muscle and 5 to left lateral rectus muscle. Change in angle of deviation from 27.5 PD to 14 PD at near fixation and 25 PD to 16 PD at distance fixation. 20 cases of esophoria: 10 female, 10 male, 7 with injection to right medial rectus muscle and 13 to left medial rectus muscle. Change in angle of deviation from 22.5 D to 8 PD at near fixation and 20 PD to 6 PD at distance fixation. 15 cases of exophoria: 7 female, 8 male, 11 with injection to left lateral rectus muscle and 4 to right lateral rectus muscle. Change in angle of deviation from 25 PD to 8 PD at near fixation and 18 PD to 6 PD at distance fixation.
Conclusion: All changes in angle of deviation were significant. Larger pre treatment angles of deviation did not preclude significant changes in angle of deviation using botulinum toxin. Greater changes in angle were seen in esotropia than exotropia and also esophoria than exophoria.
Commercial Relations: none

P94 ***The role of botulinum toxin in infantile esotropia.***

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Introduction: Infantile Esotropia (IE) develops before the first year of life. The treatment with Botulinum Toxin (BT) has been shown similar success rates as the surgery. Such success has lead to indication for surgical correction only on rebellious cases, that won't correct with BT.
Methods: To determine the long-term motor results in patients with IE submitted to treatment with BT. A retrospective study was carried out. All patients underwent treatment with BT before the age of 4 years, with a regular follow-up up to 9 years of age.
Results: Thirty eight (38) patients were included. The average of age at the first treatment with BT was of 3 years and 3 months. At the age of 9-10 18 children (47 %) had an horizontal deviation <10Δ. Thirteen (34 %) were submitted to surgery, most of them to correction of excess of accommodative convergence.
Conclusion: BT has a significant success rate in the treatment of IE, reducing the need of surgical treatment.

Notes

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