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AAPOS Past Presidents

Marshall M. Parks, MD  1974-75  Lake Tahoe
Robert D. Reinecke, MD  1975-76  Bermuda
Jack C. Crawford, MD  1976-77  San Francisco
Robison D. Harley, MD  1977-78  Williamsburg
David S. Friendly, MD  1978-79  Toronto
Phillip Knapp, MD  1979-80  San Diego
Webb Chamberlain, MD  1980-81  Orlando
Arthur Jampolsky, MD  1981-82  Monterey
Alfred G. Smith, MD  1982-83  Vancouver
John A. Pratt-Johnson, MD  1983-84  Vail
Eugene R. Folk, MD  1984-85  Puerto Rico
Thomas D. France, MD  1985-86  Maui
Gunter K. von Noorden, MD  1986-87  Scottsdale
Arthur L. Rosenbaum, MD  1987-88  Boston
William E. Scott, MD  1988-89  Kiawah
Eugene M. Helveston, MD  1989-90  Lake George
Henry S. Metz, MD  1990-91  Montreal
John T. Flynn, MD  1991-92  Maui
Forrest D. Ellis, MD  1992-93  Palm Springs
David L. Guyton, MD  1993-94  Vancouver
Malcolm L. Mazow, MD  1994-95  Orlando
John D. Baker, MD  1995-96  Snowbird
Earl A. Palmer, MD  1996-97  Charleston
John W. Simon, MD  1997-98  Palm Springs
Marilyn T. Miller, MD  1998-99  Toronto
Maynard B. Wheeler, MD  1999-2000  San Diego
Albert W. Biglan, MD  2000-01  Orlando
Jane D. Kivlin, MD  2001-02  Seattle
Joseph H. Calhoun, MD  2002-03  Hawaii
George S. Ellis, Jr., MD  2003-04  Washington DC
Susan H. Day, MD  2004-05  Orlando
Michael X. Repka, MD  2005-06  Keystone
Christie L. Morse, MD  2006-07  Seattle
Edward G. Buckley, MD  2007-08  Washington DC
Bradley C. Black, MD  2008-09  San Francisco
C. Gail Summers, MD  2009-10  Orlando
David A. Plager, MD  2010-11  San Diego
Steven E. Rubin, MD  2011-12  San Antonio

AAPOS Board of Directors

President  K. David Epley, MD
Executive Vice President  Christie L. Morse, MD
Vice President  Sharon F. Freedman, MD
Vice President-Elect  Sherwin J. Isenberg, MD
Secretary-Treasurer  Robert E. Wiggins, Jr., MD
Secretary for Program  Stephen P. Christiansen, MD
Director-At-Large  R. Michael Siatkowski, MD
Director-At-Large  Mary Louise Z. Collins, MD
Director-At-Large  Derek T. Sprunger, MD
Past President  Steven E. Rubin, MD
AAPOS Councilor to the AAO  David A. Plager, MD

AAPOS Program Committee

Scientific Program Committee Chair  Stephen P. Christiansen, MD
Scientific Program Committee Members

Scientific Program Coordinator  Yasmine S. Bradfield, MD
Katherine A. Lee, MD
Graham E. Quinn, MD
Ann U. Stout, MD
C. Gail Summers, MD
David K. Wallace, MD
Maria A. Schweers, CO
AAPOS Lifetime Achievement Award

Susan H. Day, MD

AAPOS Senior Honor Awards

Joseph L. Demer, MD, PhD
Sean P. Donahue, MD, PhD

AAPOS Honor Awards

Benjamin H. Ticho, MD

AAPOS Committee Meetings

Wednesday, April 3, 2013

3:00 PM - 4:00 PM Fellowship Training and Compliance Committee
Parliament

5:00 PM - 6:30 PM Interorganizational Relations Committee
Adams

Thursday, April 4, 2013

12:45 PM - 2:00 PM Learning Disabilities and Vision Therapy Task Force
Baltic

1:00 PM - 2:00 PM Journal of AAPOS Editorial Board
Adams

1:00 PM - 2:30 PM International Affairs Committee
Parliament

1:30 PM - 2:30 PM Research Committee
Courier

2:30 PM - 3:30 PM Fellowship Directors Meeting
Empire

2:30 PM - 4:00 PM Public Information Committee
North Star

4:00 PM - 5:30 PM Professional Education Committee
Parliament

4:00 PM - 6:00 PM Legislative Committee
Courier

4:30 PM - 5:30 PM Online Media Committee
Mastif

Saturday, April 6, 2013

1:00 PM - 2:30 PM Vision Screening Committee
Baltic

1:00 PM - 5:00 PM Singapore Program Committee
Adams

2:30 PM - 3:30 PM Corporate Relations Committee
Parliament

3:30 PM - 5:30 PM Socioeconomic Committee
Courier

This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the American Academy of Ophthalmology and the American Association for Pediatric Ophthalmology and Strabismus. The American Academy of Ophthalmology is accredited by the ACCME to provide continuing medical education for physicians.

The American Academy of Ophthalmology designates this live activity for a maximum of 25.75 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Overall Meeting Goals

Upon completion of this activity, participants will be able to:

- Describe recent medical advances in the diagnosis, management, and treatment of conditions encountered in the practice of pediatric ophthalmology and strabismus
- Apply improved techniques, compare/contrast methods, and review clinical research and advances in order to provide the best possible treatment options and care to patients
- Demonstrate methods of ethical analysis and resolution of these dilemmas
- Practice newfound expertise in select aspects of surgery pertinent to pediatric ophthalmology and strabismus

Specific Learning Objectives

1. Employ most recent data from RCCTs in the diagnosis and management of amblyopia.
2. Incorporate new preoperative evaluation techniques and surgical strategies to improve outcomes in patients with comitant, pre-comitant strabismus.
3. Utilize new surgical techniques for complicated strabismus (restrictive, paretic, miswiring syndromes, scarring, incomitance, etc) to decrease reoperation rate by 10%.
4. Employ up-to-date patient selection criteria to identify children undergoing cataract surgery who should receive intraocular lenses.
5. Recognize new treatment techniques for pediatric glaucoma, retinal, and oculoplastic and orbital disease and make appropriate sub-specialty referrals for such cases.
6. Improve identification of high-risk ROP and incorporate new treatment strategies to decrease the incidence of significant visual loss from this disease.
7. Recognize pediatric ophthalmologic disease of neurologic origin and make appropriate referrals to pediatric neurology.
8. Utilize the latest resources for discussion of visual development, epidemiology of pediatric eye disease, learning disabilities, vision screening strategies with other physicians and members of the lay community.
9. Improve compliance with current coding rules and regulations for pediatric eye diseases.
10. Recognize current laboratory research with potential translation applicability to pediatric ophthalmology.

FDA Status Disclaimer: The FDA has stated that it is the responsibility of the physician to determine the FDA status of each drug or device he or she wishes to use in clinical practice, and to use these products with appropriate patient consent and in compliance with applicable law. The AAPOS provides the opportunity for material to be presented for educational purposes only. The material represents the approach, ideas, statement, or opinion of the presenter and/or author, not necessarily the only or best method or procedure in every case, nor the position of AAPOS. The material is not intended to replace a physician's own judgement or give specific advice for case management. AAPOS specifically disclaims any and all claims that may arise out of the use of any technique demonstrated or described in any material by any presenter and/or author, whether such claims are asserted by a physician or any other person. Please note: The AAPOS requires all presenters and/or authors to disclose any drug or device that is not approved for use by the FDA in the manner discussed during any oral presentation and/or on all written materials.
AAPOS Educational Mission Statement

The purpose of the American Association for Pediatric Ophthalmology and Strabismus' (AAPOS) educational activities is to present pediatric ophthalmologists and strabismologists with the highest quality lifelong learning opportunities that promote improvement and change in physician practices, performance, or competence through joint sponsorship with the American Academy of Ophthalmology (AAO), thus enabling such physicians to maintain or improve the competence and professional performance needed to provide the best possible eye care for their patients.

Due to the nature of the subspecialty, the largest component of AAPOS' educational program focuses on strabismus, amblyopia, visual development and binocular function. However, the content also emphasizes the other Practice Emphasis Areas (PEAs) that been defined by the American Board of Ophthalmology (ABO) for their Maintenance of Certification (MOC) process with emphasis on these disease processes in children, and adults with strabismus and eye movement disorders. These include:

- Cataract and Anterior Segment
- Cornea and External Disease
- Glaucoma
- Neuro-ophthalmology and Orbit
- Oculoplastics and Orbit
- Refractive Management and Intervention
- Retina and Vitreous
- Uveitis

Additionally, AAPOS' educational program provides content for topics such as effective management of a pediatric ophthalmology practice, medical ethics, risk management, and other areas deemed relevant by the needs of the membership.

Types of educational activities provided at the annual AAPOS meeting include:

- Didactic lectures
- Original research in the form of free papers and posters
- In-depth focused workshops and symposia on specific topics
- Small-group discussion opportunities with speakers and researchers

All meeting content is reviewed by the AAPOS Program Committee and Secretary for Program with respect to education qualify and utility. Members are routinely queried regarding their assessment of quality and content, as well as needs for future meetings, and comments are reviewed by the Program Committee and BOD, with necessary changes incorporated into future programs.

The expected result of AAPOS' educational activities is a broad array of ophthalmic knowledge that contributes to the lifelong learning of members and advances physician performance or competence. Ongoing assessment of the impact of AAPOS educational program is important in determining modifications to existing activities and the development of new activities. Specific expected results include increased knowledge across the ophthalmic community, activities designed to increase competence and performance with evidence-based standards, current practices, and methods of diagnosis, therapies, and disease prevention.

40th Annual Frank D. Costenbader Lecturer

A Cut Above - The Role of Vitrectomy in the Evolution of Pediatric Cataract Surgery

M. Edward Wilson, MD

Thursday, April 4, 2013 - 8:20 - 8:45 am

The Costenbader Lecture is supported by the Children's Eye Foundation

Dr. Marion Edward "Ed" Wilson Jr. was born in Charleston, South Carolina. He received a BS degree from Clemson University in 1976 and an M.D. degree from the Medical University of South Carolina (MUSC) in 1980. After an internal medicine internship at the National Naval Medical Center in Bethesda, Maryland Dr. Wilson served 2 years as medical officer for US Navy Destroyer Squadrons Four & Six. He returned to Navy Hospital Bethesda for his residency in ophthalmology. He was selected Chief Resident for his final year. He completed a fellowship in pediatric ophthalmology at the Children's National Medical Center in Washington D.C. under the direction of Dr. Marshall Parks. After spending an additional 3 years on the faculty in Bethesda as Director of Residency Training, Dr. Wilson left the Navy and joined the faculty at MUSC in 1990.

Dr. Wilson is currently the N. Edgar Miles Professor of Ophthalmology and Pediatrics at the Storm Eye Institute, Medical University of South Carolina, Charleston, SC. He served as Storm Eye Institute Residency Program Director from 1990-1998 and then as Storm Eye Institute Director and Pierre G. Jenkins Professor and Chair of Ophthalmology at MUSC for 15 years, from 1996-2011.

Dr. Wilson has received a Lifetime Achievement Award from the American Association for Pediatric Ophthalmology and Strabismus (AAPOS) and a Senior Honor Award from the American Academy of Ophthalmology. He was awarded the Claud Worth Medal by the British Isles Pediatric Ophthalmology & Strabismus Association. He was also awarded the Statesmanship Award, the highest honor conferred by the Joint Commission for Allied Health Personnel in Ophthalmology. Dr. Wilson is Board Certified in Ophthalmology and is a Fellow of the American Academy of Ophthalmology.

Dr. Wilson serves on the editorial Board of the Journal of AAPOS and served as Executive Editor of the American Journal of Ophthalmology from 2000-2013. He has been elected to membership in the prestigious American Ophthalmological Society, where he currently serves on the governing council, and the Association for Research in Strabismus ("The Squint Club"). He serves on the Board of Directors of the SC Society of Ophthalmology and is Past President of the Costenbader Society.

Dr. Wilson’s research interests include surgical techniques for use in the treatment of pediatric cataracts, as well as the full range of strabismus in children and adults. Dr. Wilson has given more than 600 invited presentations at national and international conferences including 18 named lectures. He has written or contributed to 27 books and published over 250 scientific papers, chapters, and invited editorials on a wide variety of subjects. Dr. Wilson has trained residents and fellows for more than 20 years and maintains a large referral practice. He has been selected by his peers as one of the "Best Doctors in America" for more than 15 consecutive years and is among those selected as “America’s Top Doctors”.

Ed Wilson and his wife Donna (a nurse) enjoy traveling and spending time together. They met as students at Clemson. They were married in 1973. Their son, Leland, is 33 years old and despite multiple handicaps from cerebral palsy, he loves to work and to paint. Leland thinks the world would be better if everyone got a hug every day.
Dr. Costenbader was an advocate for children. His concern for their health and the financial welfare of families in providing for the health of their children and in cosmetic alignment.

Continuing with his concern for providing for children's health care, he was co-founder of the Medical Service Plan (today Blue Shield) of the District of Columbia and was its first president from 1948 to 1951. He remained on the board for many years. In addition, he started having parents with their child in the anesthesia induction room before surgery, he eliminated bandages on eyes following strabismus surgery, and he changed strabismus.

Past Costenbader Lectures

1974 Los Angeles Marshall M. Parks, MD
1975 Lake Tahoe Robert E. Huffer, MD
1976 Bermuda Loren E. Zimmerman, MD
1977 San Francisco T. Keith Lyk, MD
1978 Williamsburg Jules Frenn, MD
1979 Toronto Robbins D. Harley, MD
1980 Alpes-Paradisee D. Greaves, MD
1981 Orlando Philip Knapp, MD
1982 Monterey Joseph Lang, MD
1983 Vancouver Jack C. Crawford, MD
1984 Vail Gunter K. von Noorden, MD
1985 Puerto Rico Arthur J. Jampolsky, MD
1986 Miami Robert M. Eldnorow, MD
1987 Scottsdale John E. Wright, MD
1988 Boston Alan B. Scott, MD
1989 Kievich Konstantin D. S. Smer, MD
1990 Lake George John T. Flynn, MD
1991 Montreal John A. Pratt-Johnson, MD
1992 Maastricht Eugene M. Hilbonten, MD
1993 Los Angeles Marshall M. Parks, MD
1994 Miami Robert M. Eldnorm, MD
1995 Lake Tahoe Robert E. Huffer, MD
1996 Bermuda T. Keith Lyk, MD
1997 Williamsburg Jules Frenn, MD
1998 Toronto Robert D. Harley, MD
1999 San Diego David L. Gayton, MD
2000 New Orleans Malcolm L. Brown, MD
2001 Orlando Forrest Darrel Edls, MD
2002 Seattle Craig S. Hoyt, MD
2003 Hawaii Burton J. Kashin, MD
2004 Washington, DC Arthur L. Rosenberg, MD
2005 Orlando Albert W. Bagin, MD
2006 Key West Earl A. Palmer, MD
2007 Seattle John D. Baker, MD
2008 Washington, DC Edward G. Buckle, MD
2009 San Francisco Richard A. Saunders, MD
2010 Orlando, FL A. Linn Murphy, MD
2011 San Diego Swan H. Davis, MD
2012 San Antonio Michael X. Kopka, MD
2013 Leonard Apt Lecture

Strabismus is Gettin' Old
Joseph L. Demer, MD, PhD
Saturday, April 6, 2013 - 8:35 – 8:55 am

Joseph L. Demer, MD, PhD, was born in Minneapolis, Minnesota, but as the eldest of eight children was raised in Tucson, where his father was professor at the University of Arizona (UA). While an Electrical Engineering undergraduate at UA, Joseph worked as a television broadcast engineer, and was a traveling member of the UA debate team and coach of a state champion high school debate team. Joseph received his MD and PhD in Biomedical Engineering from Johns Hopkins in 1983, where his dissertation research in the Winer Institute involved the role of olivocerebellar pathways in plasticity of reflexive eye movements. While Ophthalmology resident at Baylor College of Medicine in Houston, Texas, Dr. Demer was appointed to the research faculty and received his first R01 grant from the National Eye Institute (NEI) for study of human vestibulo-ocular reflexes. With the blessing of mentor Gunter K. von Noorden, MD, Dr. Demer continued this research during fellowship in Pediatric Ophthalmology at Texas Children's Hospital. Also during fellowship, Dr. Demer published the first functional imaging study of the effect of amblyopia on the human brain using position emission tomography, and published on clinical optokinetic asymmetry in esotropia.

Dr. Demer was recruited in 1988 to the University of California Los Angeles (UCLA), where he rose to the rank of Chief of the Pediatric Ophthalmology and Strabismus Division in the Jules Stein Eye Institute and Department of Ophthalmology. David Geffen School of Medicine at UCLA. Dr. Demer now holds the Leonard Apt Professorship of Ophthalmology, and is also Professor of Neurology, Director of the Ocular Motility Clinical Laboratory, Co-director of the Pediatric Ophthalmology and Strabismus Fellowship program, and committee chair of the EyeSTAR Training Program (Specialty Training and Advanced Research in Ophthalmology and Visual Science), a residency-PHD track. Dr. Demer is also a member of the Neuroscience and Bioengineering Interdepartmental program.

Dr. Demer teaches graduate and medical students in several courses, including Neurology, Ophthalmology, Neuroscience, and Bioengineering. Dr. Demer has served as editor or editorial board member for 20 scientific and clinical publications, and has chaired numerous study sections for the National Institutes of Health and a section program committee for the Association for Research in Vision and Ophthalmology (ARVO). For 35 years, Dr. Demer has investigated regulation of binocular alignment, vestibulo-ocular reflexes, visual tracking, orbital anatomy, and visual brain function. In 2003, ARVO awarded Dr. Demer its highest honor, the Friedenwald Award, for his groundbreaking research on the extraocular muscles and orbital connective tissues that culminated in the Active Puffet Hypothesis. In 2004, Dr. Demer also received an Achievement Award from the Alcon Research Institute for his work. He is an inaugural member of the Fellow of ARVO, the 2011 AAO, the 2012 American Academy of Ophthalmology (AAO), the American Society of Neuro-Ophthalmology, and the American Society of Ocular Pharmacology and Physiology.

Dr. Demer’s research has been supported by NEI since 1985, and by Research to Prevent Blindness since 1988. He has published over 215 peer-reviewed scientific papers, 40 book chapters, and six editorials. His medical and surgical practice includes in pediatric and adult strabismus, nystagmus, magnetic resonance imaging (MRI) of the orbit and cranial nerves, and children’s eye diseases. Dr. Demer performs comprehensive clinical imaging using advanced MRI methods that are undergoing continuing refinement in his laboratory. In addition to personally operating MRI scanners, Dr. Demer is an active instrument-rated airline pilot with nearly 1500 flight hours.

Dr. Demer resides in Los Angeles with his wife Melissa Reider-Demer, DNP, who is a doctoral-ally prepared nurse practitioner in Neurosurgery at UCLA. They have three children, sons Gregory and Eric, and daughter Julia.
The Leonard Apt Lecture

The Leonard Apt Lecture was established and first presented in 2000 by the American Academy of Pediatrics (AAP) Section on Ophthalmology to honor Leonard Apt, MD, for his dedication and contributions in the fields of pediatric ophthalmology and pediatric ophthalmology.

Dr. Apt was born in Philadelphia on June 28, 1922. He entered college at the age of 14 at the University of Pennsylvania, and trained in pediatrics after completing medical school at Jefferson Medical College in Philadelphia. Physicians everywhere will recall the “Apt Test” for detecting gastrointestinal bleeding in newborns, invented by young pediatrician Leonard Apt in 1955. Over the objections of leading physicians of the day who thought that pediatric ophthalmology was conceptually absurd, he then trained in ophthalmology at Harvard, the University of Cincinnati, and the National Institutes of Health. Dr. Apt became the first physician board-certified in both pediatrics and ophthalmology. As the first National Institutes of Health Special Fellow in Pediatric Ophthalmology mentored by Drs. Frank Costenbader and Marshall Parks, he organized the first formal training program for the new specialty.

Dr. Apt served as the first Research Fellow in Pediatric Ophthalmology at Wills Eye Hospital. In 1961, at UCLA, Dr. Apt established the first full-time service in pediatric ophthalmology at a United States medical school, predating both the AAP Section on Ophthalmology and AAPPOS. For many years, Dr. Apt served as the principal ophthalmology consultant for the AAP. He organized local and national courses on pediatric eye topics and spoke at Annual Meetings of the AAP. Dr. Apt became a founding member of UCLA’s Jules Stein Eye Institute.

Every ophthalmologist owes an intellectual debt to Dr. Apt. This towering intellectual figure developed the coating that first enabled the use of synthetic absorbable sutures for oculary surgery. In 1963, Dr. Apt reported on the use of povidone-iodine as a potent, safe antiseptic on the eye and surrounding skin area. It eventually became the preferred method of ophthalmic surgical preparation. In recent years, Dr. Apt and his colleague, Dr. Sherwin Isenberg, used povidone-iodine in developing countries to prevent and treat blinding eye infections in infants and children.

Dr. Apt authored more than scientific and medical 300 publications. To his numerous honors from professional societies, Harvard, Jefferson Medical College, and the University of Pennsylvania have recently been added the 2009 UCLA Emeritus Professorship Award, the 2010 AAP Lifetime Achievement Award, and the 2010 Castle Connolly National Physician of the Year Award for Lifetime Achievement. Beyond medicine, Dr. Apt was active as a founder, board member, and a major contributor to the arts, theater, music, humanities, and sports. His philanthropic gifts to UCLA have created the “Leonard Apt Fellowship in Pediatric Ophthalmology” and the “Leonard Apt Chair in Pediatric Ophthalmology.”

Dr. Apt died of natural causes in Santa Monica, California on February 1, 2013. The Leonard Apt Lecture pays continuing tribute to the late Dr. Leonard Apt not only for his monumental educational and scientific contributions, but also for his pioneering leadership in creation of pediatric ophthalmology as a medical subspecialty.

Past Apt Lectures

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<th>Location</th>
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<td>San Diego</td>
<td>J. Bronwyn Bateman, MD</td>
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<td>2001</td>
<td>Orlando</td>
<td>Bennett A. Shaywitz, MD &amp; Sally E. Shaywitz, MD</td>
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<td>2002</td>
<td>Seattle</td>
<td>Mark Siegel, MD</td>
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<td>2003</td>
<td>Hawaii</td>
<td>Linda J. Mason, MD</td>
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<td>2005</td>
<td>Orlando</td>
<td>Edwin M. Stone, MD, PhD</td>
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<td>2007</td>
<td>Seattle</td>
<td>Carol D. Berkowitz, MD, FAAP</td>
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<td>2009</td>
<td>San Francisco</td>
<td>Sherwin J. Isenberg, MD</td>
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<tr>
<td>2011</td>
<td>San Diego</td>
<td>Carol L. Shields, MD &amp; Jerry A. Shields, MD</td>
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The American Academy of Ophthalmology and the American Association for Pediatric Ophthalmology and Strabismus have determined that financial interest should not restrict expert scientific, clinical or non-clinical presentation or recipient of grant from said entity, including consultant and travel aid.

- Involvement in any for-profit corporation where the presenter or the presenter's immediate family is a director or officer.
- Ownership of greater than .01% of the stock in the producing company; or
- Financial interest in any company producing the product or drug discussed in a presentation or in the preparation of any scientific presentation or publication.
Program Schedule
All scientific sessions and social events are held at the Westin Copley Place, Boston, MA

Wednesday, April 3, 2013

7:00 AM - 8:00 PM  Registration  America Ballroom Foyer
8:00 AM - 5:00 PM  Technician Course - The Art and Science of Examining the Child  St. George A & B
8:00 AM - 5:00 PM  Administrators Meet and Greet and Administrators Roundtable  St. George C & D
9:00 AM - 5:00 PM  Board of Directors Meeting  Empire Room
1:00 PM - 4:00 PM  Poster Set Up  Essex Ballroom Foyer
4:00 PM - 6:00 PM  Poster Viewing (First Set of Posters) - Authors Not present  Essex Ballroom Foyer
6:15 PM - 7:15 PM  International Attendees Reception  Gloucester/Newbury
6:15 PM - 7:15 PM  Young Ophthalmologists’ Reception  Parliament
7:00 PM - 9:00 PM  Opening Reception  America Ballroom

Thursday, April 4, 2013

6:30 AM - 7:45 AM  Poster Viewing (First Set of Posters) - Authors Not Present  Essex Ballroom Foyer
6:30 AM - 7:45 AM  Breakfast  Staffordshire / Essex Ballroom
8:00 AM - 12:00 PM  Technician Course - COA Review Course  St. George A & B
9:00 AM - 12:00 PM  Administrators Workshop (SEC Practice Managers Program only)  St. George C
7:50 AM - 7:55 AM  President’s Remarks  America Ballroom
7:55 AM - 8:00 AM  PBA Award Presentation  America Ballroom
8:00 AM - 8:15 AM  AAO & AAPOS: New Challenges and Opportunities  America Ballroom
8:15 AM - 8:48 AM  Costenbader Lecture  America Ballroom
8:20 AM - 8:45 AM  Paper #1  America Ballroom
8:45 AM - 8:48 AM  Presentation Ceremony  America Ballroom
8:50 AM - 9:55 AM  Scientific Session: Cataract - Intraocular Lenses - Anterior Segment - Glaucoma  America Ballroom
8:57 AM - 9:04 AM  Paper #3  America Ballroom

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8:57 AM - 9:04 AM  Paper #3  America Ballroom
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<tr>
<td>9:04 AM - 9:11 AM</td>
<td>Outcomes of Iris-Enplaced Artisan-Ophtec Intraocular Lens Implantation in Aphakic Children</td>
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<td>9:11 AM - 9:18 AM</td>
<td>Phakic Intraocular Lens (PIOL) Implantation versus INTACS Corneal Rings to Manage Anisometropic Myopic Amblyopia in Children</td>
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<td>9:18 AM - 9:25 AM</td>
<td>Anatomic and Visual Outcomes of Corneal Transplantation During Infancy</td>
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<td>9:25 AM - 9:32 AM</td>
<td>Intracocular Pressure in Children: Effect of Repeat Measurements, Topical Anesthetic, and Positioning, as Assessed with Icare Compared to Goldmann</td>
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<td>9:39 AM - 9:55 AM</td>
<td>PANEL DISCUSSION All Presenters</td>
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<td>Interactive Poster Session - Author Presentation and Q/A Essex Ballroom Foyer</td>
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<td>11:00 AM - 12:45 PM</td>
<td>Scientific Session Strabismus Surgery - Oculoplastics America Ballroom</td>
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<td>11:47 AM - 12:45 PM</td>
<td>DISCUSSION OF PREVIOUS PAPER Burton J. Kushner, MD</td>
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Introduction: When fitting infant aphakic eyes with a contact lens (CL) immediately after cataract surgery, it may not always be possible to obtain an accurate refraction. For such cases there is a tendency to insert a +32 D CL. We sought to provide guidelines for the selection of an initial CL power if retinoscopy over a diagnostic lens is not possible.

Methods: Patients with a unilateral cataract and randomized to CL treatment in the Infant Aphakia Treatment Study (IATS) were analyzed. An eye was included if there was a valid preoperative axial length (AL) measurement using immersion and a one-month postoperative refraction. Target CL power was determined using refraction (adjusting for vertex distance of 12 mm) over known CL power one-month postoperatively. We compared it with four techniques (1) physician’s estimated CL power (defined as the prescribed CL power minus 2D overcorrection); (2) regression1, CL power=84.4–3.2×AL; (3) SRK/T IOL power1 calculated using a modified A-constant (112.176); 4) 32 D CL.

Results: There were 36 of 57 eyes that met the inclusion criteria. Age at cataract surgery was 2.3±1.7 months. Preoperative AL was 17.9±1.6 mm. Follow-up refraction was performed at 3±3 days. Target CL power based on the one-month refraction was 26±4.4 D. Mean prediction error was 0.4, -1.0, -2.0 & 6.2 D and mean absolute prediction error was 1.2, 2.2, 2.8 and 6.2 D respectively for physician’s estimated CL power, regression, SRK/T and 32 D CL.

Discussion: The IATS study protocol reads that if an accurate refraction could not be obtained initially, a +32 D CL should be dispensed, and the lens power should subsequently refined at the earliest opportunity. If refraction is not possible, instead of using +32 D CL, we recommend using preoperative biometry to estimate CL power.

Conclusion: If accurate refraction could not be obtained initially, preoperative biometry may help to estimate CL power.

The Effects of Surgical Factors on Postoperative Astigmatism in Patients Enrolled in the Infant Aphakia Treatment Study (IATS)

Pakal B Watt, Jason A Lee; Michael Lynn; Scott R Lambert; Elias I Traboulsi
Cleveland Clinic Foundation, Cleveland, OH

Introduction: The purpose of this study is to compare postoperative astigmatism between patients treated with intraocular lens (IOL) or contact lens (CL) after surgery for an infantile, unilateral cataract and to evaluate the impact of surgical factors on postoperative astigmatism among patients treated with an IOL.

Methods: The Infant Aphakia Treatment Study (IATS) is a multicenter clinical trial in which 114 infants <7 months of age with a unilateral congenital cataract were randomized to cataract extraction with or without IOL placement, with CL correction for those in the aphakic group. A review of video clips of procedures for patients treated with an IOL was performed and data was collected regarding incision type (clear cornea vs scleral tunnel), whether the incision was extended, the number of sutures, and whether the incision was closed in a running or interrupted fashion. Corneal astigmatism was measured using a handheld keratometer prior to surgery and at 1 year of age.

Results: There was a statistically significant greater amount of astigmatism at 1 year of age, on average, with IOL (2.1 ± 1.1) compared to CL (1.6 ± 1.0) (p=0.023). There was no statistical difference in mean postoperative astigmatism at 1 year of age for IOL patients based on incision type (p=0.214), extension of incision (p=0.849), number of sutures (p=0.31), or method of closure (p=0.19) at 1 year.

Discussion: The placement of an IOL significantly increases the postoperative corneal astigmatism when compared to contact lens correction at one year of age. Among patients treated with an IOL, none of the surgical factors had a statistically significant impact on corneal astigmatism.

Conclusion: The only factor that affected corneal astigmatism at 1 year in our study was the placement of an IOL. Although this data is unlikely to impact the decision of whether or not to place an IOL, the lack of impact of wound construction, the type of double-armed sutures used, and method of closure on postoperative astigmatism suggests that ease of surgical technique may be a more important factor to consider.

Outcomes of Iris-Enclaved Artisan-Optic Intraocular Lens Implantation

Lawrence Tychsen MD, Nicholas Faron BA
St. Louis Children's Hospital at Washington University Medical Center, St. Louis, MO

Introduction: Children treated by lensectomy for ectopia lentis, traumatic cataract with lens subluxation or severe persistent fetal vasculature-related cataracts lack capsular support for implantation of standard, posterior-chamber intraocular lenses (IOL). We reported previously use of trans-scleral sutured IOLs in this population.

Here we describe outcomes of Artisan irisi-enclaved IOL implantation.

Methods: Clinical outcome data were collected prospectively in 28 aphakic eyes of 17 infantile cataract patients (7 Marfan Syndrome; 5 Familial Ectopia Lentis; 5 Persistent Fetal Vascu- lature). All children had difficulties with contact lens or spectacle wear. Peripheral iridectomy was performed at IOL implantation. Mean age at surgery was 8.1 years (range 1-17 years); mean follow-up was 3.1 years.

Results: Aphakic spherical correction averaged 14.06 D (range +7.75 to +19.75). 26/28 eyes (93%) were corrected to within +/- 1.0 D of emmetropia and all to within 1.5 D. Uncorrected visual acuity improved from an average logMAR 1.50 (20/60) to 0.17 (20/30); best-corrected acuity improved from an average 2 Snellen lines (0.18 logMAR) to 3 lines (0.06 logMAR). Four eyes (20%) required an addi- tional vitrectomy or laser-iridotomy for pupillary block 1 day to 9 mos after IOL implantation. Two IOLs (7%) were explanted; one for repeated de-enclaving and one for microcornea- related glaucoma and corneal decompensation.

Discussion: Implantation of the Artisan aphakic IOL improved visual acuity substantially and was well-tolerated in the majority of children. Repeat vitrectomy at IOL implantation is recom- mended to reduce the risk of pupillary block caused by vitreous plugging of the iridectomy.

Conclusion: Implantation of the Artisan aphakic IOL improved visual acuity substantially and was well-tolerated in the majority of children. Repeat vitrectomy at IOL implantation is recom- mended to reduce the risk of pupillary block caused by vitreous plugging of the iridectomy.


Phakic intraocular lens (PIOL) implantation versus INTACS corneal rings to manage anisometropic myopic amblyopia in children

MOHAMED MOSTAFA K. DIAB MD, Scott R LAMBERT, Elias I TRABOULSI
MAGRABI HOSPITAL, KSA

Introduction: The therapy of amblyopia is essential to be applied for safe vision and restoring binocular fusion and stereopsis. Purpose of our study to compare the safety and efficacy of phakic posterior chamber intraocular lenses (PIOL) implantation versus INTACS intrastromal Corneal Ring Segments treatment in high myopic anisometropia in amblyopic children.

Methods: Prospective study included 30 children ages 4-12 years old, suffering from unilateral high myopic anisometropic amblyopia who had refractive spherical power from -7.0 to -17.0 diopters and myopic astigmatism -1.0 to -6.0 diopters. Patients were subdivided into group A subjected to unilateral phakic posterior chamber intraocular lens (IOL) implantation and group B treated by INTACS corneal rings Pre- and post-operative visual acuity, ocular examination, stereoacuity, axial biometry measurements, cycloplegic refraction and endothelial cell counts were performed in all patients for follow up for at least 9 months.

Results: IOL group revealed prevention of amblyopia with improvement in visual acuity was 81% of children and just 53% restricted to 15% of children. Improvement in stereoacuity was noted in 93.3% of cases but INTACS group showed less results with suc- cessful improved vision in 73% of children and just 52% restricted to 27% of children. Improvement in stereoacuity was noted in 86.66% of cases. Two cases of cataract and one case of glaucoma with one case of uveitis noted in IOL group.

Discussion: Posterior chamber phakic IOLs or INTACS may provide a safe alternative in treatment of anisometropic myopic patients.

Conclusion: To eliminate significant anisometropic myopia in children who are noncompliant with traditional medical treatment, phakic posterior chamber ICL implantation or INTACS be considered as an alternative modality of treatment. INTACS is more safe and less invasive and complications than ICL Further studies in this field are recommended.

Phakic intraocular lenses (PIOLs) and INTACS may be considered an alternative modality of treatment. INTACS is more safe and less invasive and complications than ICL Further studies in this field are recommended.


Anatomic and visual outcomes of corneal transplantation during infancy and childhood

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Introduction: This study assessed the effect of age at penetrating keratoplasty (PKP) on graft survival and visual outcome in children transplanted during infancy. We previously presented (AAPOS, 2011) a pilot study (14 children), suggesting early PKP improves vi- sion without increased graft failure. This study adds outcomes from PKP in 53 additional children.

Methods: Multi-center, retrospective cohort study of infants undergoing PKP at Chil- dren’s Hospital of Philadelphia or New York Medical College, 1998-2011. PKP was cate- gorized early (0-90 days) or late (91-365 days). Outcomes were graft survival and vision, classified poor, fair, good, excellent. Kaplan-Meier, Cox proportional hazards difference existed in proportion with good acuity between early-PKP(36%) and late-PKP(57%)(p=0.19). Among 64 eyes with acuity measurements, no significant difference existed in proportion with good acuity between early-PKP(36%) and late-PKP(39%).

Results: 67 children (79 eyes) were studied: 25 eyes early-PKP, 54 late-PKP. 76/79 congenital opacities; mean follow-up 19.5 months (range 1-147). Kaplan-Meier graft-sur- vival estimates were 0.80 ±1.1 years (95%CI 0.69-0.88), 0.47 ±0.3 years (30-0.61). Graft failure is 54% early-PKP, 84.8% late-PKP (p=0.010) and time to failure (Cox propor- tional hazards) did not differ. Among 64 eyes with acuity measurements, no significant difference existed in proportion with good acuity between early-PKP(36%) and late-PKP(70%)(p=0.19).

Discussion: Although early infancy is a critical period of visual development, there was no advantage to early PKP. Possible confounding factors not controlled for in the analysis include degree of baseline ocular or neurological abnormalities and intensity of visual rehabilitation (amblyopia treatment, etc.).

Conclusion: One-half of infant grafts survive >5 years. Clearing congenital corneal opacities in the first 3 months of life did not improve visual outcome. Early PKP did not worsen graft survival, but PKP may be technically easier to perform later in infancy.
Intracocular pressure in children: Effect of repeat measurements, topical anesthetic, and positioning, as assessed with Icare compared to Goldmann applanation tonometry

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Introduction: Tonometry is critical in evaluation/managment of children with known/suspected glaucoma, but often requires anesthetics. Both Icare- and Icare-PRO rebound tonometry circumvent anesthetic, the latter allowing supine intraocular pressure (IOP) measurement. This study addresses several relevant questions regarding tonometry in children: 1) Does IOP change with repeated IOP measurements? 2) Does IOP change before/after topical-anesthetic? 3) Does IOP change in supine positioning after IOP? Methods: Ongoing, prospective study of children's eyes (normal, suspected/glaucoma). Intra- and inter-reader agreements were calculated. Results: Arm#1 (48 children/101 eyes) had 32 normal and 13 glaucoma eyes. Arm#2 (31 children/57 eyes) included 17 normal and 14 glaucoma eyes. The software validation analysis showed 4-10% intra-grader, and 13-29% inter-grader variability on ONH cup-disc vertical, horizontal and area ratios. Discussion: Computer-assisted evaluation of longitudinal changes in optic nerve head morphology may be used in children. Arm#2 (Icare-PRO) demonstrated significant changes in cup-disc ratio compared with normals (p<10^-7 for all comparisons). Five subjects with LR pathology demonstrated similar significant but asymptotic reductions in those values only for the superior compartment of the affected LR (p=10^-3 for all comparisons), with insignificant 10% reductions for the inferior compartment (p>0.3 for all comparisons). Future evidence supporting independent innervation of the two LR neural compartments is required.

Isolated superior compartment lateral rectus (LR) palsy: A new pathophysiologic diagnosis defined by magnetic resonance imaging (MRI) analysis

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Introduction: The LR has bifid, vertically segregated patterns of innervation that functionally define superior and inferior neuromuscular compartments, raising the possibility of a lesion selectively denervating only one compartment. Using MRI, we prospectively sought evidence of compartmental LR atrophy. Methods: Surface coil coronal MRI was obtained at 312 micron resolution in quasi-coronal planes 2 mm thick throughout the orbit in 20 normal subjects and 18 subjects with unilateral LR palsy who fixed monocularly on a target placed as close as possible to central fixation. Mid-sagittal cross-sections, eight sequential pre- and post-lesion cross-sections and posterior volumes of the superior and inferior LR compartments were computed and correlated with clinical alignment findings. Results: Twelve subjects with LR palsy demonstrated symmetric, highly significant 40% reductions in maximum cross-sections and 50% reductions in posterior volumes for both comparisons with normals (p=10^-7 for all comparisons). Five subjects with LR pathology demonstrated similar significant but asymptotic reductions in those values only for the superior compartment of the affected LR (p=10^-3 for all comparisons), with insignificant 10% reductions for the inferior compartment (p>0.3 for all comparisons). All subjects with superior LR compartment atrophy exhibited ipsilateral hypotropia and exotropia in addition to the expected esotropia. Discussion: A subset of patients with clinically ‘complete’ LR palsy may instead have isolated palsy of the superior LR compartment. This new pathophysiologic diagnosis provides further evidence supporting independent innervation of the two LR neuromuscular compartments.

Conjugate surgery vs. recess-resect for lateral incomitance in 6th nerve paresis

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Introduction: To compare ipsilateral lateral rectus resection and contralateral medial rectus recession (conjunctive surgery) to an ipsilateral recess-resect procedure for the treatment of 6th nerve paresis for lateral incomitance/limitation. Methods: This is a retrospective medical record review of patients with 6th nerve paresis treated with either conjunctive surgery or an ipsilateral recess-resect procedure with pre-operative deviation, and post-operative deviation in primary and in lateral gaze. Results: A subset of patients with clinically ‘complete’ LR palsy may instead have isolated palsy of the superior LR compartment. This new pathophysiologic diagnosis provides further evidence supporting independent innervation of the two LR neuromuscular compartments.

Discussion: Paralytic esotropia, particularly if combined with ipsilateral hypotropia and exotropia, may be caused by isolated superior compartment LR palsy. Further research is required to clarify the clinical significance of isolated superior compartment LR palsy.
Introduction: The Parks-Bielschowsky 3-step test is the classical cornerstone of cyclovertical strabismus. We evaluated the sensitivity of the 3-step test in clinical diagnosis of SO palsy in patients with unequivocal magnetic resonance imaging (MRI) evidence of SO atrophy.

Methods: 51 patients were selected from a prospective MRI study of strabismus because they exhibited significant SO atrophy. Detailed ocular mobility data, including 3-step testing, were evaluated to determine sensitivity of single and combined clinical findings in diagnosis of SO palsy.

Results: Maximum mean ± SD plosional SO cross-section was reduced to 9.7±3.9 mm² in SO palsy, representing 53% of the 18.5±4.5 mm² contralesional SO cross-section, and 53% of the 18.4±3.6 mm² normal SO cross-section (P<0.0001). Only 35 patients (69%) with SO atrophy fulfilled the entire 3-step test. Two steps were fulfilled in 16 (29%) patients, and only one step was fulfilled in one patient (2%). Affected SO cross-section was similar in orbits that fulfilled the 3-step test (10.0±4.1 mm²) vs. those that did not (9.0±3.4 mm²; P=0.51).

Discussion: Since maximum SO cross section correlates with contractility, it seems reasonable to regard the MRI finding of SO atrophy as a sufficient objective confirmation of SO palsy. The complete 3-step test misses 31% of cases of SO atrophy. While acceptance of only two steps would increase sensitivity to 98%, relaxation of diagnostic rigor would probably make the test non-specific.

Conclusion: The 3-step test fails to detect SO palsy in one-third of cases proven by MRI. Often, only two of three steps are positive in SO palsy.


Superior Oblique Tuck: A Self-Dosing Procedure Appropriate for all Classes of Superior Oblique Palsy

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Introduction: Superior oblique palsy is a common cause of vertical and torsional strabismus. Knapp distinguished 6 classes, based on the direction of gaze in which the maximum deviation occurs. Different surgical procedures have been advocated for different classes. We report a sequential case series of superior oblique palties of all types, all treated with the same procedure: a superior oblique tuck, dosed according to intrapreoperative traction testing and an adjustable recession of the contralateral inferior rectus.

Methods: Retrospective chart review of 32 cases performed by a single surgeon. Each patient had deviations measured in all nine fields of gaze, on head tilt, and with double Maddox rods, both pre-op and post-op.

Results: Significant improvement in deviations in all fields of gaze was seen in all patients, regardless of class of deviation, following superior oblique tuck with yoke recession. All patients had resolution of diplopia, with only 2 requiring post-op prisms. We report on deviations in all fields of gaze.

Discussion: An advantage of our study is that all measurements, both pre- and post-op, were conducted by the same person, with the same methodology; a disadvantage, is that he could not be masked as to the intervention. We assess deviations in all fields of gaze, unlike other studies, which is especially important for an incomitant strabismus.

Conclusion: The superior oblique tuck with yoke recession is an appropriate procedure for all patients with superior oblique palsy, regardless of direction of maximal deviation. The amount of tuck necessary is based on intraoperative traction testing, not the pre-op deviations.

Abnormal Rectus Muscle Length In Horizontal Strabismus?

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Introduction: Vertical strabismus surgery is commonly performed using a 3 prism diopter (PD)/mm surgical dosage, with few reports of surgical outcomes, especially in patients with non-restrictive strabismus. The purpose of this study was to analyze the outcomes of vertical strabismus surgery and evaluate the dose-response relationship of rectus and oblique muscle surgery.

Methods: Records of patients undergoing vertical strabismus surgery over a 1 year period were reviewed. Exclusion criteria included prior vertical surgery, restrictive strabismus, dissociated vertical deviation, and follow-up <4 weeks. Main outcome measures were change in vertical deviation and collapse of A/V pattern.

Results: Of 85 patients identified, 50.59% were male (age 0.9 - 81.2 years; follow-up 4-31 weeks). Patterns collapsed to 0 PD in 6/8 with A pattern (75%) and 23/32 with V pattern (72%). Of 45 patients without A/V pattern, 32 (71%) attained orthotropia, with mean change in deviation of 11 PD (91%). In the 16 patients without oblique surgery, surgical response was 2.7 PD/mm. For pre-op deviations of <5 PD, the change was 1.4 PD/mm; for 5-9 PD, 2.7 PD/mm, and for 10-14 PD, 3.4 PD/mm. In the 20 patients who underwent unilateral inferior oblique (IO) weakening procedures without rectus muscle surgery, surgical response was 11.55% attainment of orthotropia, with an average change in deviation of 10.4 PD.

Discussion: Vertical rectus muscle surgery changed ocular alignment by 2.7 PD/mm, while IO surgery had an average effect of 10.4 PD. The dose-response was larger for larger pre-operative deviations.

Conclusion: The dose-response curve for vertical rectus muscle surgery, often cited as 3PD/mm, may be more dependent on the pre-operative deviation than previously believed.
Graded Recten Tenotomy (GRT) in Small Angle Hypertropia

Introduction: GRT is a novel adjustable procedure during peripheral GRT of the IR.

Results: The results are promising as they show that GRT is a safe and effective procedure for management of MSF.

Discussion: The study suggests that GRT is a safe and effective procedure for management of MSF.


Silicone band Loop Myopexy in treatment of Myopic Strabismus Fixus: Surgical outcome of a novel modification

Introduction: The aim of this study was to describe a novel modification of loop myopexy with silicone band for myopic strabismus fixus (MSF).

Results: The results of this study are promising as they show that the novel modification of loop myopexy with silicone band is effective in the management of MSF.

Discussion: The study suggests that the novel modification of loop myopexy with silicone band is a safe and effective procedure for the management of MSF.

2013 Apt Lecture: ‘Strabismus Is Getting’ Old

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Purpose: Because extraocular muscle (EOM) connective tissue-pulley system determines EOM force directions, pulley geometry can induce strabismus. This lecture discusses connective tissue related strabismus with early childhood onset from anatomical abnormalities due to connective tissue degeneration. Craniosynostosis-caused cranial base and eye malformations in childhood. Roter and Demer reported age-related distance deviations (ARDE, commonly called divergence parasagittal exotropia) ET and cyclovertical strabismus (CVS) result from connective tissue degeneration formed the ‘sagging eye syndrome’ (SES). This study used clinical trials to study these deviations.

Methods: 95 consecutive cases of pulley heterotopy were identified, of whom 56 had pattern strabismus of childhood onset. Surface coil MRI was obtained in 56 orbits of 28 patients of mean age 69±12 (SD) years who had SES. Control data were obtained from 25 orbits of 14 age-matched normal subjects, and 52 orbits of 28 normal younger (age 0-5 years) control subjects. Data was correlated with clinical findings, ETDRS visual acuity (VA), and binocularity in strabismus.

Results: Patients with childhood onset strabismus had intact LR-rectus band ligaments and relatively straight EOM paths, but exhibited rectus pulley array cyclorotation: incyclorotation was associated with A-pattern, and excyclorotation - with V-pattern. These internal features were associated with cardiac tissues in the pericardium of rectus, in-situ collapsed patterns. Patients with SES exhibited blepharoptosis and superior sulcus defects. There was significant interocular displacement of all rectus pulleys in SES, with elongation of rectus A (P<0.001) that followed seen by control orbits. Symmetrical lateral rectus (LR) pulley sag was associated with ARDE, and asymmetrical LR +1 mm with CVS. The LR-LR band was ruptured in 91% patients with SES. Both LR resection and medial rectus (MR) recession were effective treatments for ARDE, but MR recession required dose augmentation. Partial vertical rectus recession tended to be effective in CVS.

Discussion: Adnexal inspection provides valuable clues to strabismus arising from connective tissue pathology. Canthal fissure inclination suggests uni- or bilateral heterotopy of a structurally robust rectus pulley array with onset by early childhood, while adnexal laxity suggests acquired elongation of the rectus EOMs, and age-related degeneration and degeneration of pulley ligaments. Childhood onset abnormalities are associated with pattern strabismus that may benefit from clinical imaging, while SES is associated with concomitant ARDE or CVS. Connective tissue changes in SES are accompanied by adnexal laxity so recognizable by clinical signs that further etiologic investigations are seldom necessary.

Conclusion: While orbital imaging may be clinically valuable in evaluating childhood onset pattern strabismus, spicuous external features usually obviate imaging in adult onset distance ET and hypertropia that commonly result from intravascular changes in EOMs and orbital connective tissues.


Functioned Strabismus: Decreased Binocular Summation (BiS) and Binocular Inhibition

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Introduction: Binocular summation (BiS) is defined as the superiority of visual function for binocular over monocular viewing. BiS decreases with age and large interocular differences in visual acuity (VA). BiS has not heretofore been well-studied as a functional measure of binocularity in strabismus.

Methods: Strabismus patients and normal controls underwent a battery of psychophysical and psychophysiologic tests including ETDRS VA, Sloan low contrast acuity (LCA, 2.5%), binocularity in strabismus.

Results: Sixty strabismic and 80 normal subjects were prospectively examined (age range 8-60 years). Mean BiS was significantly lower in the strabismic patients than controls for the LCA charts (2.5% and 1.25%, p<0.001 for both). For 1.25% LCA, strabismics had a mean BiS of 57% indicating binocular inhibitory BiS. Controls exhibited a mean BiS of 94% on the ETDRS, Pelli-Robson or sVEP. Regression analysis revealed a significant association between BiS and strabismus for 2.5% (p<0.001) and 1.25% (p<0.001) LCA accounting for large and interocular difference in VA.

Discussion: BiS is significantly decreased in strabismus, and some measures of binocular function with two misaligned eyes viewing are worse than during monocular viewing. This may be due to why strabismic patients who are not diplopic close one eye, but not others, in non-surgical situations. This finding represents an advancement in understanding of the visual deficits impacting quality of life in strabismic patients.

Conclusion: Strabismus patients sub-normal BiS and even binocular inhibition for low contrast viewing, suggesting that strabismus impairs visual function more than previously appreciated. BiS may represent a novel measure by which to evaluate and monitor function in strabismus.
Electronic Health Record Implementation in Pediatric Ophthalmology: Impact on Volume and Time

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Introduction: Electronic health record (EHR) systems have potential to improve quality, delivery, and cost of ophthalmic care. This study evaluates two measures related to EHR implementation in pediatric ophthalmology: clinical volume and time requirements compared to traditional paper documentation.

Methods: An academic pediatric ophthalmology practice implemented an institution-wide EHR in 2006 (Epic, Madisow, WI). A study population was defined of 4 stable faculty providers who practiced for >/=<5 months before and after implementation. Patient volume data and time use data were abstracted from the EHR reporting system, and volume data were compared to baseline paper data from the 3 months before implementation. Results: There were 12,749 total patient encounters by study providers during this period. Compared to baseline, EHR patient volume was 9% lower in year 1, 4% lower after year 2, and 7% lower after year 3. With EHR, 14% of charts were completed during weekend hours and 30% were completed during weekday evenings. Half of EHR charts were completed within 1.4 days, and 75% were completed within 5.3 days. Discussion: EHR adoption is increasing nationally, being promoted by major federal initiatives, and will likely affect every pediatric ophthalmologist [1,2]. Ophthalmology documentation and workflow requirements are unique compared to other medical fields, and pediatric ophthalmology requirements are further sub-specialized [3]. Improved EHR interface design will improve the ability of pediatric ophthalmologists to provide patient care, and will require collaboration from clinicians.

Conclusion: EHR implementation was associated with a small decrease in clinical volume, and with documentation during non-business hours.


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A Randomized Trial of Increased Patching for Amblyopia

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Introduction: After treatment with spectacles and patching, some patients have residual amblyopia. We conducted a randomised trial to evaluate the effectiveness of increasing prescribed daily patching from 2 to 6 daily hours in children with stabilised residual amblyopia.

Methods: One hundred sixty-seven children 3 to <9 years old with stable residual ambyopia (20/200 to 20/160) effort, attention and reflexes were enrolled at least 12 weeks of daily patching were randomly assigned to either continue 2 hours of daily patching or increasing patching time to an average of 6 daily hours.

Results: Ten weeks after randomization, amblyopic eye visual acuity had improved an average of 1.2 lines in the 6-hour group and 0.5 line in the 2-hour group (difference in mean visual acuity adjusted for acuity at randomization = 0.6 line, 95% confidence interval: 0.2 to 1.0, P=0.003). Improvement was seen in 40% of subjects patched for 6 hours versus 19% of those patched for 2 hours (P=0.004).

Discussion: When amblyopic eye visual acuity stops improving with 2 hours of daily patching, increasing the patching dosage to 6 hours results in more improvement in visual acuity after 10 weeks than continuing with 2 hours.

Conclusion: Clinicians should consider increasing the patching dosage for children whose amblyopia stops improving after treatment with 2 hours of daily patching.

Anisometropia and amblyopia in nasolacrimal duct obstruction

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Introduction: Childhood nasolacrimal duct obstruction (NLDQ) has long been considered to be a benign condition which does not affect vision development. (1) Recent studies have suggested an association between NLDQ and amblyopia. (2)

Methods: A retrospective review was conducted of 1218 patients between ages of birth to six years with diagnosis of nasolacrimal duct obstruction (NLDQ) from 2000-2010. Data collected included onset of NLDQ, laterality of NLDQ, cycloplegic refractive error, determination of clinically significant anisometropia (defined as > or equal to one diopter), and diagnosis of amblyopia with amblyopia subtype (anisometropic vs. other). Results: 887/1218 (72.6%) had unilateral NLDQ. Anisometropia was found in 79/1218 (6.5%) patients on initial examination for a total of 105/1218 (8.8%). A significant association between same sided unilateral NLDQ and higher hyperopia in the anisometropia patients (2) was found on initial examination. Follow-up data of 482 patients showed 28 (5.6%) developed amblyopia, 16 of which were due purely to anisometropia.

Discussion: Anisometropia (8.6%), amblyopia (5.6%) and anisometropic amblyopia (3.3%) in this large NLDQ cohort exceeds that found in the general pediatric population. (3) No cause-effect relationship could be established in this retrospective study.

Conclusion: Measurement of cycloplegic refraction and periodic follow up of children diagnosed with NLDQ is warranted. Future prospective studies could elucidate any benefit to early spontaneous resolution or surgical intervention.

Introduction: Practical pediatric objective screening devices have improved at the same time the 99174 procedure code came into use. Pediatricians, concerned with practicality, are asking ‘Which photoscreener should we get?’ A new addition by iCheck-time the 99174 procedure code came into use. Pediatricians, concerned with practicality, are asking ‘Which photoscreener should we get?’

Methods: Consecutive young patients in a pediatric eye practice had comprehensive examinations and four state-of-the-art photoscreeners (iScreen, Pedesision SPOT, Plusoptix A09 and iCheckKids) consistent with the 2003 AAPOS Vision screen Amblyopia Risk Factor guidelines.

Results: 96 patients aged 6-130 months (mean 48 months) had prescreening probability 53%. The Sensitivity/specificity for each was: iScreen 78%/52%, SPOT 77%/87%, Plusoptix 83%/90% and the iCheckKids with DCC interpretation: 80%/93%. Additional statistics highlight the impact of inconclusive screen interpretations.

Discussion: These devices performed well. Each device has advantages with adjustable interpretation by Plusoptix and SPOT, rapid aim and image with online interpretation with iScreen and hand-held portability with iCheckKids. All devices are expected to improve with enhanced interpretation paradigms. Additional validation efforts include pediatric offices and community screening.

Conclusion: Recent developments in devices and interpretation promise to improve early screening for amblyopia.

Uveal melanoma in children and adults in 8033 cases

Introduction: To evaluate prognosis of uveal melanoma based on age.

Methods: Chart Review

Results: Of 8033 patients with uveal melanoma, 106 were young (< 20 years), 4287 in mid-adults (20-60 years), and 3640 in older adults (>60 years). Based on age, young, mid-adults, older adults tumor locations was iris (21%, 4%, 2%), tumor diameter (10.2, 8.0, 5.3, 5.7 mm) and thickness (6.0, 5.3, 5.7 mm) (all=0.001). Kaplan-Meier metastasis at 10 and 20 years were 9% and 20% in young (p<0.011), 23% and 34% in mid-adults (p=0.0001); and 28% and 39% in older adults.

Discussion: Uveal melanoma in children represents only 1% of all uveal melanoma. More often, it affects the iris and has related ocular melanocytosis. Similar to cutaneous melanoma, prognosis in children tends to be more favorable than adults. Several reports have shown younger age as an independent factor influencing reduced risk for metastasis. This, along with smaller tumor size, could be responsible for the more favorable prognosis for younger patients.

Conclusion: Young patients showed lower melanoma metastasis.

References:

Length of Day During Early Gestation is an Independent Predictor of Risk for Severe Retinopathy of Prematurity

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Introduction: We have identified in a mouse a light-response pathway via melanopsin stimulation that regulates the formation of retinal vasculature during a period that approximates the first trimester of gestation in humans. We were thus interested in whether average day length (ADL) during early gestation was a predictor of severe ROP (SROP).

Methods: 712 eyes of 357 premature infants [401-1250 g birth weight (BW)] from 1998 to 2003 were included. Multiple logistic regression with generalized estimating equations to account for inter-eye correlation was performed. The outcome variable SROP was a (1) classic threshold ROP in zone I or zone II, (2) type I ROP, or (3) in a few eyes, type 1 posterior zone II ROP that examiners chose to treat.

Results: Multiple logistic regression analysis evaluating all 712 eyes with 76 eyes developing SROP showed that BW, gestational age, per capita income, multiple birth, black race and ADL were independent predictors of eyes developing SROP. Each additional hour of ADL during the first 90 days after the estimated date of conception (EDC), decreased the likelihood of SROP by 29% (p = 0.014). In a model of 146 premature infants with 108 eyes with 76 developing SROP, each additional hour of ADL during the first 105 days after EDC decreased the likelihood of SROP by 46% (p = 0.001).

Discussion: Higher average day length during early gestation lowers the risk for eyes developing severe ROP.

Conclusion: This finding may have implications for light during early gestation as a pro-phylactic treatment to prevent severe ROP.


Evaluating The Association Of Autonomic Drug Use In The Development and Severity of Retinopathy Of Prematurity

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Introduction: The purpose of this study was to explore the association of autonomic agents, presumed to regulate the ocular perfusion, in the development and severity of retinopathy of prematurity.

Methods: We reviewed the charts of infants screened for retinopathy of prematurity at our institution in the years 2009 and 2010. We included in the study infants that had been treated with autonomic agents during their stay in the neonatal intensive care unit. Multiple logistic regression analysis was used to assess the association between the development and severity of ROP and the use and dosage (0-4) of autonomic agents, after adjustment for covariates (the estimated gestational age and weight of the infants, and the development of septicemia, intraventricular hemorrhage, or Respiratory Distress Syndrome).

Results: 350 infants were included in the study. The most common autonomic agents used were caffeine (n=338) and dopamine (n=63). After adjustment, there was a significant association between the use of dopamine and development of ROP (P=0.001). Odds ratio = 3.2 (95% CI from 1.7 to 8.2) and the need forROP treatment (P=0.001). Odds ratio = 5.96 (95% CI from 2.4 to 16.61). For infants using dopamine, after adjustment, the estimated percent of infants needing treatment was 10% (95% CI from 1% to 19%) and for those developing ROP was 47% (95% CI from 31% to 64%). Caffeine use in infants not using dopamine, after adjustment, the estimated percentage of infants needing treatment was 2% (95% CI from 0 to 4%) and for those developing ROP was 35% (95% CI from 24% to 51%). After adjustment, the number of dopamine doses was significantly associated with the development of any ROP (P=0.001). Odds ratio = 1.27 (95% CI from 1.11 to 1.45), and the need for treatment (P=0.002). Odds ratio = 1.3 (95% CI from 1.0 to 1.23). Each unit increase in the number of dopamine dose was associated with 24% increase in the odds of the need for laser treatment and 27% increase in the odds of development of any ROP and in the development of severe ROP. After adjustment, the total dose of caffeine use was significantly associated with the development of any ROP (P=0.025). Odds ratio 1.001 (95% CI from 1.000 to 1.003) and the need for treatment (P=0.033). Odds ratio 1.27 (95% CI from 1.001 to 1.003). Each 50 mg increase in the dose was associated with 5% increase in the odds of development of ROP and 9% increase in the odds for the need for ROP treatment.

Discussion: Caffeine and dopamine strongly and independently influenced the development and severity of retinopathy of prematurity.

Conclusion: While a causal relationship has not been established, autonomic agents may play an important role in the development of retinopathy of prematurity.

Analysis of Plus disease using Handheld Spectral Domain Optical Coherence Tomography in Non-sutured Neonates
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Introduction: Spectral Domain Optical Coherence Tomography (SDOCT) has only recently been explored in neonates with retinopathy of prematurity (ROP). 1,2 Vessel architecture has not been studied. This study provides an SDOCT analysis of vascular features in plus disease in non-sutured neonates.

Methods: Analysis was of SDOCT images from 94 neonates (30-52 weeks postmenstrual age) undergoing ROP screening. Ophthalmoscopic findings were obtained from study case report forms. Fourteen neonates with plus disease were compared to 14 randomly selected neonates without plus disease and with ROP stage 0-2. One eye with the best SDOCT scan quality was graded (masked) from each subject to identify elevated vessels, scolloped retinal layers, hypointense vessels and retinal spaces. A pediatric ophthalmologist evaluated the retinal images generated from SDOCT scans for abnormal dilation and tortuosity.

Results: Of 14 eyes with plus disease, SDOCT scans showed elevated vessels in 10 (71%), scolloped retinal layers in 6 (57%), hypointense hypervascular regions in 4 (30%), and retinal spaces in 2 (14%). None of these features were detected in the control group. Retinal images had a limited field of view (1-2 retinal quadrants in 19/28 images, 3 quadrants in 5/28 and 4 quadrants in 4/28). The dilation and tortuosity on retinal images, correlated with clinical judgment in 25/28 eyes.

Discussion: SDOCT may potentially aid in future analysis of vascular changes signaling plus disease. Findings from this early feasibility pilot study need to be tested in a larger-scale investigation.

Conclusion: SDOCT may complement clinical information in the monitoring of disease progression in neonates with ROP.

BEAT-ROP Refraction data at Age Two Years
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Introduction: Refractive outcomes at age two years of patients treated with intravitreal bevacizumab (IVB) or with conventional laser therapy (CLT) for zone I or zone II posterior Stage 3+ ROP (who were enrolled in the BEAT-ROP clinical trial) will be presented.

Methods: BEAT-ROP patients underwent cycloplegic refractions at age two years. Exclusions from the original 150 patients (300 eyes) included 16 patients (32 eyes): (nine patients (18 eyes) who died before the age of two years; six patients (12 eyes) with bilateral retinal detachments; and one patient (two eyes with binocular cataracts).

Results: Cycloplegic refractions were available from 79 (of 134 possible) patients [154 (of 264 possible) eyes]: [32 zone I and 47 zone II posterior]. Spherical equivalent means ± standard deviations were as follows: for zone I: IVB (17 patients: 34 eyes) -2.56 ± 3.19; CLT (15 patients: 27 eyes) -2.63 ± 3.3; for zone II posterior: IVB (25 patients: 50 eyes) -0.69 ± 2.51; and for CLT (22 patients: 43 eyes) -5.72 ± 6.40 p = 0.0005.

Discussion: More myopia was found in eyes treated with peripheral retinal ablation (CLT) while less myopia was found in eyes treated with intravitreal vascular endothelial growth factor inhibitor (IVB).

Conclusion: There was a significant difference between the cycloplegic refractions of infants treated with IVB versus CLT in both zone I and zone II posterior. Confirmation of these refractive outcomes and the establishment of long term safety of bevacizumab which does escape into blood to some extent is essential.

Visual acuity and macular optical coherence tomography abnormalities in children with history of retinopathy of prematurity.
Victor M Villegas; Hilda Capo; Kara Cavouto; Audina M Berrocal
Bascom Palmer Eye Institute
Miami, FL

Introduction: To correlate visual acuity (VA) and macular optical coherence tomography (OCT) findings in patients with history of retinopathy of prematurity (ROP) and normal macular foveosity.

Methods: This retrospective cohort study reviewed the charts of all ROP patients evaluated during the last two years. Children with prior OCT were included. Patients with abnormal macular foveosity or prior virectomy were excluded. Subjects were divided by VA into group 1 if V<20/40, and group 2 if V<20/40.

Results: Forty-five patients were identified: 48 eyes in group 1 and 35 in group 2. Mean values in groups 1 and 2 included: age in years, 9.4 ± 7.8, spherical equivalent, -5.86 D v. -9.51 D, and gestational age in weeks, 24.9 ± 25.2. Seventy percent of group 1 patients and all patients from group 2 had laser therapy. Mean central foveal thickness in micrometers was 310 and 303 in groups 1 and 2 respectively. Retention of inner retinal layers was found in 61% in group 1 and 69% in group 2.

Discussion: Patients with history of ROP frequently have abnormal foveal morphology by OCT, including retention of inner retinal layers. Abnormal foveal contour associated with ROP does not necessarily imply poor VA.

Conclusion: Macular structural abnormalities detected by OCT do not always correlate with VA. Other factors may play a role in the visual development of children with history of ROP.

Induced pluripotent stem cells: An emerging tool for the study of human inherited retinal disease
David M. Gamm, MD, PhD
2013 AAPOS Young Investigator Award Talk

Introduction: Human embryonic stem cells (hESCs) and induced pluripotent stem cells (iPSCs) are both valuable sources of retinal cell types for in vitro and in vivo studies. However, unlike hESCs, iPSCs can be derived from individual patients, and therefore offer a unique opportunity to model human retinal disease.

Methods: Using protocols developed in our laboratory, iPSCs derived from patients with selected inherited retinal disorders (e.g., gyrate atrophy (GA) and Best vitelliform macular dystrophy (BVM/D)) and normal controls underwent targeted differentiation to obtain enriched cultures of affected retinal cell types. Thereafter, the retinal cell cultures were examined to determine whether disease-specific phenotypes could be recapitulated in vitro.

Results: Molecular, biochemical, and pathological analyses revealed phenotypes in iPSC-derived cell populations that could be used to test drug efficacy and/or study the underlying disease mechanism(s). For the GA culture model, a deficit in retinal microvasculature was present in differentiated iPSC-RPE cells that could be improved with high dose vitamin B1. In the BVM/D culture model, iPSC-RPE cells from affected patients showed greater accumulation of ingested photoreceptor outer segment material and reduced transcellular fluid flux compared to sibling control iPSC-RPE. Subsequent investigation suggested a role for BESTROPHIN-1, the protein mutated in BVM/D, in the regulation of key RPE functions.

Discussion: In designing a iPSCs modeling study, care should be taken to select retinal disorders that have a reasonable expectation of recapitulating key pathophysiological processes in culture. In addition, a means to enrich for cell type(s) targeted by the disease is necessary; otherwise, the task of assessing a reproducible culture environment becomes daunting. Taking these and other limitations of iPSC modeling into consideration, inherited diseases of the retina remain appealing, particularly monogenic, early-onset diseases that affect the RPE. As we improve our understanding of complex disorders and our ability to build more intricate culture environments, the number of types and diseases amenable to iPSC modeling will broaden.

Conclusion: iPSCs represent a new and potentially powerful tool that can help close the gap between our knowledge of the genetics and the biology of inherited retinal diseases. In addition, custom iPSC retinal models could be used to test known therapeutics and develop drug and gene therapy screening platforms. However, limitations exist in any culture system; thus, iPSC technology is envisioned to complement, not supplant, existing laboratory models of disease.
## Poster Schedule

1st Set of Posters (1–40) Displayed from Wednesday, April 3, 4:00 PM - Friday, April 5, 11:30 AM, Essex Ballroom Foyer

Interactive Poster Session - Author Presentation and Q/A - Thursday, April 4, 9:55 - 10:55 AM

### STRABISMUS SURGERY

| Poster #1 | Malignant Hyperthermia in Strabismus Surgery: A Survey of AAPOS Members  
Mary O’Hara, MD  
Mitchell J. Goff, MD; David J. Woods, MD; Jason E. Karo, MD; Frank W. Scribick, MD |
| Poster #2 | Immediate Post-Operative Angle is the Best Predictor of Long-Term Strabismus Surgery Success in Children  
Paulita Pamela P. Astudillo  
Cotesta Melissa; Jennifer Schofield; Derek Stephens; Stephen Kraft; Kamiar Mireskandari |
| Poster #3 | Partial Rectus Muscle Tenotomy for Treatment of Small-Angle Strabismus  
Timothy P. Lindquist  
Alexander I. Zabeneh, Scott E. Oltisky |
| Poster #4 | Comparison of the Efficacy of Medial Rectus Recession and Lateral Rectus Resection for Treatment of Divergence Insufficiency  
Brenda Breidenstein  
Shira L. Robbins, David B. Granet, Erika C. Acera |
| Poster #5 | Unilateral Lateral Rectus Resection for Horizontal Diplopia in Adults with Divergence Insufficiency  
David R. Stager, Sr., MD  
Trevor Black, Joost Felius, PhD |
| Poster #6 | Change in Horizontal Comitance After Symmetric vs. Asymmetric Strabismus Surgery  
Carolyn P. Graeber, MD  
David G. Hunter, MD, PhD |
| Poster #7 | Adjustable Augmented Rectus Muscle Transposition Surgery With or Without Ciliary Vessel Sparing for Abduction Deficiencies  
Karen Hendler, MD  
Stacy L. Pineles, MD; Joseph L. Demer, MD, PhD; Federico G. Velez, MD |
| Poster #8 | Superior Rectus Transposition and Unilateral or Bilateral Medial Rectus Recession for Duane Syndrome and Six Nerve Palsy  
Yair Morad, MD  
Ramesh Kekunnaya, MD, FRCS |
| Poster #9 | Surgical Outcomes in Adult Sixth Nerve Palsy  
Jason H. Peragallo  
Beau B. Bruce; Nancy J. Newman; Amy K. Hutchinson; Phoebe D. Lenhart; Valerie Bisoussé; Scott R. Lambert |
| Poster #10 | Early Results of Slanted Recession of the Lateral Rectus Muscle for Intermittent Exotropia with Convergence Weakness  
Bo Young Chun, MD, PhD  
Kyungh Min Kang, MD |
| Poster #11 | The Effect of Unilateral Strabismus Surgery on Lateral Incomitance in Patients with Exotropia  
Brita S. Deacon, MD  
A. Paula Grigorian, MD; Hanya M. Qureshi; Katherine J. Fray, CO; Horace J. Spencer, MS; Paul H. Phillips, MD |
| Poster #12 | Comparative Study of Lateral Rectus Recession versus Recession-Resection in Unilateral Surgery for Intermittent Exotropia  
Soh-youm Suh  
Seong Joon Kim; Young Suk Yu |
| Poster #13 | Biomechanics of Superior Oblique: Z-Tenotomy: Is It Different from Unguarded Tenotomy?  
Andrew Shin  
Lawrence Yoo; Joseph Demer |
PUBLIC HEALTH
Poster #14  Additional Analyses Regarding Strabismus among Aged Medicare Beneficiaries
Michael X. Repka, MD
Fei Yu, Flora Lum, Anne Coleman

Poster #15  Sight- or Life-Threatening Pediatric Eye Conditions: Assessment of the Baseline Diagnostic Knowledge of Pediatrics Residents and the Effectiveness of a Self-Study Based Teaching Presentation in Improving Diagnostic Confidence and Skills
Lilly Droll, MD
Scott Kretner, MD, Aneela Kundnani, MD
Judith Gurland, MD

Poster #16  Insurance Coverage and Access to Healthcare in the Baltimore Pediatric Eye Disease Study
Kathryn S. Klein, MD, MPH
Joanne Katz, ScD; James M. Tielch, PhD; David S. Friedman, MD, MPH, PhD;
Michael X. Repka, MD, MBA

Poster #17  Traumatic Hyphema in Children: A Review of 137 Consecutive Cases
Emily A. McCourt, MD
Brett W. Davies, MD

CATARACT - GLAUCOMA
Poster #18  Visual Acuity after Secondary Intracocular Lens Implantation in Pediatric Aphakia
Deborah K. VanderYeen, MD
William H. Dean, MD

Poster #19  Treatment of Pseudophakic Posterior Capsular Opacification in Children with Secondary Capsulotomy
Kathryn S. Klein, MD, MPH
Joanne Katz, ScD; James M. Tielch, PhD; David S. Friedman, MD, MPH, PhD;
Michael X. Repka, MD, MBA

Poster #20  Visual Outcomes and Stability of Transscleral-Sutured Intraocular Lenses in Children
Shaival S. Shah, MD
Yasmin Bradfield, MD, Michael Struck, MD

Poster #21  Review of Surgical Treatment of Bilateral Congenital Cataracts
Scott W. Yeates, MD
M. Edward Wilson, MD; Rupal Trivedi; Leah A. Benoist

Poster #22  Long-Term Cumulative Incidence of Glaucoma after Congenital Cataract Surgery
Scott R. Lambert, MD
Amritab Purohit, Hillary M. Superak; Michael J. Lynn; Allen D. Beck

Poster #23  The Role of Gonioscopy in the Management of Apathic Glaucoma - extended follow up
Eva Gajdsova, MD, PhD
William Moore, FRCOphth, Ken K. Nischal, FRCOphth

Poster #24  Ocular and Systemic Findings in Peters’ Anomaly
Darakhshanda Khurram, MD
Jayaprakash Patel, Eva Gajdsova, Will Moore, Samer Hamada

RETINA - RETINOBLASTOMA
Poster #25  Dexamethasone Intravitreal Impact (Ozurdex) in the Treatment of Pediatric Uveitis
Monica L. Bratton, MD
Yu Guang He, MD, David Weakley, MD

Poster #26  Natural History of Retinal Hemorrhage in Children with Abusive or Accidental Head Trauma
Wendy S. Chen, MD, PhD
Brian Forbes, MD, PhD, Gui-shuang Ying, PhD; Huiyan Huang, MD; Gil BenNunbaum, MD, MSCE

Poster #27  Retinal Vasoproliferative Tumors in Patients with Neurofibromatosis. An Analysis of 6 Patients
Jerry A. Shields, MD
Marco Puligmi, MD; Swathi Kaliki, MD; Carol L. Shields, MD

Poster #28  Retinal Astrocytic Hamartomas: Spectral-Domain Optical Coherence Tomography Classification and Correlation with Tuberculous Sclerosis Complex
Massimiliano Serafino, MD
Francesco Pichi, MD; Gian Paolo Giuliani, MD; Carol L. Shields, MD; Antonio P. Giardella, MD; Paolo Nucci, MD

RETNOPATHY OF PREMATURITY
Poster #29  Incidence of Pinal Gland Cyst and Pineoblastoma in Children with Retinoblastoma During the Chemoreduction Era
Aparna Ramasubramanian, MD
Christina Kytasty; Jerry A. Shields; Anna T. Meadows; Ann Leachey; Carol L. Shields

Poster #30  Incidence of Retinopathy of Prematurity (ROP) in Infants Greater than 31 Weeks Gestational Age Undergoing Screening Examinations for ROP
Jennifer L. Hou, MD
Stefan Silius, MS, Rebecca S. Brazzerman, MD; Robert E. Enzinger, MD

Poster #31  Evaluation of an Indirect Ophthalmoscopic Digital Photographic System (Keeler) as a Retinopathy of Prematurity (ROP) Screening Tool
Sasapin G. Prakalapakorn, MD, MPH
Sharon F. Friedman, MD; Yuliya Lobkrygina, PhD, David K. Wallace, MD, MPH

Poster #32  Improved Speed and Accuracy of Plus Disease Quantification Using Image Fusion Methodology
Laura A. Vickers, MD
David K. Wallace, MD, MPH; Sharon F. Friedman, MD; Rolando Estrada, PhD; Sina Farsi, PhD; Grace Prakalapakorn, MD, MPH

Poster #33  Factors Influencing Rates of Retinopathy of Prematurity (ROP) in Argentina: A Case Study of Policy, Legislation and International Collaboration
Luxe Harihar, MD, MPH
Graham E. Quinn, MD, MSCE; Clare Gilbert, MD, MSc; Juan E. Silva, MD, MPH; Alicia Benit, MD; Grace Prakalapakorn, MD, MPH

Poster #34  Comparison of Serum VEGF Levels, Vision and Neurological Development in Laser and Bevacizumab Treated ROP Patients
Lingkun Kong, MD, PhD
David K. Coats, MD, Kimberly L. Dinh, Pharm.D2; Robert Vogt, MD; Sid Schechter, MS; Paul G. Steinkuller, MD

Poster #35  Computer-Assisted Quantification of Plus Disease after Treatment of Retinopathy of Prematurity with Intravitreal Bevacizumab
Kevin R. Gertsch, MD
David Wallace, MD, MPH; J. Niklas Ulrich, MD; Laura Eyed, MD; Michelle Cabrera, MD

Poster #36  Orbital Ultrasonography in Prematurity Babies with and without Retinopathy of Prematurity
Yonina D. Ron Kella, MD
David Barash, Mri Erhenberg, Ronit Friling, Micky Osovsky, Rita Ehrlich

OPTIC NERVE - UVEITIS - CORNEA
Poster #37  The Association of Prematurity and Nonglaucomatous Optic Disc Cupping in Children
Alexander E. Pogrebniak, MD
David G. Steinkuller, MD

Poster #38  The Role of Magnetic Resonance Imaging in Diagnosing Optic Nerve Hypoplasia
Phoebe D. Lenhart, MD
Nilesh K. Desai; Beau B. Bruce; Amy K. Hutchinson; Scott R. Lambert

Poster #39  Anti-TNF Therapy for Childhood and Adolescent Uveitis
Janet D. Leach
Breno da Rocha Lima, Nida Sen; Mohamad S. Jaafar

Poster #40  Incidence of Pineal Gland Cyst and Pineoblastoma in Children with Retinoblastoma During the Chemoreduction Era
Aparna Ramasubramanian, MD
Christina Kytasty; Jerry A. Shields; Anna T. Meadows; Ann Leachey; Carol L. Shields
Malignant Hyperthermia in Strabismus Surgery: A Survey of AAPOS Members
Mary O’Hara MD; Mitchell J Goff MD; David J Woods MD; Jason E Karo MD; Frank W Scribick MD
University of California, Davis, Sacramento, California

Introduction: To determine the incidence, management and outcomes of malignant hyperthermia occurring during strabismus surgery in children and adults.

Methods: North American AAPOS members were surveyed about their experiences with malignant hyperthermia during child and adult strabismus surgery.

Results: A total of 320 surveys (47%) were returned. Twenty-nine malignant hyperthermia (MH) cases were reported in an estimated 1,068,206 surgical strabismus procedures (1/36,000 estimated incidence). Three MH cases were found to have a prior family history of malignant hyperthermia; one case had known positive muscle biopsy with caffeine testing prior to surgery. Only 2 cases were reported to have underlying medical problems (1 neuroblastoma, 1 cerebral palsy). Death from malignant hyperthermia was not reported in any strabismus surgery. Management of malignant hyperthermia included dantrolene in 11/29 cases, aborted surgery in 5/29 cases, switched anesthetic agents in 4/29 cases, sodium bicarbonate or core body cooling in 7/29 cases and unknown in 13/29 cases.

Discussion: The AAPOS membership reports a lower incidence of malignant hyperthermia in strabismus surgery than reported in earlier papers. While family history is known to play a role in MH susceptibility, our survey found a positive family history in only 3 of 29 cases.

Conclusion: The low incidence rate and nonexistent fatality rate from strabismus-surgery-related MH reported in this survey may be related to increased awareness and earlier detection, use of dantrolene, and the use of Intensive Care Unit facilities to improve outcomes.


Immediate Post-Operative Angle is the Best Predictor of long-term Strabismus Surgery Success in Children.
Paulita Pamela P Astudillo; Cotesta Melissa; Jennifer Schoffeld; Derek Stephens; Stephen Kraft; Kamir Mireskandari
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Toronto, ON, Canada

Introduction: Strabismus surgery is a common procedure, however prediction of long-term success remains elusive. The objective of this study was to determine if achievement of an ideal post-operative target range can predict the surgical outcome in children.

Methods: The charts of patients aged 0 to 12 years old who underwent horizontal strabismus surgery were reviewed. The ideal post-operative target range was defined as within 4 prism diopters (PD) of orthotropia in esotropic patients and 0-8 PD of esotropia in exotropic patients at the first post-op visit within 7 days of surgery. Surgical success was defined as a measurement within 10 PD of orthotropia with a minimum of 6 months’ follow-up.

Results: A total of 352 patients were included in the study. The mean follow-up was 18 months. Patients who were within the target range had a higher success rate than those outside the target range (73.5 % vs 54.3 %, p=0.0004). Although exotropic patients had higher success rate when they were within target range (71.1% vs 37%, p=0.0002), esotropic patients had a trend towards higher success, which was not statistically significant (74.6% vs 67.2% p=0.3972).

Discussion: This study shows that regardless of strabismus type, children have higher chances of obtaining long-term surgical success when they are within target range after surgery. This is explained by the expected alignment drift post-operatively.

Conclusion: Achieving the ideal target range in children is associated with obtaining long-term surgical success in horizontal strabismus surgery and may support the use of adjustable sutures in this age group.
Partial rectus muscle tenotomy for treatment of small-angle strabismus

Timothy P Lindquist; Alexander I Zabeneh; Scott E Olitsky
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Kansas City, Missouri

Introduction: Small deviations of ocular alignment are often treated with prism in spectacle correction. Circumstances in which patients desire not to wear spectacles preclude use of prism. Surgical correction of deviations is commonly accomplished by recession, resection or transposition of the extracocular muscles. Situations where the deviating angle is too small to be reliably corrected by these procedures present need for alternative management.

This study sought to analyze the efficacy and predictability of partial tenotomy for treating small angle deviations. Patients treated by partial tenotomy were undergoing strabismus surgery for a second deviation along a different axis.

Methods: A single-center, 21-month retrospective chart review performed of patients with a small-angle deviation (> 6 prism dipters (PD)) who underwent partial tenotomy of a rectus muscle without concomitant procedures to correct deviations along the same axis returned nine subjects. Pre- and post-operative measurements were compared to analyze the efficacy and predictability of partial tenotomy.

Results: Mean pre-op deviation was 4.7 PD (+/- 1.6 PD), mean post-operative deviation was 0 PD (+/- 1 PD). Six patients underwent partial tenotomy of an inferior rectus muscle, two of a medial rectus, and one of a lateral rectus. A paired t-test showed the means difference of 4.67 PD to be statistically significant (p< 0.001).

Discussion: Partial rectus muscle tenotomy can produce predictable results, with half-tendon widths producinng an average of 4.67 PD of correction.

Conclusion: Partial rectus muscle tenotomy should be considered a reliable treatment option for small-angle strabismus.

Comparison of the Efficacy of Medial Rectus Recession and Lateral Rectus Rejection for Treatment of Divergence Insufficiency

Brenda Breidenstein; Shira L Robbins; David B Granet; Erika C Acera
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La Jolla, CA

Introduction: Surgical approaches for divergence insufficiency esotropia include medial rectus recession and lateral rectus recession. A retrospective chart review was undertaken to compare the efficacy of each surgical approach.

Methods: We performed a retrospective chart review of patients over 50 with divergence insufficiency esotropia who were operated on between 2005 and 2012 by two surgeons (DBG and SLR).

Results: Eighteen patients with divergence insufficiency were identified. Nine underwent medial rectus recession (Group 1; 5 unilateral, 4 bilateral) and nine underwent lateral rectus recession (Group 2; 3 unilateral, 6 bilateral). Adjustable sutures were used in all cases; two patients in each group required postoperative adjustments. The average distance between the preoperative and postoperative measurements was 0 PD (+/- 1 PD). Six patients underwent partial tenotomy of an inferior rectus muscle, two of a medial rectus, and one of a lateral rectus. A paired t-test showed the means difference of 4.67 PD to be statistically significant (p< 0.001).

Discussion: Partial rectus muscle tenotomy can produce predictable results, with half-tendon widths producing an average of 4.67 PD of correction.

Conclusion: Partial rectus muscle tenotomy should be considered a reliable treatment option for small-angle strabismus.

Unilateral lateral rectus resection for horizontal diplopia in adults with divergence insufficiency

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Center for Misaligned Eyes; Ophthalmology, UT Southwestern Medical Center; Retina Foundation of the Southwest, Dallas, Texas USA

Introduction: Divergence insufficiency (DI) is an acquired comitant strabismus in aging individuals characterized by esotropia and diplopia at distance. Treatment options include occlusion, base-out prism glasses and various surgical procedures to the horizontal rectus muscles. Here we present a large cohort of patients with DI who underwent unilateral resection of the lateral rectus (LR) muscle. This procedure is simple, performed on the non-dominant eye, and typically under local anesthesia with relatively minimal risks.

Methods: Clinical characteristics and complaints were collected from all patients with DI who underwent unilateral LR resection over a 5-year period. Treatment success was defined as the elimination of the horizontal deviation and horizontal diplopia.

Results: The cohort consisted of 60 patients (age 54-93 years; 77% were female). The majority sought surgical care after prism glasses were no longer tolerated or after rapid onset of a larger deviation (typically 12 to 20 prism dipters), often following cataract or refractive surgery. After surgery (minimum 6 weeks follow-up; median 10 weeks), 82% showed successful results, although a few developed a mild vertical deviation causing continued diplopia.

Discussion: Treatment of DI with unilateral lateral rectus resection generally appeared successful. Some of the treatment failures may have been due to pre-existing or later-onset vertical deviation.

Conclusion: Unilateral lateral rectus resection appears to be a viable option for treatment of DI.

Change in horizontal comitance after symmetric vs. asymmetric strabismus surgery

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Introduction: Horizontal strabismus surgery outcomes evaluate alignment in primary gaze, yet misalignment in side gaze also causes symptoms. Here we elucidate the effect of surgical approach on strabismus comitance to inform surgical planning.

Methods: Records of patients undergoing horizontal strabismus surgery over a 3.5 year period were reviewed. Inclusion criteria included patients with side gaze measurements recorded >6 months before and <1 year after surgery. Minimum follow-up was 8 weeks. Main outcome measure was change in comitance (difference between right and left gaze before and after surgery).

Results: Of the 95 patients who met inclusion criteria, 79 (83%) were comitant preoperatively, of whom 6 developed decreased from 19.75 to 3.4 postoperatively. Of 16 with incomitant strabismus preoperatively, all of whom had asymmetric surgery, 3 (19%) were restored to comitance. The largest change in comitance occurred with 1 muscle surgery (7 ), then 3 muscle (5 ), 2 muscle (4 ), and 4 muscle (3 ). Of the 6 cases developing postoperative incomitance, 83% had unilateral surgery, but 1 muscle versus 2 muscle surgery showed no difference in induced incomitance.

Discussion: Asymmetric strabismus surgery was associated with changes in postoperative comitance. Single muscle surgery produced the largest change.

Conclusion: Unilateral surgery is a powerful tool for treating patients with incomitance, but it can cause incomitance in patients who were previously comitant. This should be factored into surgical planning, with both decreases and increases in diplopia or who are sensitive to the social implications of suboptimal reconstruction.
Conclusion: however, necessitated reversal of the SRT in one patient, and added bi-medial recession in our series, ASRT combined with medial rectus recession eliminated postoperative: 0-8 exotropia). One patient needed re-operation due to intractable torsion.

Methods: No patient had vertical deviation.

Results: Six patients with abducens palsy and one with eso-Duane syndrome were included. Mean follow up was 2.2±2.2 months. Resection of 3-5 mm was performed in all patients. Pre-operative central gaze esotropia of 32.6±12.6 PD (range, 15-50) decreased to 8.1±7.4 PD (range, 0-18) at the final visit (p<0.002). Two patients required post-operative adjustment with recession of one of the transposed muscles due to an induced vertical deviation with overcorrection. At the final visit, one patient had a vertical deviation>4PD, and none had overcorrection or anterior segment ischemia.

Discussion: Unlike posterior fixation sutures, adjustable sutures can be utilized when augmenting transposition procedures by resection of the transposed muscles. This can help to overcome induced vertical deviations or overcorrections. In addition, ciliary vessels can be spared in these procedures. Conclusion: Augmentation of VRT by resection of the transposed muscles can be performed with adjustable sutures and vessel-sparing technique. This allows for post-operative control of overcorrections and induced vertical deviation as well as less risk of anterior ischemia.

Superior rectus transposition and unilateral or bilateral medial rectus recession for Duane syndrome and six nerve palsy 1.Assaf Harofeh Medical Center, Tel Aviv University, Zrifin, Israel. 2. Jasti V Ramanamma Children’s Eye Care Center, LV Prasad Eye Institute Hyderabad, India.

Introduction: We describe our results with augmented superior rectus transposition (ASRT) for the treatment of esotropia Duane’s syndrome and six nerve palsy and compare the effect adding bi-medial recession or unilateral recession to the procedure.

Methods: Retrospective surgical case review of patients undergoing ASRT which were operated by the authors. Preoperative and postoperative orthoptic measurements were recorded. Outcome measures included the angle of esotropia in the primary position, angle of head turn and the limitation in abduction.

Results: Eight cases of Duane’s syndrome and one case of six nerve palsy were identified. Minimum follow-up was 2 months (range 2-18 months). Mean deviation improved from 33.3±3.3 to 7.7±4.4 esotropia, face turn was improved from 20 degrees to 2.5 degrees, and abduction limitation improved from -3.9 to -2.0 (p<0.01). Four of the five patients who had unilateral medial rectus recession added to ASRT were ortho or under-corrected (preoperative: 14-45D, postoperative: 0-8D esotropia), while three of the four patients who had bi-medial recession were ortho or over-corrected (preoperative: 30-50D esotropia postoperative: 0-8 esotropia). One patient needed re-operation due to intractable torsion. No patient had vertical deviation.

Discussion: In our series, ASRT combined with medial rectus recession eliminated head posture, corrected esotropia and improved abduction in all patients. As opposed to conventional vertical transposition surgery, no vertical deviation occurred. Torsion, however, necessitated reversal of the SRT in one patient, and added bi-medial recession caused overcorrection in some patients.

Conclusion: ASRT combined with unilateral or bilateral recession of the medical rectus is safe and effective. Adding bi-medial recession may result in overcorrection.

Surgical Outcomes in Adult Sixth Nerve Palsy 1.Assaf Harofeh Medical Center, Tel Aviv University, Zrifin, Israel. 2. Jasti V Ramanamma Children’s Eye Care Center, LV Prasad Eye Institute Hyderabad, India.

Introduction: Sixth nerve palsy (6NP) is the most common adult ocular motor nerve palsy. Our goal was to identify factors associated with surgical outcomes in 6NP.

Methods: Medical records of all adult patients from 1988-2012 with 6NP who underwent strabismus surgery or botulinum toxin injections were retrospectively reviewed. Success was defined as absence of diplopia without prisms, vertical deviation<2PD, and horizontal deviation<10PD.

Results: 82 patients from four surgeons were included (49 [60%] women; mean age 52 years (range: 20-86)); 68 (80%) had unilateral 6NP. Palsies were complete in 33 (40%), 21 (26%) had >1 surgery. Underlying etiology was idiopathic/microvascular in 23 (29%), traumatic in 22 (27%), neoplastic in 19 (23%), and miscellaneous causes in 18 (22%). Success frequency was similar across etiologies. 16/41 patients (39%) with trauma or neoplasm required repeat surgery vs. 5/41 (12%) with other etiologies (p=0.05). Success was more frequent with Hummelshien-type procedures than vertical rectus transposition (VRT) among patients with complete palsies (7/9=78% vs. 8/23=35%;p<0.05). Success was more frequent among all surgically-treated 6NP patients who had adjustable vs. non-adjustable sutures (20/28=71% vs. 22/44=50%;p<0.07).

Discussion: Etiology of 6NP does not appear to affect surgical success in adults, but patients with traumatic and neoplastic causes were more likely to require repeat procedures. Despite a small number of patients, success was more frequent using the Hummelshien-type procedure and with adjustable sutures.

Conclusion: Surgical success in adults does not correlate with the etiology of the sixth nerve palsy, but may vary based on the type of procedures in this patient population.

Early results of slanted recession of the lateral rectus muscle for intermittent exotropia with convergence weakness 1.Department of Ophthalmology, Kyungpook National University Hospital Daegu, KOREA

Introduction: To evaluate the efficacy of slanted recession of the lateral rectus (LR) muscle for intermittent exotropia (IXT) with convergence weakness.

Methods: A retrospective analysis was made of all patients who underwent slanted LR recession between January 2010 and June 2012 for IXT with convergence weakness. Twenty-nine patients were included in this study. All patients had their follow-up duration more than 3 months. The medical records of the angle of esotropia in the primary position were reviewed and analyzed: patient's sex, age, preoperative and postoperative ocular alignment were recorded and analyzed: patient’s sex, age, preoperative and postoperative oculomotor weakness. Results: The study group was composed of 14 males and 15 females, with a mean age of 10.8. Preoperative mean deviation angle was 31.9 ± 5.4 PD at distance and 42.6 ± 5.8 PD at near. Slanted LR recession reduced the deviation angles to 2.7 PD at distance and 3.4 PD at near at 3 months. In addition, the mean difference between the distance and near deviation angles was significantly reduced from 10.7 PD preoperatively to 0.7 PD at 3 months postoperatively (p<0.05). The mean difference was significantly increased from 4.3 arcsec preoperatively to 94.4 arcsec at 3 months postoperatively (p<0.05).

Discussion: Slanted recession of the LR was effective in reducing near-distance differences. This surgical technique also demonstrated a positive impact on stereopsis.

Conclusion: It is suggested that the slanted recession of the LR will decrease relatively high recurrence rate of IXT with convergence weakness, however, further work will focus on the long-term stability of ocular alignment in these patients.
The effect of unilateral strabismus surgery on lateral incomitance in patients with exotropia

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Introduction: The purpose of the study was to determine the effect of unilateral strabismus surgery on lateral incomitance in patients with exotropia.

Methods: Prospective evaluation of patients > 7 years old with exotropia who had unilateral horizontal or vertical strabismus surgery at Arkansas Children’s Hospital between 12/09 and 1/12. Prism and alternate cover testing was performed with distance fixation in primary position, right gaze, and left gaze after 45 degrees of monocular occlusion, within one week prior to surgery, within one week after surgery, and 3 months after surgery. The surgical procedure was done under the discretion of the surgeon. Patients with extracocular muscle paralysis, fibrosis or trauma were excluded. The change in deviation induced by strabismus surgery in lateral gaze was expressed as a percentage of the change in deviation induced in primary position.

Results: Fourteen patients with an age range of 17-74 years and a preoperative exotropia of 20-85 prism diopters met inclusion criteria. Nine patients had unilateral recessions/resections, three had unilateral lateral rectus resections, and two had unilateral medial rectus resections. Thirteen patients (93%) had greater effect from strabismus surgery with gaze towards the operated eye (p<0.0013). On average, the surgical effect in gaze towards the operated eye was 148% that achieved in primary position whereas the surgical effect in gaze away from the operated eye was 82%. Ten patients had >3 months follow-up. Nine of these patients (90%) had greater surgical effect with gaze towards the operated eye. On average, the surgical effect in gaze towards the operated eye was 121% that achieved in primary position whereas the surgical effect in gaze away from the operated eye was 85%.

Discussion: Lateral incomitance from strabismus surgery maybe undesirable. This study is the first to prospectively quantify the amount of lateral incomitance induced by unilateral strabismus surgery in patients with exotropia.

Conclusion: Unilateral strabismus surgery induces clinically significant lateral incomitance in patients with exotropia. The lateral incomitance is reduced, but still remains 3 months after surgery.

The Effect of Unilateral Lateral Rectus Recession Versus Recession-Resection in Unilateral Surgery for Intermittent Exotropia

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Introduction: To compare outcomes of unilateral lateral rectus recession (ULR) vs lateral rectus recession-medial rectus resection (RR) in treatment of small to moderate angle intermittent exotropia in children.

Methods: The medical records of intermittent exotropia patients with exodeviation measuring 20 to 25 prism diopters (PD), and underwent ULR or RR between 2002 and 2010 were retrospectively reviewed. The successful alignment after surgery was defined as esophoria/tropia <5PD to exophoria/tropia <10PD. Surgical outcomes were compared between the ULR group and the RR group.

Results: Of 85 patients, 44 underwent ULR and 41 underwent RR. The mean follow-up period was 43.2 months in the ULR group and 39.2 months in the RR group (P=0.166). Mean preoperative exodeviation at distance and near was 21.9±2.0PD, 22.3±1.6PD in the ULR group and 24.3±1.6PD, 26.1±3.8PD in the RR group, respectively (P>0.05). The incidence of successful outcome at the last follow-up visit was not significantly different between the 2 groups, which was 39% in the ULR group and 32% in the RR group (P=0.650). Reoperation rate for recurrence of exodeviation was 18% in the ULR group and 27% in the RR group (P=0.437). Reoperation for consecutive exotropia was done in 2 patients of the RR group. Cumulative probability of survival from recurrence did not differ between 2 groups (P=0.83, log rank test).

Discussion: Surgical outcomes at a mean of 3.7 years were not significantly different between the ULR and the RR group.

Conclusion: Unilateral lateral rectus recession could be considered as a primary approach in the treatment of small to moderate angle exotropia.
Sight- or Life-Threatening Pediatric Eye Conditions: Assessment of the Baseline Diagnostic Knowledge of Pediatrics Residents and the Effectiveness of a Self-Study Based Teaching Presentation in Improving Diagnostic Confidence and Skills
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Introduction: Timely diagnosis and management of ocular diseases in children often times depend on appropriate referral by general practitioners. Exposure to ophthalmology is limited in most pediatric residency programs. The objective of this study was to assess the baseline knowledge of a population of pediatrics residents regarding sight- or life-threatening eye diseases in children. We further investigated whether providing a teaching presentation can improve the residents’ knowledge.

Methods: We assessed the baseline knowledge with a written test including 10 questions. The residents were then provided with a teaching presentation for self-review and the test was repeated. The change in mean score and subjective diagnostic confidence was compared using a paired t-test.

Results: 28 residents participated in the baseline test. The mean score was 4.96±1.59. The mean score after review of the teaching presentation was 5.57±1.40 (p=0.21). The subjective confidence of residents to diagnose serious pediatric eye conditions (on a scale from 0 to 3) was 1.46±0.7 and 1.48±0.65 before and after review of the teaching material, respectively.

Conclusion: Baseline knowledge and subjective confidence of pediatric residents regarding diagnosis of serious eye conditions in children are limited. Sight- and life-threatening conditions were frequently missed in our test setting. Distribution of study material for self-review does not significantly improve diagnostic knowledge.

Prevalence of Health Insurance Coverage and Access to Healthcare in the Baltimore Pediatric Eye Disease Study
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Introduction: The purpose of this study was to determine the prevalence of health insurance coverage and difficulty accessing healthcare in a cohort of urban children and to compare these findings to the subgroup with eye disease.

Methods: This was a cross-sectional population based study of white and African-American children aged 6 through 71 months in Baltimore, Maryland. Among 4132 children identified, 3990 eligible children (97%) were enrolled and 2546 children (62%) were examined. There was an in-home interview for caregivers followed by an office-based eye examination. Socioeconomic information, insurance status, barriers to accessing health care, and the presence of ocular disease were obtained from caregivers.

Results: Of those examined 48% were female, and the average age was 39.8 months. Nearly all of the children had health care insurance (96%), and many had vision care coverage (75%). Eye abnormalities including significant refractive error, strabismus, amblyopia, unexplained visual loss and other structural abnormalities were identified in 5.1% of subjects; 98% of those with an eye abnormality had health insurance coverage during the past year. Inability to access health care in the last year was reported for 3% of all children and 4% of children with any eye condition. The two most common reasons cited for difficulty accessing health care were long wait time for an appointment and lack of access to transportation. In 23.1% of those with eye disease, caregivers reported the child had been previously diagnosed with an eye problem by a doctor.

Discussion: In our population-based study in an urban setting, nearly all children, including those with eye disease, had health insurance. Only a small number were unable to obtain needed medical care. However, less than a quarter of those with vision problems were aware they had them.

Conclusion: Improved screening for pediatric eye disease in this urban community may improve children’s access to needed eye care.
Introduction: To study preservation of the posterior capsule at the time of cataract extraction and IOL implantation with subsequent Nd:YAG capsulotomy or pars plana vitrectomy with capsulotomy (PPV/C) for treatment of posterior capsular opacification (PCO) in young children.

Methods: Fifty-eight eyes of 40 patients who underwent posterior capsule extraction with AcrySof IOL implantation and intact posterior capsules were divided into two groups: younger (Group A) (6 months - 3 years, n=20) and older (Group B) (3 years - 7 years, n=38).

Upon PCO development, children underwent Nd:YAG laser or PPV/C. Primary outcomes included elapsed time until first capsulotomy and number of procedures needed to maintain a clear visual axis.

Results: Nineteen eyes (95%) in A and 31 (81.6%) in B required a secondary procedure for PCO. In both groups, a clear visual axis at their last follow-up visit (range = 8 - 166 months). The mean number of procedures needed to maintain a clear visual axis in A compared to B was 1.5 vs 1.1, with a range of 1 to 3 procedures for all patients requiring a secondary procedure to clear the visual axis. Elapsed time until first capsulotomy procedure to clear the visual axis was 14.3 months (A) and 22.7 months (B) (p=0.049). The Kaplan Meier curve of 50% probability for time to capsulotomy procedure was 9.5 months for A and 21 months for B.

Conclusion: Secondary Nd:YAG laser capsulotomy and/or PPV/C is a viable alternative to primary capsulotomy for management of pseudophakic PCO in young children.

Review of Surgical Treatment of Bilateral Congenital Cataracts
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Introduction: Dense bilateral cataracts presenting early in infancy require early intervention with minimal time for visual development for each eye. Recently, the Infant Aphakia Treatment Study has reported outcomes of bilateral congenital cataract surgery at age 7 months in this high-risk group. This study describes our experience with the treatment of unilateral congenital cataract in this age group. The purpose of this study is to review visual outcomes and adverse events when infants with cataracts present bilaterally.

Methods: We reviewed charts of consecutive patients who underwent bilateral congenital cataract surgery by a single surgeon at age 7 months or less. Exclusion criteria were retinopathy of prematurity or preoperative corneal diameter <4mm. Ages of surgery, causes of cataract, intraocular lens (IOL) placement (if yes primary or secondary), complications, and visual acuity after 5 years when available were analyzed.

Results: 128 eyes of 114 children were included in the study. 37 female and 27 male, 37 African American, 16 African American, 11 others. Mean age at follow-up was 2.7 months with a range of 0-7 months. 58% of patients had a family history of congenital cataract, 17% had an associated syndrome, and 25% were of unknown cause. 54 eyes had an IOL placed during cataract removal. Of the 74 eyes without an IOL placed primarily, 39 received a secondary IOL. Age at follow-up was 8.96 years (SD 3.7). Follow-up duration 8.72 (SD 3.78). 16/54 eyes with primary IOL implantation and 5/74 eyes without primary IOL implantation had reoperation for postoperative PCO. 6/54 eyes with primary IOL implantation and 20/74 eyes without primary IOL implantation had glaucoma. Visual acuity data were available for 60 eyes when measured at above 5 years of age. Median visual acuity was 0.25%. 28% of eyes recorded to have 20/30 or better vision. 35% had between 20/30 and 20/60, 27% between 20/60 and 20/200, 10% had worse than 20/200.

Discussion: Visual outcomes are often better for bilateral infantile cataracts compared to the unilateral population of IATS but the range is from normal to legally blind. Visual axis opacification and glaucoma are the most common adverse events in the months to years after surgery.

Conclusion: Treatment for patients with bilateral congenital cataracts often results in near normal vision. Patients who were primarily with an IOL had more returns to the operating room for visual axis opacification but less glaucoma.
Introduction: We wished to determine the role of goniotomy in cases with aphakic glaucoma after congenital cataract surgery.

Methods: Retrospective case note review of patients (pts.) with aphakic glaucoma undergoing goniotomy between Sept 1999 and Sept 2008.

Results: We identified 6 pts. (8 eyes) who underwent 12 goniotomies (10 temporal approach goniotomies (TAG), 2 nasal approach goniotomies (NAG)). All patients underwent tensectomy without intraocular lens implant. All 8 eyes had anomalous angle on gonioscopy. Median age at cataract surgery was 2 months (range 5.75-3.3 months). There were 4 pts. (4 eyes) with unilateral cataract with persistent fetal vasculature (PFV), 2 pts. (4 eyes) with bilateral cataract. Median age at presentation of glaucoma was 4 months (range 1.5-20 months). Median time of follow up after last goniotomy was 68.5 months (range 23-114 months). 4/8 eyes (all with PFV) underwent 1-3 cyclodiode treatments before TAG or NAG. 6 of 8 eyes (75%) were controlled with no sign of glaucoma progression with/without topical treatment by 1 or 3 goniotomies. 2 of 8 eyes required multiple cyclodiode lasers after last goniotomy was performed to control glaucoma. 1 of 8 eyes had developed rhegmatogenous retinal detachment 23 months after NAG. No eye developed hyphaema that needed evacuation.

Discussion: In this small series 75% of eyes had controlled glaucoma with/without drops by goniotomy-ies and were spared from filtration/seton surgery.

Conclusion: Goniotomy should be considered as a treatment option in cases of aphakic glaucoma when gonioscopy shows an abnormality of the angle, especially in cases of PFV.

Ocular and systemic findings in Peters' anomaly

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Introduction: Peters’ anomaly is a congenital anterior segment anomaly of the eye, characterized by central corneal opacity and the corresponding posterior stromal defect. The purpose of the study was to document the frequency of systemic disease in patients with Peters’ anomaly, investigate the long term clinical course and to determine the final visual outcomes in unilateral and bilateral disease.

Methods: A retrospective case notes study was conducted in all the patients with anterior segment developmental anomaly who were either treated surgically or medically in the Paediatric Ophthalmology Department of Great Ormond Street Children’s Hospital between January 2000 and Dec 2011. No exclusion criteria were defined for this study.

Results: A total of 200 procedures were performed on 72 eyes of 35 patients. The procedures included 31 PKPs and 90 glaucoma procedures. The median follow-up was 9 years (11 years to 8 months from the time of first procedure.) VA greater than 1.0 logmar was achieved in 12 patients, less than 1.0 logmar to hand movement in 14 patients, light perception in 4 and no light perception in 7 patients. Post operative complications were graft failure (8.3%), cataract (8.57%), glaucoma in 4 eyes, phthisis in 5 eyes in 68% of patients had systemic involvement including cardiac anomalies and developmental delay.

Discussion: Children born with Peters’ anomaly require thorough clinical examination, including USM. These patients should be screened for any associated systemic anomalies in case of bilateral disease.

Conclusion: Long term visual outcomes of Peters’ anomaly differ according to the disease severity.
Retinal vasoproliferative tumors in patients with neurofibromatosis. An analysis of 6 patients
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Introduction: Most patients with neurofibromatosis type 1 (NF1) have no major fundus mani-
festations. However, rare findings include multiple choroidal nevi, myelinated nerve fibers, combined hamartoma, choroidal schwannoma and choroidal melanoma. Another fundus lesion, retinal vasoproliferative tumor, (RVPT) has recently been recognized with NF1.

Methods: The authors reviewed the fundus findings and management of 6 patients with NF1 who developed RVPT.

Results: The mean patient age at recognition of RVPT was 18 years (median 12; range 9-39). Of the 6, there were 3 females and 3 males. Other ocular findings of NF1 included multiple Lisch nodules in 2 and optic nerve gloma in 1. The VPT was located between the equator and ora serrata in 5 cases and posterior to equator in 1 case The mean basal diameter of VPT was 11 mm, with a mean thickness of 4 mm. Associated features included retinal detachment (n=6), yellow exudation (n=6) epiretinal membrane (n=3), retinal hemorrhage (n=2), retinal neovascularization (n=1) cystoid macular edema (n=1). The primary treatment included cryotherapy (n=1), cryotherapy with intravitreal Bevacizumab (n=2), subtenon’s Triamcinolone (n=1), plaque radiotherapy (n=1), and enucleation (n=1).

Conclusion: RVPTs have been classified into primary and secondary types. Secondary RVPTs have been observed with an increasing number of pediatric fundus conditions including intermediate uveitis, retinitis pigmentosa, Coats’ disease, retinopathy of prematurity, familial exudative vitreoretinopathy, and others.

Discussion: RVPT should be added to the list of conditions that can occur with NF1 and children with NF1 should be monitored for RVPTs. This tumor can lead to severe visual loss and may require vigorous treatment.

Retinal Astrocytic Hamartoma: Spectral-Domain Optical Coherence Tomography Classification and Correlation with Tuberous Sclerosis Complex
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Introduction: Retinal astrocytic hamartoma (RAH) is the best-known ocular manifestation of tuberous sclerosis complex (TSC). We classified RAHs using spectral-domain OCT in 86 eyes and correlate each class with systemic manifestations of TSC.

Methods: Systemic features of TSC in 47 patients with RAHs were recorded. The examiners classified the RAHs using SD-OCT into one of 4 groups: 1) The association between RAH and systemic manifestations of TSC was studied using univariate analysis on one-way ANOVA test and multiple linear regression analysis.

Results: Logistic regression showed that type IV RAHs (20.4%) are the only independent significant factor strictly associated with subependymal giant cell astrocytoma (SEGAs) of the brain (70% of type III; odds ratio = 0.996; 95% CI: P < 0.001); type IV RAHs (12.2%) seem to be found only in patients with pulmonary lymphangiomyomatosis (100% of type IV; odds ratio = 1); finally type II RAHs (25.6%) are an independent significant factor associated with forehead plaques (92% of type II; odds ratio = 0.997; 92% CI: P < 0.001). Analysis with paired t test showed no significant correlation between the four types and all others systemic manifestations (P=0.26 for type I, P=0.12 for type II, P=0.19 for type III, P=0.24 for type IV). Discussion: The statistical correspondence between type III RAHs and SEGAs emphasizes the histological similarities of the two lesions, composed of elongated fibrous astrocytes with interfacing cytotoxic processes.2 We found a statistical association between the cavitary type IV RAHs and pulmonary lymphangiomyomatosis which is characterized by cystic de-
struction of lung parenchyma.

Conclusion: A non-invasive technique such as SD-OCT could become a fundamental tool in screening patients and referring them to the specialist.


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Factors influencing rates of Retinopathy of Prematurity (ROP) in Argentina: a case study of policy, legislation and international collaboration

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Introduction: The purpose of this study was to describe the key processes and stakeholders, including the Ministry of Health (MOH) and UNICEF, involved in the recognition of an epidemic of ROP blindness in Argentina to the development of national guidelines, policies and legislation for its control.

Methods: Data on the incidence of ROP was collected from 13 NICUS from 1999 until 2012, as well as the percent of children blind from ROP in 9 blind schools throughout 7 provinces in Argentina. Additionally, document reviews, focus group discussions and key informant interviews were conducted with neonatologists, ophthalmologists, neonatal nurses, MOH officials, clinical societies, legislators and UNICEF staff in the 7 provinces.

Results: In the late 1990’s over 80% of children under 5 years old in schools for the blind were blind from ROP. Recognition of this led to the formation of a National ROP group through the MOH in 2003, a targeted intervention of workshops and capacity building with UNICEF from 2004-2009 and the development of a national ROP screening law in 2007. By 2012, the rates of ROP as a cause of blindness in children in blind schools and the rates of severe ROP needing treatment in the NICUS visited had decreased significantly.

Discussion: The combination of a national ROP program, collaboration with UNICEF and national legislation, played a role in decreasing ROP in 7 provinces throughout Argentina.

Conclusion: The lessons learned and successes experienced in Argentina can hopefully be replicated in other countries in Latin America and beyond.

References:
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Evaluation of an Indirect Ophthalmoscopic Digital Photographic System (Keeler) as a Retinopathy of Prematurity (ROP) screening tool

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Introduction: While retinopathy of prematurity (ROP) remains an important cause of blindness, there is a paucity of trained screeners, especially in the developing world[1]. The purpose of this study was to determine whether digital retinal images obtained using an indirect ophthalmoscopic imaging system (Keeler) could be accurately graded for pre-plus or plus disease by masked experts and potentially be used for telemedicine.

Methods: We performed a retrospective chart review of infants screened for ROP (11/2009-11/2011), who had posterior pole images acquired using the Keeler system during routine ROP examinations. Masked to the clinical exam findings, two ROP experts reviewed and graded these images as normal, pre-plus or plus. We compared the experts’ grades of Keeler digital retinal images for a given eye on a given exam against the clinical examination results from the same session.

Results: Included were 253 infants (average gestational age = 27 weeks (range: 23-34), birth weight = 961 grams (range: 450-2300), post-menstrual age at examination = 35 weeks (range: 30-42)). Of those infants with plus disease on clinical exam, graders 1 and 2 had a sensitivity of 100% and 94% and specificity of 86% and 89%, respectively, for grading pre-plus or plus disease.

Discussion: Digital retinal images obtained by the Keeler system can be read with a high sensitivity and specificity to screen for clinically important ROP.

Conclusion: The Keeler system may be a valuable tool for ROP screening at a distance (e.g., via telemedicine).

References:

Comparison of Serum VEGF Levels, Vision and Neurological Development in Laser and Bevacizumab Treated ROP Patients

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Introduction: To measure serum levels of Bevacizumab and VEGF in infants who were treated with intravitreal injection of Bevacizumab or laser for type 1 ROP, and to observe the effects on vision and neurological development.

Methods: Infants with type 1 ROP were treated with either 0.625 mg intravitreal injection of Bevacizumab or laser. Blood samples were collected before treatment and on post-treatment day 2, 14, 42 and 60. Serum levels of Bevacizumab and VEGF were measured on each sample. Ocular and neuro-developmental outcomes were assessed and compared, as were systemic complications.

Results: 1) The serum level of Bevacizumab was detected at 2 days after intravitreal injection, peaked at 14 days, and last at least for 60 days. 2) The serum level of VEGF decreased in both groups 2 days after the treatment. 3) There were no significant differences in the systemic complications. 4) Refractive errors at age 1 year in the Bevacizumab treated group were significantly lower than in the laser treated group. 4) Neurological development (developmental quotient, DQ) at last visit before age 1 year was not significantly different.

Discussion: This is a preliminary outcome study. Long-term follow up and large group studies are continuing.

Conclusion: Bevacizumab escapes into systemic circulation after intravitreal injection and persists more than 2 months. Serum VEGF level decreased after both laser and Bevacizumab treatment, but it was more significant in the Bevacizumab treated group. The Bevacizumab treated group had lower refractive errors. There were no significant neurodevelopmental differences between these two groups.

References:

Improved Speed and Accuracy of Plus Disease Quantification Using Image Fusion Methodology

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Introduction: The diagnosis of plus disease in Retinopathy of Prematurity (ROP) largely determines the need for treatment; however, this diagnosis is subjective and prone to error. [1] [2] ROPTool is a semi-automated computer program that quantifies vascular tortuosity and dilation. A previous study showed that more than half of video indirect ophthalmoscopy still images had insufficient quality to permit analysis by RopTool. [2] We evaluated the ability of an image fusion methodology (robust mosaicing) to increase traceability and improve efficiency of posterior pole disease analysis using RopTool.

Methods: We reviewed video indirect ophthalmoscopy images from routine ROP examinations of 39 right eyes of 39 infants (September 2010-March 2011). We selected the best unenhanced still image from the video for each infant. Robust mosaicing, a single-frame image fusion algorithm, created an enhanced still image from the same video for each eye. We evaluated the time required and ROPTool’s ability to analyze two major vessels per quadrant on the enhanced vs. unenhanced still images.

Results: Mean(range) gestational age was 27 weeks(24-35); birthweight 885 grams(540-1660). Of 156 quadrants available for analysis, 10(6%) had plus and 11(7%) had pre-plus disease. ROPool analysis was faster (124 vs 153 seconds; p=0.017) and able to trace more quadrants (143/156, 92% vs 115/156, 74%; p<0.0001) using enhanced vs. unenhanced still images.

Discussion: Enhancing images with robust mosaicing increases traceability and decreases time to analyze posterior pole vessels by RopTool.

Conclusion: Retinal image enhancement using robust mosaicing advances efforts to automate the grading of posterior pole disease in ROP.

References:
Computer-assisted Quantification of Plus Disease after Treatment of Retinopathy of Prematurity with Intravitreal Bevacizumab

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Introduction: Treatment for Type 1 retinopathy of prematurity (ROP) includes laser and, more recently, intravitreal injection of bevacizumab [1]. This study uses ROPtool, a photoanalyzer, to objectively measure changes in retinal vascular dilation and tortuosity (plus disease) following intravitreal bevacizumab.[2]

Methods: Fundus images from 6 newborns treated with intravitreal bevacizumab for ROP were analyzed using ROPtool to assess changes in tortuosity, dilation and a calculation of overall plus disease. Measurements were obtained at baseline (n=6), 1 week (n=6), and 2 weeks (n=1) after treatment.

Results: Average vessel tortuosity decreased by 49%, dilation decreased by 9% and overall plus disease decreased by 17% in the first week after treatment with bevacizumab. One week later, the average vessel tortuosity decreased by another 20%, dilation decreased by 1%, and overall plus disease decreased by 14%.

Discussion: Few studies have shown objective changes in ROP after treatment with laser[3] but no previous studies have shown similar objective findings after treatment with bevacizumab. This study demonstrates a larger decrease in tortuosity at 1 week post-bevacizumab compared to a previous study of post-laser patients analyzed by Computer Assisted Image Analysis Software (that study found only a 2% decrease in tortuosity and 20% decrease in dilation at 1 week[3]).

Conclusion: Objective measurements of plus disease show greater changes in tortuosity 1 week after treatment with bevacizumab guides clinicians’ expectations for ROP regression following this new treatment.


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The Association of Prematurity and Nonglaucomatous Optic Disc Cupping in Children

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Introduction: The purpose of our study was to examine the association of premature birth and nonglaucomatous optic disc cupping in children and the neurologic correlates in premature and nonpremature cohorts with nonglaucomatous optic disc cupping.

Methods: Within a comprehensive pediatric ophthalmology practice associated with a children’s hospital, a computerized database search was conducted of all patients seen over a four year period with nonglaucomatous optic disc cupping. Optic disc parameters were assessed with digital photographs and history with regard to prematurity were noted and compared to control groups from the same practice. Data regarding associated systemic or neurologic disease was tabulated and existing neuroimaging reviewed.

Results: Forty-five eyes (mean horizontal cup/disc 0.70 ± 0.025) with nonglaucomatous cupping had clinically larger discs than 31 eyes (mean horizontal cup/disc 0.407 ± 0.095) without large cups (cupping eyes mean disc area 3.49 ± 1.32 mm squared versus eyes without large cups mean disc area 2.94 ± 0.9 mm squared, P < 0.001). The nonglaucomatous cupping group showed 14 (31%) of 45 children premature (all had gestational age at birth at 32 weeks or less), and the control group showed 5 (3.9%) of 128 consecutive patients with gestational age at birth at 32 weeks or less (P < 0.001). Periventricular leukomalacia was not seen.

Discussion: We found a statistically and clinically significant increased prevalence of prematurity in pediatric patients with nonglaucomatous cupping. The cupping was associated with a large disc size but not with periventricular leukomalacia.

Conclusion: Prematurity should be considered in evaluating the etiology of optic cupping in children.

**Anti-TNF Therapy for Childhood and Adolescent Uveitis**

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**Introduction:** Childhood uveitis is the third most common cause of blindness in the pediatric population (1). Numerous side effects of chronic corticosteroid use have prompted a quest for a viable steroid-sparing treatment. Our purpose is to describe the corticosteroid-sparing effect of anti-TNF therapy in chronic childhood and adolescent uveitis.

**Methods:** Retrospective longitudinal case series of patients started on anti-TNF therapy for chronic uveitis. Major outcome measures were corticosteroid-sparing success, adverse events, inflammation control, need for and ability to taper concurrent treatments assessed at 1-, 3-, 6-, 12-, 18-, and 24-month intervals.

**Results:** Nineteen eyes of 10 patients who used adalimumab or infliximab and followed for an average of 12 months were identified. Three patients had anterior uveitis and 7 had posterior segment uveitis. All patients with posterior segment inflammation improved significantly with anti-TNF therapy. 84% of eyes with anterior chamber inflammation improved or remained stable. Four patients (40%) required two cycles of therapy due to either relapse or failure. All patients were successfully weaned to systemic steroid dose of less than 7 mg/day without relapse, but 33% required lowdose maintenance steroids. Half of patients required at least one other non-biologic systemic immunosuppressive after 6 months. One serious adverse event (anaphylactic reaction to infliximab) was identified.

**Discussion:** This is the first study of its kind looking at outcomes for both anterior and posterior uveitis after relatively long term treatment with anti-TNF therapy in children.

**Conclusion:** Anti-TNF antibody biologics improve inflammation control and offer a steroid-sparing therapy in pediatric uveitis patients.

**References:**

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**Corneal anesthesia in childhood**

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**Introduction:** Corneal anesthesia (CA) in childhood carries a poor prognosis and there is little literature on its management. We present the largest reported series of children with this rare disorder.

**Methods:** We performed a retrospective chart review of children with congenital or acquired CA presenting to our institution over the last 15 years. Patients with concurrent facial nerve or other cranial nerve palsies were included.

**Results:** 21 eyes of 16 children were identified with CA caused by posterior fossa tumours (5), cerebellar hypoplasia (3), severe head trauma (3), familial dysautonomia (2) and isolated CA (3). The range of follow-up was 1-244 months, median 47.5 months. Six eyes in four children had final visual acuities (VA) of 20/40 or better. All eyes with VA 20/200 or worse at last follow-up had associated facial nerve palsy (CNVIIIP) or isolated CA. Complications included corneal scarring (81%), infectious keratitis (48%), corneal neovascularization (48%) and perforation secondary to keratitis (5%). Four children underwent corneal grafting for perforation or scarring. All grafts became hazy or opaque, with VAs of 20/800 or worse. The commonest surgical procedure was tarsorrhaphy (ten eyes). Seven were done on eyes with VA already 20/200 or worse. The three eyes undergoing tarsorrhaphy with VA better than 20/200 maintained vision of at least 20/200.

**Discussion:** Isolated CA, and CA with CNVIIIP, are associated with visual outcomes below 20/200. Earlier tarsorrhaphy may help preserve vision in these high-risk eyes.

**Conclusion:** We recommend that ophthalmologists suspect and test for CA in children with painless epithelial defects and consider early tarsorrhaphy.
**Notes**

**Poster Schedule**

2nd Set of Posters (41-80)  Displayed from Friday, April 5, 4:15 PM - Sunday, April 7, 10:45 AM, Essex Ballroom Foyer

Interactive Poster Session - Author Presentation and Q/A - Saturday, April 6, 10:00 - 11:00 AM

### AMBLYOPIA - VISION - VISION SCREENING

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**73**
Visual Evoked Potential Latency Predicts Improvement in Amblyopia Following Occlusion Therapy
Sina Salehi Omran, MS3; Sean P Donahue, MD, PhD
Vanderbilt Eye Institute, Nashville, TN

Introduction: Visual evoked potentials (VEP) can be used to diagnose amblyopia in a preverbal child. We sought to determine the relationship between characteristics of the VEP and the eventual outcome of occlusion therapy.

Methods: Twenty-one amblyopic individuals (age 3-6 years) were tested shortly after the initiation of monocular occlusion for amblyopia therapy. The Diopsys NOVA-TR system produced a checkerboard pattern reversal visual evoked response at 2 Hz for 10 seconds (20 reversals) for each of 5 spatial frequencies in the amblyopic and fellow eye. Of the twenty-one, nineteen presented for follow-up after 6 months of treatment or having reached a final endpoint. The difference in logMAR VA between initial and endpoint acuities was compared to the P100 latency of the amblyopic eye for the two highest spatial frequencies.

Results: Linear regression analysis for the relationship between the P100 latency in the amblyopic eye and the logMAR improvement in the distance VA of that eye was statistically significant and negative (Pearson coefficient -0.66; n=11, p=0.027), suggesting that children with longer P100 latencies when therapy is initiated have less improvement. For seven patients with P100 latency less than 120 ms, the mean improvement was 0.20±0.11, while those having a more delayed P100 latency had no detectable improvement in acuity.

Discussion: The P100 latency time measured at the beginning of occlusion therapy in the amblyopic eye correlates significantly and negatively with the eventual improvement in distance visual acuity.

Conclusion: VEP P100 latency time in an amblyopic eye can predict how well a child will respond to occlusion therapy.

References:

Interocular Suppression and Amblyopia
Vidhya Subramanian; Reed M Jost; Sheridan Jost; Eileen E Birch
Retina Foundation of the Southwest
Dallas, TX

Introduction: Discordant monocular visual inputs that result from strabismus and/or anisometropia are resolved by either alternation between monocular inputs or habitual suppression of one eye’s input. The dominant theory is that amblyopia results from habitual suppression. Recently, we demonstrated and quantified suppression in amblyopic children using dichoptic video game goggles (Subramanian et al. ARVO 2011). Here we quantify suppression associated with amblyopia of different etiologies and ages of onset.

Methods: 43 amblyopic children ages 5-16 years participated (11 strabismic, 13 anisometropic, and 19 combined; 6 infantile, 26 pre-school and 11 school-age onset). Dichoptic goggles presented coherently moving dots to the amblyopic eye (AE) and noise (randomly moving dots) to the fellow eye (FE) eye. AE coherent dot contrast was always 100%; FE noise dot contrast was reduced until the child experienced binocular vision. The FE contrast required to experience binocular vision quantified severity of suppression.

Results: Children with strabismic and combined amblyopia only experienced binocular vision when FE contrast was reduced to 12±3% and 17±5%, respectively. Children with anisometropic amblyopia were able to tolerate significantly higher FE contrast (39±5%; p<0.005). Severity of suppression was not correlated with age of onset (r=0.09; p=0.1) but was correlated with AE logMAR visual acuity (r=0.40; p<0.05).

Discussion: Suppression was more severe in strabismic and combined amblyopia than in anisometropic amblyopia. The association between severity and depth of amblyopia supports the hypothesis that amblyopia results from interocular suppression.

Conclusion: The link between amblyopia and suppression suggests that binocular therapy to reduce interocular suppression may be of benefit in the prevention or treatment of amblyopia.
Sweep visual evoked potential and visual development in optic nerve hypoplasia

Krista J Stewart; Jim Ver Hoeve; Yasmín Bradfield

University of Wisconsin, Madison, WI

Introduction: Optic nerve hypoplasia (ONH) remains a leading cause of childhood visual impairment. Visual development in infancy and preverbal age in patients with ONH has not been well characterized to date. In this study, we assessed sweep visual evoked potential (VEP) measurements as indicators of early visual development and predictors of future visual outcome in patients with ONH.

Methods: We retrospectively studied 38 patients with clinically diagnosed ONH who had performed sweep VEP. Final recognition acuity was assessed with Snellen or HOTV letters, if patients were capable. Other factors assessed included presence of nystagmus, CNS malformations, pituitary involvement, and optic nerve size.

Results: Most patients had subnormal sweep VEP acuities compared to age-matched normals. VEP acuities reached a plateau by 20 months of age in patients with ONH compared to a plateau at 12 months in normal children, correlating well with recognition acuity performed at an older age. 59% of patients had acuity worse than 20/40, and 11% had acuity 20/200 or worse after 20 months of age.

Discussion: Sweep VEP measurements in ONH suggest a significant delay in visual development, but confirm that there is some improvement in vision until 20 months of age. Final visual acuity correlates with ONH components, suggesting that sweep VEP may be used to predict outcomes at an early age.

Conclusion: Sweep VEP measurements may be used clinically to provide parents with an accurate visual prognosis for children with optic nerve hypoplasia.

Reference:

Parental Understanding of Amblyopia and Compliance with Follow-up after Vision Screening

Justin Y Rheem BS, Demitrio J Camarena BS, BA; Blen D Esheithe MPH; Leila M Khazaeni MD; Jennifer A Dunbar MD

Loma Linda University Medical Center, Loma Linda, California 92354

Introduction: This study evaluates the influence of parental amblyopia education on compliance with photo-screening referral.

Methods: Children age 6 months to 6 years received photo-screening in the setting of parent amblyopia education. Parents responded to Pre-education and Post-education test questions regarding the urgency of amblyopia follow-up. Children failing photo-screening received reference for comprehensive examination and their compliance was recorded. Parental support for follow-up included full-time social worker, gas cards, free clinic appointments, and free glasses. Reasons for noncompliance were assessed via telephone survey. Results were stratified for compliance and education with Chi-square and logistic regression.

Results: Among 2,579 referred following photo-screening, 567 were compliant (22.4%). Participation in the educational session (n=420) did not increase compliance with follow-up (Chi Square P=0.91). Compliance was not influenced by the difference between pre- and post-test scores assessing understanding of urgency to follow up (LR P=0.36; Wald test P=0.35; LR: P=0.27, Wald test P=0.25).

Discussion: Although parents' assessment scores improved after the educational session, education did not significantly improve compliance with comprehensive examination. Lack of time and insurance problems were the most frequent reasons given for noncompliance.

Conclusion: In this study, parental understanding of the urgency of amblyopia did not improve compliance with vision screening recommendations. Further research into lowering barriers to compliance with vision screening follow-up is needed in this population.

Incidence of Pathology found in Pediatric Patients referred for Ophthalmologic Assessment following Abnormal Vision Screening

Andrea K Leung, MD; Helia Garcia, OC; Heather de Beaufort, MD

Children's National Medical Center, Washington, DC

Introduction: The purpose of this study is to review the incidence of pathology identified on abnormal vision screening by primary care physicians and school systems, based on the age of the patient at the time of screening.

Methods: The purpose of this study is to review the incidence of pathology identified in patients referred for abnormal vision screening by primary care physicians and school systems, based on the age of the patient at the time of screening. The secondary purposes of this study are to describe the patient demographics associated with types of pathology found on ophthalmologic examination and to assess the accuracy of different methods used for vision screening.

Results: New-patient ophthalmology assessments at a tertiary-care pediatric hospital over a two-year period were identified. A retrospective chart review was performed to determine the incidence and the types of pathology found in patients referred for abnormal vision screening.

Discussion: There is little literature discussing the incidence of pathology found in children with abnormal vision screening. Our early data shows that the majority of these patients have amblyopia or refractive errors, but thirty percent have no pathology.

Conclusion: Based on preliminary data, vision screening by primary care physicians and schools primarily identify children with refractive error and amblyopia. There was no significant difference between ethnicities or age groups in the types of refractive error or pathology identified on ophthalmologic examination.

Reference:
High Sensitivity and Specificity of the Pediatric Vision Scanner in Detecting Strabismus and Amblyopia in Preschool Children

Reed M Jost MS;* Susan E Yanini PhD;* Cynthia L Beauchamp MD;* David R Stager, Sr. MD;* David Stager, Jr. MD;* Lori Doo MD;* Molly Nolan;* Eileen E Birch PhD;* *Retina Foundation of the Southwest; †Pediatric Ophthalmology & the Center for Adult Strabismus; ‡Pediatric Ophthalmology & Adult Strabismus; †Department of Ophthalmology, UT Southwestern Medical Center, Dallas, TX

Introduction: The Pediatric Vision Scanner (PVS) directly detects strabismus and amblyopia by analyzing binocular scars for the presence or absence of birefringence, which is characteristic of strabismus and amblyogenic risk factors. In a preliminary study of the PVS in detecting amblyopia sensitivity and specificity were 88% and 88%, respectively. Here we report the sensitivity and specificity for a large cohort, confidence intervals, and analyses of screening errors.

Methods: 250 children (2-6y) were enrolled: 103 controls and 147 with strabismus and/or amblyopia. In addition to the PVS, children were tested with the SureSight™ Autofractor and the Ran- dolt Preschool Stereoeotaxy Test (RSTP). Each test yielded a recommendation of ‘pass’ or ‘refer’. A comprehensive pediatric ophthalmic exam served as the gold-standard.

Results: The PVS correctly identified 144 of 147 children with strabismus and/or amblyopia: sensitivity = 98% (95%CI: 95-100%). The PVS correctly identified 90 of 102 control children; specificity = 88% (95%CI: 79-96%). The SureSight™ misclassified 81 children, failing to detect 49 children with strabismus and/or amblyopia and over-referring 18 children with astigmatism. The RSTP misclassified 51 children, including similar numbers of affected and control children. Misclassifications were not consistent across tests. Using Bayesian analysis to estimate the performance of each test in a preschool screening setting (assuming a prevalence of 4%, 2 accurate, 89%, 66%, and 72% were predicted for the PVS, SureSight™, and RSTP tests, respectively.

Discussion: The PVS identifies children with strabismus and/or amblyopia with high sensitivity, outperforming the SureSight™ and the RSTP. Conclusion: Preschool vision screening may be more efficient with a device that directly detects strabismus and/or amblyopia.


The efficacy of the plusoptiX S04 photoscreener as a vision screening tool in children with autism

Thomas C McCurry MS, MBA; Linda Lawrence MD; Liliana Mayo PhD
MediUniversity of South Carolina, Charleston, SC

Introduction: Children with autism and related disorders reportedly have an increased prevalence (40%) of ocular disorders. Comprehensive eye examinations by a pediatric ophthalmologist are recommended for all children with autism and related disorders.1 Examination of the visual system can be very time consuming, expensive, and stressful for the child. A photoscreener such as the plusoptiX S04 may be a cost-effective, time-saving, and less stressful alternative. The efficacy of the plusoptiX S04 photoscreener as a vision screening tool was evaluated.

Methods: Examinations can be very time consuming, expensive, and stressful for the child. A photoscreener such as the plusoptiX S04 may be a cost-effective, time-saving, and less stressful alternative. The efficacy of the plusoptiX S04 photoscreener as a vision screening tool was evaluated.

Results: The plusoptiX S04 referred 29 (67%) of 43 children with autism. 15 (35%) children had treatable eye disease upon examination. The plusoptiX S04 had a sensitivity of 93% (CI: 0.84 to 0.95), PPV 91%, and NPV 98%. The plusoptiX S04 correctly identified 85 of 89 control children; specificity = 95% (95%CI: 92-98%). The plusoptiX S04 correctly identified 54 of 54 children with strabismus and/or amblyopia; sensitivity and specificity were 98% and 100%, respectively. Of the 8 children who were referred, 5 had high myopia and 3 had astigmatism.

Discussion: The plusoptiX S04 is sensitive but less specific at detecting treatable ocular conditions in children with autism. The majority of children with autism and amblyogenic risk factors were detected on screening, however about half of all referrals had no amblyogenic risk factors.

Conclusion: The use of the plusoptiX S04 photoscreener in children with autism is effective and has the potential to save time and expense related to routine eye examinations.

Abstract #089

Change in Community-Based Preschool Vision Screening from Visual Charts to Retinomax
Eugene A Lowry; Ryan Lui; Travis C Porco; Alejandra De Alba Campomanes
University of California, San Francisco, San Francisco

Introduction: To determine the difference in referral rate and positive predictive values between a community-based vision screening program using eye charts against one using autorefraction.

Methods: 5,186 preschool children were screened in the 2010-2011 using vision charts, motility, and cover-uncover testing. Follow-up on referred children was determined through provider surveys. 1,773 preschool children were screened in 2011-2012 using autorefraction with Retinomax (manufactured by Nikon, Tokyo, Japan), Hirschberg and cover-uncover testing. Follow-up on referred children was provided on a mobile eye van. Populations were compared for referral rates and positive predictive value. Positive cases were defined as: refractive error treated with glasses, strabismus, cataracts, or amblyopia.

Results: The visual charts screening program referred 4.3% of screened children. The autorefraction screening program referred 16.5% of screened children. The difference (12.2%) was significant (p<0.0001). The probability of a referred child meeting case definition at follow-up was 69.3% and 56.2% for vision charts and autorefraction, respectively (p = 0.07).

Discussion: A significantly larger number of preschool children were referred for follow-up in a community-based screening program using autorefraction rather than vision charts. There is a non-significant trend towards decreased positive-predictive value in children referred based on Retinomax compared with visual eye chart.

Conclusion: Screening programs based on Retinomax are likely to refer a greater number of children that require glasses compared with vision charts. This will increase the number of children appropriately treated with glasses as well as overall screening costs.

Poster 52 Saturday 10:00 - 11:00 am
JAAPOS Abstract #077

Abstract #090

Validation of Spot screening device for amblyopia risk factors in a pediatric ophthalmology clinic setting
Glynnis A Garry
Vanderbilt Eye Institute, Vanderbilt University Medical Center, Nashville, Tennessee

Introduction: Early detection of amblyopia is critical to the prevention of permanent visual impairment in children. The Spot Vision Screener is a handheld digital screening device that evaluates children for the presence of amblyopia risk factors (ARFs). We attempted to validate this screening device in a controlled clinic setting.

Methods: During a 3-month period, 217 children (ages 2 to 9 years) were screened using Spot in a Pediatric Ophthalmology clinic before receiving a comprehensive gold standard eye exam. Gold standard examinations were evaluated using the new AAPOS Vision Screening Committee guidelines and compared with results from the Spot Vision Screener. Results from Spot were evaluated through two different manufacturer software versions: v1.0.3 and v1.1.51. The specificity and sensitivity for each software in detecting ARFs were determined.

Results: 217 children were screened by Spot (n=80 had amblyopia, n=153 had ARFs); 157 children were referred, and 60 passed. Using the original software (v1.0.3), Spot had a sensitivity of 91% and a specificity of 73% to detect ARFs. The updated software (v1.1.51) was applied to 157 patient records in a masked manner, and specificity (83%) was minimally affected. (2)

Conclusion: The Spot is an effective pediatric vision screener comparable to the Plusoptix. Proposed modifications to the manufacturers criteria may be useful for the Spot and for the Plusoptix.

Poster 54 Saturday 10:00 - 11:00 am
JAAPOS Abstract #052

Prospective Evaluation of the Spot (Pedavision) Vision Screener as Autorefractor and in the detection of Amblyogenic Risk Factors Compared to Plusoptix and a Comprehensive Pediatric Ophthalmology Examination
Mae Millicent Petersen; Rupal H Trivedi; Vera A Ball; Carrie E Papa; Maria E Shissett; M Edward Wilson; Jennifer D Davidson
Medical University of South Carolina/Storm Eye Institute, Charleston, South Carolina, USA

Introduction: The Pedavision Spot photorefractor screener has been marketed over the last year (1) without published validation. We report a prospective study of the Spot compared to the more validated Plusoptix screener and to a comprehensive examination. We also report these evaluations utilizing modifications to photorefractor referral criteria that have been proposed to improve specificity while maintaining sensitivity (2).

Methods: After informed consent, patients underwent screening with the Spot and with the Plusoptix prior to their comprehensive examination by a pediatric ophthalmologist masked to the results. Data including refractions, pass/refer, strabismus and any ocular pathology, were entered into a Redcap database for statistical analysis.

Results: Currently, 161 patients have been enrolled (ave age 6.0 years). The sensitivity and specificity of the Spot for detection of proposed AAPOS amblyopia risk factors (ARFs) are 0.98 and 0.49. With proposed modifications to the manufacturers criteria the Spot sensitivity is 0.87 and specificity 0.72 and with the Plusoptix, sensitivity 0.91 and specificity 0.61. Compared to cycloplegic retinoscopy (gold standard), the Spot showed a mean difference of -0.096 ± 1.15 D for SE and 0.38 ± 0.63 D for cylinder. Corresponding numbers for the Plusoptix were -0.37D ± 1.20 D for SE and 0.31D ±0.63 cylinder.

Discussion: In this ongoing study, sensitivity for the Spot with manufacturer's guidelines is excellent and is comparable to the more established Plusoptix. Proposed modifications to manufacturers referral criteria improve specificity with acceptable sensitivity for both the Spot and the Plusoptix. The Spot underestimates hyperopia more than does the Plusoptix.

Conclusion: The Spot is an effective pediatric vision screener comparable to the Plusoptix. Proposed modifications to the manufacturers criteria may be useful for the Spot and for the Plusoptix.

References:
2. Change in Community-Based Preschool Vision Screening from Visual Charts to Retinomax
Eugene A Lowry; Ryan Lui; Travis C Porco; Alejandra De Alba Campomanes
University of California, San Francisco, San Francisco

Introduction: To determine if adding Lang stereoaucuity to plusoptix photoscreening improves sensitivity.

Methods: Retrospective chart review of children who had a plusoptix A09 photoscreening and Lang stereoaucuity performed by a lay screener in our office. All children also underwent a comprehensive pediatric ophthalmology examination including cycloplegic refraction performed by one pediatric ophthalmologist. Children were determined to have amblyopia risk factors based on the current AAPOS referral criteria. Children were considered to pass the Lang stereo test if they had any measurable stereoaucuity.

Results: 92 patients ages 3-11 were included, 76% of children were found to have amblyopia risk factors. The Lang Stereo test alone was found to have a sensitivity of 63% and specificity of 64%. The plusoptix alone was found to have a sensitivity of 93% and specificity of 91%. Assuming that all children who were initially a pass on the plusoptix but were referred on the Lang stereo, the sensitivity increased to 97% but the specificity decreased to 62%.

Discussion: While it is important to maximize sensitivity (reducing false negatives) programs must also ensure they are maximizing specificity (reducing false positives).

Conclusion: The Lang stereo test has a low sensitivity and specificity and should not be used alone for pediatric vision screening. Adding this test to a plusoptix photoscreening program would improve specificity only minimally, while at the same time would decrease sensitivity significantly. The Lang stereo-aucuity test is not sensitive or specific enough to be recommended as an adjunct to pediatric vision screening.

Poster 51 Saturday 10:00 - 11:00 am
JAAPOS Abstract #088

Does Adding Stereo Testing to Plusoptix Photoscreening Improve Sensitivity?
Noelle S Matta CO, CRC, COT, David I Silbert MD, FAAP
Family Eye Group, Lancaster Pennsylvania

Introduction: To determine if adding Lang stereoaucuity to plusoptix photoscreening improves sensitivity.

Methods: Retrospective chart review of children who had a plusoptix A09 photoscreening and Lang stereoaucuity performed by a lay screener in our office. All children also underwent a comprehensive pediatric ophthalmology examination including cycloplegic refraction performed by one pediatric ophthalmologist. Children were determined to have amblyopia risk factors based on the current AAPOS referral criteria. Children were considered to pass the Lang stereo test if they had any measurable stereoaucuity.

Results: 92 patients ages 3-11 were included, 76% of children were found to have amblyopia risk factors. The Lang Stereo test alone was found to have a sensitivity of 63% and specificity of 64%. The plusoptix alone was found to have a sensitivity of 93% and specificity of 91%. Assuming that all children who were initially a pass on the plusoptix but were referred on the Lang stereo, the sensitivity increased to 97% but the specificity decreased to 62%.

Discussion: While it is important to maximize sensitivity (reducing false negatives) programs must also ensure they are maximizing specificity (reducing false positives).

Conclusion: The Lang stereo test has a low sensitivity and specificity and should not be used alone for pediatric vision screening. Adding this test to a plusoptix photoscreening program would improve specificity only minimally, while at the same time would decrease sensitivity significantly. The Lang stereo-aucuity test is not sensitive or specific enough to be recommended as an adjunct to pediatric vision screening.

Poster 53 Saturday 10:00 - 11:00 am
JAAPOS Abstract #085
Real-time automatic strabismus screening using digital image analysis techniques

Annegret H Dahlmann-Noor PhD; Ron Maor; Simon Barnard PhD; Yuval Yashiv; Gill Adams
NIHR Biomedical Research Centre at Moorfields Eye Hospital and UCL Institute of Ophthalmology; IRISS Medical Technologies, London, UK

Introduction: Strabismus is a risk factor for amblyopia and in pre-school children has a prevalence of 3.9%. Alignment tests increase the sensitivity of preschool vision screening to detect strabismus. The Hirschberg test of ocular alignment evaluates centrality of corneal light reflections. IRISS Medical Technologies are developing a novel real-time strabismus screening device, based on automated processing and analysis of high-resolution digital photographs of the first Purkinje image. Advantages of this approach include portability, availability, low price, speed and ease of use of devices which can be used to acquire images. This study aimed to deliver a first estimate of diagnostic test accuracy in a diagnostic and a screening setting.

Methods: The Research and Ethics Committee of the UK Institute of Optometry approved relevant parts of the study. We examined 331 individuals in primary schools (n=56) and an optometry practice (n=275). Age: 179 +/- 10 years, 152 +/- 11 years. We acquired three full-face photographs. All participants underwent unaided visual acuity (Logmar or crowded single letters/pictures), cover/uncover test and Randot stereopsis by a study- accredited optometrist.

Results: Prevalence of manifest strabismus in the study sample was 6.34%. Sensitivity of the IRISS device to detect strabismus was 95%, specifically 91%.

Discussion: Early results compare very favourably with other alignment tests.

Conclusion: In order to further test the technology we are currently acquiring photographs from 500 strabismic children in a diagnostic setting. This data will be used to refine the technology to output a ‘pass/fail’ recommendation. A diagnostic test accuracy study will evaluate the new ‘Strabismus Screener’ in population-based screening of pre-school children.

References:

Mood and Quality of Life in Adults with Strabismus

Kelly A MacKenzie BSc (Hons); Hayley McBain MSc BSc; Joanne C Hancox FRCOphth; Daniel G Erza FRCOphth; Gillian G Adams FRCOphth; Stanton Newman MRCP (Hons); CPsychol
Moorfields Eye Hospital; School of Health Sciences, City University; UCL Institute of Ophthalmology; NIHR Biomedical Research Centre for Ophthalmology, London, UK

Introduction: To explore the demographic, clinical and psychosocial factors which are associated with mood and quality of life in patients with strabismus.

Methods: Cross-sectional study at a tertiary referral centre. Participants were recruited prior to strabismus surgery, between November 2011 and April 2012. Exclusion criteria consisted of other co-morbidities, facial or ocular abnormalities, identifiable psychosis, dementia, or other cognitive impairment. Those unable to read or understand English were also excluded. All patients completed a series of psychosocial questionnaires, Hospital Anxiety and Depression scale (HADS) and AS-20 Quality of Life (QoL).

Results: Of 286 consented, 222 participants completed the questionnaires. Demographic data: 103 male (46%), overall age range 17 to 86 and 81% participants white. Average deviation 34 diptres and 125 (56%) patients experienced diplopia. Adopting the clinical thresholds for anxiety and depression, the proportion of patients with clinical anxiety in this sample was 23.8% and clinical depression 10.36%. Utilising previously described norms (95% CI) of patients scored below normal on overall, 151 (58%) in functional and 185 (63%) in psychosocial QoL.

Discussion: Psychosocial rather than clinical and demographic characteristics were consistently associated with QoL and mood. In this study population the levels of anxiety and depression are 10x that of the normal population. These levels are more in line with long-term chronic diseases such as arthritis and facial disfigurement.

Conclusion: Psychosocial factors rather than strabismic characteristics have more effect on patient distress. In the future, based on these variables we may be able to predict which patients will not be satisfied, regardless of their surgical outcome.

Responsiveness of a diplopia questionnaire score to strabismus surgery

David A Leske; Sarah R Hatt; Laura Liebermann; Jonathan M Holmes
Mayo Clinic, Rochester, Minnesota

Introduction: We have previously described a patient-reported diplopia symptom questionnaire that allows a patient to rate their diplopia on a 5-point scale (never, rarely, sometimes, often, always), in specific positions of gaze (reading, straight ahead distance, down, right, left, up, and other). We have also previously described a data-driven scoring algorithm for this questionnaire to yield a score of 0 (no diplopia) to 100 (diplopia in all gaze positions always). In the present study, we evaluated the responsiveness of the diplopia questionnaire (DQ) score to strabismus surgery.

Methods: To first evaluate test-retest variability, we collected DQ data at 2 consecutive visits (1-154 days apart) with no intervening treatment and no clinical change in 91 adults with diplopic strabismus. In a subsequent cohort (87 surgeries for diplopia), we then compared preoperative and 6-week postoperative scores (range 4 to 10 weeks). Types of strabismus included parietal, restrictive, idiopathic, and childhood onset.

Results: Test-retest variability was good (ICC=0.81, 95% CI: 0.73-0.87), with 95% limits of agreement (LOA) of 39 points. Postoperative scores were markedly improved from preoperative scores (66 ± 33 vs 28 ± 33, p<0.0001). Of 67 (87%) surgeries where the preoperative score was able to improve greater than the 95% LOA, 42 (63%) improved by exceeding this threshold.

Discussion: The new diplopia questionnaire score is responsive to surgery in adult patients with diplopic strabismus.

Conclusion: The new patient-reported diplopia questionnaire score may be a useful outcome measure for clinical applications and for research studies.
Incidence of strabismus in preverbal children with hyperopia previously diagnosed with pseudoesotropia

Ariel L. Silbert; Noelle S Matta CO; CRC, COT; David I Silbert MD, FAAP
Family Eye Group, Lancaster Pennsylvania

Introduction: We previously reported that 12% of children under age 3 diagnosed with pseudoesotropia without significant refractive error later developed strabismus or mild refractive amblyopia. Mohan and Sharma recently reported on 51 patients with pseudoesotropia and hyperopia and noted that esotropia developed in 53.9% of the children with >1.50D of hypermetropia compared to 2.6% of those who had <1.50 hypermetropia, implying a low risk of esotropia unless hyperopia was greater than 1.50D on initial exam. We reviewed our data to see if this association holds.

Methods: Records between 01/01/2001, and 02/26/2010, were reviewed retrospectively. 394 patients diagnosed with pseudoesotropia with an otherwise normal examination were reviewed. 253 with follow-up were analyzed.

Results: 46 children were 36 months or older at initial presentation; none developed strabismus. 207 children were <36 months at initial presentation; 22 (11%) were later found to have strabismus. 78 of these children had hyperopia > 1.50 D; 8 (10%) later developed strabismus. 129 children had hyperopia <=1.50 D; 14 (11%) developed strabismus.

Discussion: Our analysis shows an equal risk of strabismus developing in pseudoesotropes under age 3 with greater or less than 1.50D of hyperopia.

Conclusion: There is a significant risk of esotropia developing in children under three diagnosed with pseudoesotropia. Hyperopia less than 1.50D, does not obviate the need for careful follow-up.

Outcomes Including Stereocuity Following Surgical Correction of the Non-accommodative Component in Accommodative Esotropia

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Introduction: Initial therapy for accommodative esotropia is spectacle, followed by surgical management of any persistent, non-accommodative component. Previous studies have assessed surgical alignment outcomes. We additionally evaluated binocularity by considering stereocuity.

Methods: This is a retrospective review of consecutive patients over twenty years who underwent bilateral medial rectus recession by one surgeon (n=695), with a diagnosis of accommodative eso- tropia and hypermetropia greater than or equal to +2.25D (+3.0D). Data extracted at the preopera- tive, 6-week, 1-year, and final postoperative visits included visual acuity, stereocuity, cyclography, esotroposcopy, and esodeviation at distance and near. Alignment was subdivided into group A (within 10 PD of orthotropia), group B (residual esotropia greater than 10 PD), or group C (consecutive esotropia greater than 10 PD). Stereocuity was measured as phase (40-100 arc-seconds) and gross (301-3600 arc-seconds).

Results: At six weeks, 86% were in group A while 14% patients were in group B. At the final postoperative visit, 64% were in group A while 27% were in group B and 8.6% were in group C. 30.4% of patients maintained stereocuity despite increased misalignment. Better binocularity was associated with a mean older age at time of surgery (4.75 years-old with stereocuity versus 3.8 years-old without stereocuity). Those with fine stereocuity were the oldest (5,13 years-old).

Discussion: Better alignment outcomes correlated with better stereocuity. Children who under- went surgery at an older age were also found to have better stereocuity.

Conclusion: A favorable alignment correlates with good binocularity, which can persist in patients who have a residual esostrabismus greater than 10 PD (group B).

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Diagnostic ophalmologic findings in Moebius Syndrome
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Introduction: Moebius syndrome is defined as congenital facial nerve palsy combined with abduction deficit. To precisely characterize the clinical phenotype beyond these minimum diagnostic criteria, we evaluated participants at consecutive Moebius Syndrome Foundation conferences.

Methods: All attendees of Moebius Syndrome conferences held in the United States in 2008, 2010, and 2012 were invited to participate. Participants underwent standardized ophthalmologic examination. Eye and facial movements were recorded and reviewed by the study team, and diagnostic and associated findings were noted.

Results: Of the 113 participants enrolled, 16 did not qualify for diagnosis of Moebius syndrome (typically facial palsy with full eye movements) and 9 had an atypical phenotype with complete upgaze limitation. The remaining 88 participants had a classic Moebius syndrome phenotype with either orthotropia or esotropia in primary position, and no ptosis. Of these, 49 (63%) had limited adduction, of whom 33 (67%) had a motility pattern simulating horizontal gaze palsy. Dysinnervation was observed in 24 participants (35%), including anomalous eye or lid movements and crocodile tears. We noted 2 novel findings: intorsion with re-fixation (16%), and a volitional Bell’s phenomenon to moisten the cornea (45%).

Discussion: Only 4 of 5 patients believed to have Moebius syndrome have typical findings. The remainder either do not meet diagnostic criteria or have another condition. Adduction limitation may be profound, even with straight eyes. Dysinnervation is common, and we describe two previously unreported clinical features.

Conclusion: Careful assessment of eye movements is essential for accurate diagnosis of Moebius syndrome and related entities.

The use of pre-operative botulinum toxin injection in large angle childhood esotropia

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Introduction: This study aimed to assess the influence of pre-operative botulinum toxin (BT) injection upon the surgical correction of large angle esotropia (ET) in children and the stability of alignment following subsequent strabismus surgery.

Methods: A retrospective review of children younger than 14 who had received BT prior to surgery for large angle ET (> 50 prism diptres-) from January 2002 to April 2012 was undertaken. 27 patients who met inclusion criteria and had been treated with BT to both medial recti were identified. The angles for near and distance fixation, pre-BT, 3 months and 6 months post BT, at last follow-up prior to surgery and at last post-operative follow-up were analysed.

Discussion: 3 months post BT the mean angle of deviation had reduced from 60.7 to 38.7. This stayed stable (42.7) after a mean follow up of 11.8 months. 20 of the 27 patients (74%) had undergone or were awaiting 2-muscle surgery. Of those operated (n=15), 11 were satisfactorily aligned but 4 exhibited a residual post-operative esotropia of 20 Δ or more at final follow up (range 3 months to 3 years).

Conclusion: The use of pre-operative BT reduced the angle of deviation in children with large angle ET and enabled the use of less aggressive 2-muscle (instead of 3 or 4 muscle) strabismus surgery.

References:
Introduction: Botulinum toxin (Botulinum®) injections may be used for patients with recurrent strabismus. We hypothesized that injection into the dominant eye would be more effective than injection into the non-dominant eye, because there would be a greater stimulus to restore binocularity by inducing temporary misalignment of the preferred eye.

Methods: Retrospective review of 46 patients with moderate angle recurrent esotropia following previous extraocular muscle surgery. Patients with deprivation amblyopia or developmental delay were excluded. Injection into the dominant eye was also recommended, but the injection was performed in the non-dominant eye if the parents preferred. The pre- and postoperative records were analyzed.

Results: Forty-six patients with recurrent esotropia of 14–25 PD ( prism dipters) were treated with Botulinum. The injection was performed in the non-dominant eye in 21 patients (average deviation 19.6 PD; average age 4.9 years), and in the dominant eye in 25 patients (average deviation 18.9 PD; average age 5.6 years). Follow-up was greater than one year in all patients (average 4.4 years). Treatment was successful in 13/21 (61%) of patients in the non-dominant group and 14/25 (56%) of patients in the dominant group.

Discussion: There was no significant difference in the outcome of Botulinum injection for recurrent esotropia between patients who received injections in the dominant or non-dominant eye.

Conclusion: The efficacy of Botulinum for recurrent strabismus is not affected by ocular dominance. Therefore, other factors may be considered when deciding which muscle to inject.

Incidence and Clinical Characteristics of Adult-Onset Distance Esotropia

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Introduction: The purpose of this study is to describe the incidence and clinical characteristics of adult-onset distance esotropia in a population-based cohort.

Methods: The medical records of all adult (>19 years of age) residents of Olmsted County, Minnesota diagnosed from January 1, 1985, through December 31, 2004, with a symptomatic, comitant esodeviation greater at distance than near, were retrospectively reviewed.

Results: Seventy-five cases of adult-onset distance esotropia were identified during the 20-year period, yielding an annual incidence of 6.0 per 100,000 residents older than 19 years, and comprising 10% of all forms of adult-onset strabismus in this population. The 75 cases were diagnosed at a mean age of 70 (range 19–91 years) and 49 patients (p<0.008) were female. Thirty-two percent (23) were also already diagnosed with age-related macular degeneration. The Kaplan-Meier rate of progression was 47% by 5 years after diagnosis. None of the following co-morbidities were statistically associated with progression: gender, age, refraction, treatment modality, macular disease or vascular disease risk factors, such as diabetes mellitus, hypertension or coronary artery disease.

Discussion: Although adult-onset distance esotropia is more prevalent among women and commonly progresses over time, neither gender nor age, refractive error, modality of treatment, or systemic vascular disease risk factors are associated with progression.

Conclusion: Adult-onset distance esotropia comprised 1 in 10 adults with new-onset strabismus in this population and was significantly more common among women. Although almost half progressed within 5 years, there were no identifiable ocular or systemic comorbidities associated with progression.

Does injection into the dominant or non-dominant eye affect the outcome of botulinum toxin injection for recurrent strabismus?

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Hypertropia In Unilateral, Isolated Abducens Palsy (6NP)

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Introduction: If hypertropia is observed with 6NP, multiple cranial neuropathies or a skew deviation are often considered. Understanding of the association of hypertropia with 6NP would facilitate etiologic evaluation.

Methods: We retrospectively reviewed binocular alignment in a consecutive series of 43 cases of unilateral, isolated 6NP. Complete 6NP was defined as inability to abduct past midline, and incomplete palsy as lesser limitation.

Results: Etiologies of 6NP included: microvascular-15, trauma-5, meningioma-4, idiopathic-3, nasopharyngeal carcinoma-2, meningitis-2, aneurysm-2, migraine-2, arteriovenous malformation-1, neovascular compression-1, retrobulbar block-1, abducens schwannoma-1, sarcoid-1, stroke-1, carotid-cavernous fistula-1, and Arnold-Chiari malformation-1. Hypertropia in any gaze position was found in objective alternate cover or Krimsky testing in 30% (13/43), and on subjective Hess screen testing in 63% (22/35) of 6NP cases. Hypertropia on objective or subjective testing were found in 50% (7/14) of patients with complete and 62% (18/29) with partial 6NP. Mean (±SD) hypertropia was 5.3±2.2 prism dipters(PD), range 2-10PD on clinical exam, and 4.7±2.1PD, range 2-10PD on Hess screen testing. The ipsilesional eye was hypertropic in 64% (14/22), and hypotropic in 36% (6/22) of cases.

Discussion: Small angle hypertropia is frequently associated with 6NP, not necessarily implying another neurological lesion. Recent anatomical and physiological studies have demonstrated that the lateral rectus muscle has separately-innervated superior and inferior compartments. Some hypertropias associated with 6NP may result from pathology weakening one lateral rectus compartment more than the other, thus inducing a vertical imbalance.

Conclusion: Measurable hypertropia is commonly seen in unilateral, isolated 6NP, whether complete, or partial.


IS THE CONVERGENCE INSUFFICIENCY SYMPTOMS SURVEY SPECIFIC FOR CONVERGENCE INSUFFICIENCY?

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Introduction: The Convergence Insufficiency Symptom Survey (CISS) is a 15-item questionnaire used as both a diagnostic tool and measure of symptomatology in the Convergence Insufficiency Treatment Study (CITS) and ongoing Convergence Insufficiency Treatment Trial (CITT) to quantify the severity of symptoms associated with convergence insufficiency (CI).

Methods: 32 patients ages 8 to 18 were enrolled in a prospective, masked clinical trial. CISS scores of patients with and without CI (as defined by CITS) who presented for a routine eye examination were compared. Patients completed the CISS and then underwent a complete eye examination, including visual acuity, assessment of distance and near ocular alignment, near point of convergence, convergence and divergence amplitudes, and monocular near point of accommodation.

Results: Preliminary results of the mean score on the CISS for the convergence insufficiency group (n=19) was 19.2 (SD=12.9) vs. 16.5 (SD=11.7) for the non-CI group (n=23). There was no statistical difference between the two groups (p=0.7).

Discussion: Our results suggest that a high CISS score may be found in pediatric patients with and without convergence insufficiency.

Conclusion: There may be no reliable difference in the CISS score in pediatric patients with and without convergence insufficiency.
Visual acuity deficits in children with nystagmus and Down Syndrome

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Introduction: Visual function deficits in children with Down syndrome are caused by refractive error, limited accommodation, nystagmus, and possibly by abnormal cortical morphology. Here we determine to what extent nystagmus may explain visual acuity deficits in children with Down syndrome wearing refractive correction.

Methods: Eye movement recordings and Teller visual acuity were obtained under binocular viewing conditions in 15 children (age 1 - 16 years, median 3.7 years) with Down syndrome and nystagmus wearing proper refractive correction. Fixation stability was quantified using the Nystagmus Optimal Fixation Function (NOFF). An exponential model based on results from 93 age-similar children with idiopathic infantile nystagmus (Felius et al, IOVS 2011) was used to relate NOFF to age-corrected visual acuity defects.

Results: Visual acuity ranged from 0.2 to 0.9 logMAR, resulting in 0.38±0.18 logMAR (4 lines) age-corrected visual acuity defect. NOFF ranged from -4.6 (poorest fixation, 1% foveation) to 1.3 (best, 79% foveation) with median -1.0 (27% foveation). Although on average, visual acuity deficit was slightly but significantly larger (0.13 logMAR; P=2.7, P<0.018) than expected based on the nystagmus model, most children (80%) had visual acuity deficit within the model's 95%-predictive interval.

Discussion: There was only a small mean difference between the measured visual acuity deficit and the deficit predicted by the nystagmus model. While other factors may also contribute to visual acuity loss in Down syndrome, nystagmus alone could account for visual acuity deficits in a majority of these children.

Conclusion: Therefore, nystagmus treatment may result in improved visual acuity in children with Down syndrome.

Can color vision and retinal nerve fibre layer thickness serve as suitable biomarkers in childhood demyelinating disease?

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Introduction: With OCT a better understanding of neurodegeneration in demyelinating disease can be achieved by capturing thinning of the retinal nerve fibre layer (RNFL). On the other hand it is well known that color vision is often affected in these patients. The purpose of this study is to investigate whether there is any association between RNFL thinning and color vision deficiency in children and young adults with demyelinating disease with or without idiopathic optic neuritis (ON).

Methods: Thirty young patients (13-28y) participated in this study. They all had clinically and neuroradiologically confirmed demyelinating disease (which was diagnosed before the age of 16y) with or without a history of ON. After a thorough clinical examination, they underwent OCT imaging using high-resolution spectral-domain OCT (SD-OCT, Spectralis, Heidelberg Engineering, Germany), measuring RNFL thickness. In addition all patients had a monocular psychophysical color vision evaluation using Ishihara test and Farnsworth-Munsell hue 100 color test. The RNFL test error score (E.S.) was compared to SD-OCT parameters in eyes with and without ON.

Results: All eyes of patients with demyelinating disease showed RNFL thinning compared to normative data. Although thinning in eyes without a history of ON was much smaller, compared to RNFL thinning in eyes after one or more episodes of ON, where significant RNFL thinning was found (p<0.01). Average E.S. of the whole group of patients was more than 90, ranging from 28 to 584 and was much higher in ON eyes (range: 68-584) compared to eyes without ON (28-56).

A strong correlation was found between color vision FM 100 error score and RNFL thickness (p<0.001).

Discussion: Also other potentially useful biomarkers (such as ERG) need to be analyzed in patients with demyelinating disease.

Conclusion: Color vision loss and RNFL thinning measured with SD-OCT are in strong correlation in patients with demyelinating disease and can therefore serve as suitable biomarkers of the disease.
Asymptomatic Pediatric Idiopathic Intracranial Hypertension

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Introduction: Pediatric idiopathic intracranial hypertension (IIH) may be identified in patients with clinical symptoms including headache and blurring vision and signs of papilledema on exam. Little is known about the clinical features and outcomes in asymptomatic IIH patients.1,2

Methods: Ten year retrospective chart review of all patients with a diagnosis of IIH (ICD-9 348.2) at a single, tertiary care center. Data including clinical characteristics and complete ophthalmic findings were recorded.

Results: We identified 13/68 (19%) patients with asymptomatic IIH, and 10/13 (77%) of these patients were male. Asymptomatic patients on average were younger than symptomatic patients (9 yrs versus 13 yrs, P<0.05) and male gender was associated with the absence of symptoms (P=0.002). Three patients were on a medication associated with IIH and only two had a BMI > 25 kg/m2. Mean opening pressure did not differ significantly between asymptomatic and symptomatic groups (37 cm H20 versus 34 cm H20, P=0.17).

Discussion: Asymmetric IIH can be associated with significant morbidity including vision loss, chronic optic nerve edema, and the need for surgical intervention. Conclusion: Pediatric patients with asymptomatic IIH may be young and male. Often they may be misdiagnosed as having pseudopapilledema without a formal work-up. When optic nerve swelling is present, the clinician should have a high index of suspicion for papilledema and pursue an evaluation for this diagnosis.

Ophthalmic Manifestations of the Glycoproteinoses

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Introduction: The glycoproteinoses comprise a group of rare and extremely rare lysosomal storage disorders. The ophthalmic manifestations of these disorders have been sparsely documented. A better understanding of these findings may help with the diagnosis of each disorder and may provide improved ophthalmic prognosis.

Methods: Twenty-nine patients with glycoprotein storage disorders underwent ophthalmological examinations as part of a multi-specialty clinic at the Third International Conference for Glycoproteinoses. Three patients had a diagnosis of mucolipidosis II; 8, mucopolysaccharidosis III; 5, combined mucopolysaccharidosis I/II/III; 7, alpha-mannosidosis; 2, aspartylglucosaminuria; 2, fucosidosis; and 1, galactosialidosis. Near visual acuity, motility examination, slit lamp examination, dilated fundus examination, and cycloplegic refraction were recorded for each patient.

Results: Age range was 3–41 years. Overall, near visual acuity was well preserved in all patients, with at least J3 acuity in the better eye. Hypermetropia of at least +5.00 D spherical equivalent was found in 20 of 58 eyes. 21 of 29 patients had strabismus. 19 patients had at least trace corneal haze, though no patient had corneal clouding that obscured the anterior segment examination. Most patients had a normal posterior segment examination; however, 6 of 7 patients with alpha mannosidosis exhibited retinal vascular tortuosity.

Discussion: Refractive error and strabismus are common findings in the glycoproteinoses. Corneal clouding is generally mild, and retinal and optic nerve findings are uncommon. Functional visual acuity is generally maintained.

Conclusion: These findings add to the sparse literature on ophthalmic findings in the glycoproteinoses. This series represents the largest collection to date on these disorders.

Lenticular changes in cerebrotendinous xanthomatosis, a treatable metabolic disorder that is important to recognize

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Introduction: Cerebrotendinous xanthomatosis is a progressive neurodegenerative storage disease characterized by abnormal deposition of cholesterol and cholesterol in multiple tissues, including the lens and brain, and caused by recessive CYP27A1 mutations. Ophthalmologists have the unique potential to facilitate earlier diagnosis and preventative treatment by recognizing the juvenile cataract phenotype. We highlight the morphology of lens opacities in a family with genetically confirmed disease.

Methods: Retrospective case series.

Discussion: Two sisters, each visually symptomatic before ten years old, had a unique pattern of bilateral fleck deposits throughout the lens with slight posterior capsular cataract. When initially examined at eight years old, their then asymptomatic younger brother had the same bilateral fleck deposits with minimal posterior capsular opacity; one year later he developed anterior capsular opacity and became symptomatic. Both asymptomatic parents had few but distinct similar flecks localized at the Y-suture while an asymptomatic sister did not. Genetic analysis revealed homozygosity for a CYP27A1 mutation (c.1263+1G>A) in the three symptomatic siblings, hetrozygosity for the mutation in the two parents, and no mutation in the asymptomatic sister. When specifically questioned, the three affected children had had recurrent bouts of diarrhea since early childhood, which is a common feature of the disease.

Conclusion: Such juvenile lenticular findings should raise suspicion for this treatable metabolic disorder.

Timing of Dacryostenosis Resolution and the Development of Anisometropia

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Introduction: Early spontaneous resolution of dacryostenosis was more likely to have higher, not lower, rates of anisometropia than late spontaneous or surgical resolution. Anisometropia was recently shown to develop in ten percent of infants diagnosed with dacryostenosis at a mean age of one year. The purpose of this study was to determine whether (<1 year) spontaneous resolution or probing decreases or eliminates this risk.

Methods: The medical records of all patients diagnosed as an infant with dacryostenosis from January 1, 1988, through December 31, 1992 were retrospectively reviewed. Anisometropia was defined as > 1 diopter of refractive error between the two eyes.

Results: Among 682 consecutive infants, 244 (36.9%) subsequently underwent a complete ophthalmic examination: 189 (77.5 %) spontaneously resolved at a mean age of 4.5 months (range, 0.3–35 months), and 55 (22.5 %) underwent probing at a mean age of 16 months (range, 0.5–3 months). Anisometropia was diagnosed in 17 (9.0%) of the 189 who spontaneously resolved and in two (3.6%) of the 55 operated children (p<0.19). There was a tendency, although not statistically significant, for earlier resolution to be associated with higher rates of anisometropia.

Discussion: Although dacryostenosis is associated with the development of anisometropia, especially among those with early spontaneous resolution, it remains unknown whether this relationship is causal or merely an association and whether early surgical intervention can modify or eliminate this risk.

Conclusion: Early spontaneous resolution of dacryostenosis was more likely to have a higher, not lower, rate of anisometropia than late spontaneous or surgical resolution. Further studies are warranted to clarify the relationship between age at resolution and the development of anisometropia in infants with dacryostenosis.

The optic nerve and retinal vasculature in albinism: normal or abnormal?

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Introduction: Albinism, an inherited disorder resulting in reduced ocular melanin, is usually associated with reduced best-corrected visual acuity (BCVA), nystagmus, foveal hypoplasia and iris transilluminance. The purpose of this study is to describe the optic nerve (ON) anatomy and peripapillary retinal vasculature in albinism and to examine the relationship to BCVA.

Methods: This IRB-approved study is a retrospective review of 34 patients with albinism and 51 controls seen at the University of Minnesota. The ON and peripapillary vasculature were analyzed by fundus photos using Ophthavision.

Results: Our data indicate that the optic disc diameter (DD) and ON area are statistically smaller in albinism than controls (p <0.001; p=0.0008). Using DD to disc-macula ratio, with ‘macula’ determined as center of foveal avascular zone, more patients with albinism qualified as optic nerve hypoplasia. Significantly more patients with albinism had a double ring sign, situs inversus and a nasally-directed artery (p at least <0.0148). There was no significant difference between groups for ON color, vessel branching pattern, cilioretinal artery, tortuosity or vessels crossing the ON margin. No correlation of BCVA to DD or ON area was found.

Discussion: In this study, patients with albinism had smaller DD and ON area than controls, confirming the clinical impression of Spedick and Beauchamp (1986). The vascular and retinal vasculature was heterogeneous within the albinism group. Reduced BCVA is not explained by the smaller DD and ON area.

Conclusion: The ON in albinism is smaller than controls. Further studies are required to elucidate the cause of the decreased BCVA in albinism.
Introduction: Canalicular atresia (CA) is an uncommon anomaly. This study evaluated the treatment and outcome of patients with CA.

Methods: This was a retrospective study of 25 eyes of 16 otherwise normal patients with history of nasolacrimal duct obstruction (NLDO) found to have CA at the time of nasolacrimal duct probing (NLDP).

Results: Eleven eyes had lower atresia, 12 had upper atresia, and 2 had both upper and lower atresia. NLDP was performed through the patent canaliculi in all patients except the two who had both upper and lower atresia. Of the 12 patients with upper CA, 10 improved after NLDP and 2 improved after subsequent balloon catheter dilation (BCD). Of the 11 patients with lower CA, 1 improved after NLDP and 10 required additional surgeries (BCD, lacrimal stents, and/or dacryocystorhinostomy). Patients with upper and lower canalicular atresia were treated with Jones tube placement.

Discussion: Canalicular atresia is an unusual lacrimal anomaly that is sometimes found at the time of NLDP. The outcome of NLDP is much better for patients with upper CA compared to lower CA. NLDP through the lower canaliculi has a success rate similar to that for children without CA. Patients with lower CA have much poorer outcomes following simple NLDP.

Conclusion: NLDO associated with upper CA can be successfully treated in most patients by simple NLDP through the lower canaliculi. For patients with lower CA, additional procedures (BCD or stent placement through the upper canaliculi) should be considered at the time of initial surgery.

References:
Workshop Schedule

Thursday, April 4, 2013

2:00 PM - 4:00 PM
Workshop #1
Simulated Strabismus Surgery - A Practical and Interactive Demonstration of Novel Simulation Technique
John D. Ferris; Anthony J. Vivian
St. George A & B

2:15 PM - 3:15 PM
Workshop #2
Fiscal Benchmarking Workshop
Deborah S. Lenahan, MD; Daniel Laby, MD; Nils Mungan, MD; Robert Gold, MD; Merrill Stass-Isern, MD; Theodore Curtis, MD; Jorie Jackson, CO
America Ballroom

3:30 PM - 5:30 PM
Workshop #3
Pediatric Coding 2013
Robert S. Gold, MD; Robert Wiggins, MD, MHA; Elizabeth Cottle, CSC, OCS
America Ballroom

Friday, April 5, 2013

7:00 AM - 8:15 AM
Workshop Session A

Workshop #4
AOC Workshop: DVD - A Conceptual, Clinical and Surgical Overview
Alex Christoff, CO, COT; Edward L. Raab, MD, JD; Erick Bothun, MD; Michael C. Brodsky, MD; Kathy Fray, CO; David L. Gayton, MD; Claire C. Hennessey, CO; Kim Merrill, CO; David Morrison, MD
America North

Workshop #5
Oculoplastic Surgery of Interest to the Pediatric Ophthalmologist
Linda R. Dagi, MD; Alexandra T. Elliott, MD; Suzanne K. Freitag, MD
America Center

Workshop #6
Genetic and Metabolic Cases You Don't Want to Miss!
Sylvia R. Kosi; Gail Summers; Deborah Alcorn; Jane Edmond; Sharon Lehman
St. George

Workshop #7
Pediatric Cataract - International Perspectives
I. Christopher Lloyd, FRCS, FRCOphth.; Graeme C. Black, DPhil, FRCOphth.; Cecilia Fenerty, MD, FRCOphth.; Lola Solebo, PhD, MRCOphth.; Jane L. Ashworth, PhD, FRCOphth.
America South

8:30 AM - 9:45 AM
Workshop Session B

Workshop #8
The New Age of Medical Management of Pediatric Non-Infectious Uveitis
Rebecca Braverman, MD; C. Stephen Foster, MD; Nasrin Tehrani, MD; John Ainsworth, MD; Mark Dacey, MD
America Center

Workshop #9
Apt Lecture Workshop: Cutting No Slack for the Sagging Eye Syndrome
Joseph L. Demer, MD, PhD; Zia Chaudhuri, MS, FRCS (Glasg); Robert A. Clark, MD
America North

Workshop #10
Video Demonstrations of Classical or Rare Signs in Pediatric Ophthalmology and Strabismus
Ken K. Nischal, FRCPht; Edward Buckley, MD; David Plager, MD; Edward Wilson, MD; David Granet, MD; Jane C. Edmond, MD
America South

Workshop #11
Rehabilitation of Children with Low Vision: Controversies and Consensus
Terry L. Schwartz; Rebecca Coakley; Kelly Luk
St. George

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<tr>
<th>Time</th>
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<th>Topic</th>
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<td>10:30 AM - 11:45 AM</td>
<td>Workshop Session C</td>
<td>Should Your Patients get Whole Genome Sequencing? Should You?</td>
<td>Arlene V. Drack, MD</td>
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<td>11:00 AM - 12:15 PM</td>
<td>Workshop #12</td>
<td>Elder Wise: Pearls from Pediatric Greats</td>
<td>K. David Epley, MD; Alan B. Scott, MD; Marilyn Miller, MD; Eugene Hefeston, MD; John O'Neill, MD; William Scott, MD</td>
<td>America South</td>
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<tr>
<td>12:30 PM - 1:45 PM</td>
<td>Workshop #13</td>
<td>Rapid Fire Cases in Pediatric Ophthalmology (Non Strabismus) That Will Change Your Practice</td>
<td>Aparna Ramasubramanian; Carol L. Shields; Alex V. Levin; Bruce Schnaidl; Jerry A. Shields</td>
<td>America North</td>
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<tr>
<td>1:15 PM - 2:30 PM</td>
<td>Workshop #15</td>
<td>Optical Coherence Tomography: Pearls for the Pediatric Ophthalmologist</td>
<td>Daniel J. Salchow; Cynthia A. Toth; Veit Sturm</td>
<td>America Center</td>
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<tr>
<td>1:15 PM - 2:30 PM</td>
<td>Workshop #16</td>
<td>Through the Eyes of Autism: Eye Care for these Special Patients</td>
<td>Joseph L. Doerner; Eugene E. Hartman; M. Edward Wilson; Stuart R. Dankner</td>
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<td>1:15 PM - 2:30 PM</td>
<td>Workshop #17</td>
<td>No CME: Protecting Your Online Image</td>
<td>K. David Epley, MD; Andrew Doan, MD, PhD</td>
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<td>1:15 PM - 2:30 PM</td>
<td>Workshop #18</td>
<td>Sticky Situations in Pediatric Glaucoma and What They Taught Us - Lessons Learned the Hard Way</td>
<td>Sharon F. Freedman, MD; Allen D. Beck, MD; Alex V. Levin, MD; David S. Walton, MD</td>
<td>America North</td>
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<td>1:15 PM - 2:30 PM</td>
<td>Workshop #19</td>
<td>Adult Strabismus</td>
<td>David Stager, Jr; Steven M. Archer; Edward G. Buckley, MD; Forrest J. Ellis; David B. Granet; David L. Guyton; David G. Hunter</td>
<td>America South</td>
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<td>2:45 PM - 4:00 PM</td>
<td>Workshop Session E</td>
<td>Developing an Integrated System for Children's Vision Care - Report on the Work of the National Center for Children's Vision and Eye Health</td>
<td>Mary Louise Z. Collins, MD; Jean E. Ramsey, MD, MPH; Eugene Hartman, PhD; Joseph M. Miller, MD, MPH; Michael X. Repka, MD; Kira Baldonado</td>
<td>America Center</td>
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<tr>
<td>3:15 PM - 4:30 PM</td>
<td>Workshop #20</td>
<td>AAP/AAPOS Pediatric Neuro-Ophthalmology Workshop: Avoiding Disaster: Lessons Learned from Difficult Cases</td>
<td>Daniel J. Karr, MD; Edward G. Buckley, MD; Jane C. Edmond, MD; Gena Heidary, MD, PhD; John MacDonald, MD; R. Michael Siatkowski, MD</td>
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<td>3:15 PM - 4:30 PM</td>
<td>Workshop #21</td>
<td>Management Issues in Non-Cataractous Lenticular Disorders in Children</td>
<td>Ramesh Kekunnaya; Arif O. Khan; Alex V. Levin; Ken Nischal; R. Michael Siatkowski, MD</td>
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<td>3:15 PM - 4:30 PM</td>
<td>Workshop #22</td>
<td>New Concepts on Visual Cortical Plasticity: Multiple Critical Periods and Implications for Amblyopia</td>
<td>Agnes Wong, MD, PhD, FRCSC; Terri Lewis, PhD; Takao Hensch, PhD</td>
<td>St. George</td>
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<td>3:15 PM - 4:30 PM</td>
<td>Workshop #23</td>
<td>Special Symposium: The Child with Developmental Delay: Multispecialty Perspectives on Improving Care</td>
<td>K. David Epley, MD; Linda Lawrence, MD; Cheryl McCaslin, CO; Shirley Anderson, OTR/L, SCV, CLVT; Sharon Lehman, MD; Jorie Jackson, CO</td>
<td>America Ballroom</td>
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<td>3:15 PM - 4:30 PM</td>
<td>Workshop #24</td>
<td>Symposia - Update on Ocular Anti-Infectives for the Pediatric Ophthalmology</td>
<td>M. Edward Wilson, MD; Steven J. Lichtenstein, MD; Rudolph S. Wagner, MD; Peter D'Arienzo, MD</td>
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<td>4:45 PM - 6:00 PM</td>
<td>Workshop #25</td>
<td>OMIC Workshop: Lessons Learned From 25 Years of Pediatric Ophthalmology</td>
<td>Anne M. Menke, RN, PhD; Robert Wiggins, MD, MHA</td>
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<tr>
<td>4:45 PM - 6:00 PM</td>
<td>Workshop #26</td>
<td>Difficult Problems Non Strabismus Workshop</td>
<td>Ken K. Nischal, MD; Elias Traboulsi, MD; Lea Ann Lope, MD; Federico Velez, MD; Mary O'Hara, MD</td>
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<td>4:45 PM - 6:00 PM</td>
<td>Workshop #27</td>
<td>Difficult Problems Strabismus Workshop</td>
<td>Sean P. Donahue, MD, PhD; Edward G. Buckley, MD; Oscar A. Cruz, MD, David G. Hunter, MD; Evelyn A. Payse, MD</td>
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<td>4:45 PM - 6:00 PM</td>
<td>Workshop #28</td>
<td>Protecting Your Online Image</td>
<td>K. David Epley, MD; Andrew Doan, MD, PhD</td>
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Simulated Strabismus Surgery - a practical and interactive demonstration of novel simulation techniques.

John D Ferris Mr; Anthony J Vivian Mr
Gloucestershire Eye Unit and Addenbrooke's Hospital, Cambridge

Purpose/Relevance: To demonstrate how the safety of strabismus surgical training can be enhanced by the use of novel simulation techniques, using life-like silicone model eyes.

Target Audience: Ophthalmologists involved with teaching strabismus surgery and surgical trainees.

Current Practice: Patient safety should be our principle concern when teaching any form of surgery. However, very few training programs provide any form of strabismus surgery simulation. This means surgical trainees may not have developed core surgical skills, such as rectus muscle and scleral suturing techniques, before operating on patients.

Best Practice: A simulation program, using life-like silicone eyes, to teach basic suturing techniques before moving on to performing recession/resection techniques, inferior oblique surgery and then the use of adjustable sutures.

| Trainees are required to have performed at least 5 complete rectus muscle procedures satisfactorily, before being allowed to operate on patients.

Expected Outcomes: All delegates will be aware of the potential benefits of simulation training for patients, trainees and trainers and will have observed live demonstrations of rectus muscle and oblique muscle surgery on the model eyes. They will also have learnt how to incorporate surgical simulation into their training programs or practices.

Format: Introductory lectures (40 minutes); Live strabismus surgery demonstration, by leading surgeons from the USA and UK (20 minutes); Q&A session (15 minutes).

Summary: This workshop will demonstrate how strabismus surgical simulation, using life-like model eyes, can enhance patient safety and the quality of surgical training. The combination of lectures, live surgical demonstrations, followed by a Q&A session, will we hope be conducive to an educational and interactive workshop.


Fiscal Benchmarking Workshop - Data From FY 2011
AAPOS Socioeconomic Committee

Deborah S Lenahan MD; Daniel Laby MD; Nils Mungan MD; Robert Gold, MD; Merrill Stass-Isern, MD; Theodore Curtis, MD; Jorie Jackson, CO
Pediatric Eyecare of Western Colorado, Grand Junction, CO

Purpose/Relevance: The purpose of this presentation is to present financial data gathered by a survey of AAPOS members. This will be the third consecutive year that key metrics for a successful pediatric ophthalmology practice have been evaluated and discussed. Each year, the survey continues to be refined and new metrics added.

Target Audience: The target audience is pediatric ophthalmologists and their practice.

Current Practice: Financial benchmarks have not been available for pediatric ophthalmology until the advent of the SEC Fiscal Benchmarks Project in 2010.

Best Practice: The ongoing survey discussed at this workshop allows AAPOS members to establish norms specific to pediatric ophthalmology, thus enabling participants to identify potential problem areas in their practice, whether private or academic.

Expected Outcomes: At the conclusion of the session, the attendees will be able to understand key financial metrics in their practices and have norms available for comparison. Additionally, they will gain a better understanding of how practice patterns can be modified to enhance practice profitability.

Format: Panel discussion/open question and answer forum.

Summary: The data from the just completed FY 2011 survey will be presented. This information will be discussed, with a panel discussion of each of the benchmarks and questions from the audience.

Cleft palate occurs when the muscles of the face and mouth do not develop properly. Babies with cleft palate have an abnormal opening or fissure in the soft or hard palate. This condition is also known as cleft lip and palate. Cleft palate can be unilateral (one side) or bilateral (both sides). It can be partial (partially formed) or complete (completely formed). Cleft palate can be accompanied by other birth defects, such as cleft lip, heart defects, and hearing loss.

Purpose/Relevance: To have an interactive discussion regarding the proper coding of pediatric patients’ exami-
nations, specialized testing, and surgical procedures in order to perform these tasks for proper compliance. The panel has expertise in coding being involved in the review of the Pediatric Coding Comparison for the American Academy of Ophthalmology, AAOE participants, and a certified coding specialist who is part of the AAO Coding specialists group.

Target Audience: Pediatric ophthalmologists, orthoptists, administrators, and technicians.

Current Practice: In pediatric ophthalmology practices today, proper coding of exams and procedures is essential for compliance. Proper documentation is essential for proper coding and continued education and practice experience is expanded at this session. Specific topics and examples will include the necessity of Pre最大限度 documentation and coding, Sensorimotor Exam documentation and coding, and vision and med diagnostic coding examples. Statistics show that 4.4% of E/M payments were billed at a lower code level. (http://www.cms.gov/Outreach-and-Agument/MedicareLearningNetwork/MLNProducts/downloads/Evaluation_Management_Fact_Sheet_ICN905363.pdf). Between phone, video, email, and coek nearly 4,000 Inquiries a year are received. The examples below provide a strong indication of the current level of knowledge and will be among the questions addressed in this course. I have performed strabismus surgery on a patient with bilateral A-pattern esotropia. The report indicates that retinal bent spacers were used. What is the correct way to report this part of the procedure?

1. Would CPT code 33030 be appropriate to code for a tube removal?

2. How do I code for right medial rectus advancement?

3. When a patient returns to follow-up on nasociliary duct obstruction and the baby’s eyes are clear, what is the appropriate diagnosis code?

4. How do you code for infero lateral oblique myokymy?

5. Patient has bilateral lateral rectus resections and the inferior obliques explored. How do I code for the exploration of the obliques?

Best Practice: The ideal situation to coding properly is education, continually asking questions to get to the proper answer, and put both in real practice examples.

Expected Outcomes: Once this course is completed, the attendees should have a better understanding of the coding situations presented and be able to take this back to their practice and make the proper coding decisions.

Format: Panel discussion with discussion of submitted questions and open question and answer format.

Summary: The material presented at this workshop will be driven by questions submitted in advance by the AAPOS members, their orthoptists, administrators, or technicians to the panel, so that interactive discussion occurs for many coding situations submitted. Questions will also be taken “live” at the session.


Genetic and metabolic cases you don’t want to miss!

Syliva R Kossi; Gail Summers; Deborah Alcorn; Jane Edmond; Sharon Lehman

Purpose/Relevance: Genetic and metabolic disorders of childhood may initially present to the pediatric ophthalmologist. It is essential for the pediatric ophthalmologist to recognize oculomotor abnormalities that may signal the presence of a genetic or metabolic disorder, particularly those with serious systemic manifestations.

Target Audience: Pediatric Ophthalmologist.

Current Practice: Pediatric ophthalmologist may not be able to identify genetic or metabolic cases and appropriately refer the child when needed.

Best Practice: Pediatric Ophthalmologist should be able to identify oculomotor abnormalities that indicate a genetic or metabolic disease such as nystagmus and refer the child when needed to other appropriate physicians.

Expected Outcomes: At the conclusion of this workshop, the physician will be better able to recognize and treat the ocular manifestations of more unusual inborn errors of metabolism and genetic disorders that involve the eye.

Format: This workshop will consist of a panel that will present interesting cases of hereditary eye disorders including inborn errors of metabolism and structural abnormalities of the eye. To make this workshop more thought provoking, the diagnosis will not be initially given, but the workshop will use case presentations to develop a differential diagnosis. At the end of each case there will be opportunity for questions from the audience to be answered by the panel.

Summary: Children with various abnormalities including ocular motility disorders, optic nerve changes, retinal changes and anterior segment abnormalities will be presented. After the case presentation a differential diagnosis will be formulated, followed by a discussion of the etiology, genetics and management of the condition.

References:

Workshop 3
Thursday
3:30 - 5:30 pm

Workshop 4
Friday
7:00 - 8:15 am

Workshop 5
Friday
7:00 - 8:15 am
Pediatric Cataract - international perspectives
I Christopher, Grigg, Lloyd FRCS FRCOphth; Graeme Black DPNI FRCOphth; Cecilia Fenerly MD FRCOphth; Lola Soladoh PhD MRCP ophth; Jane L Ashworth PhD FRCOphth
Manchester Royal Infirmary, Manchester; University of Manchester Health Sciences Centre
Manchester, UK

Purpose/Relevance: This workshop will cover developments in improving congenital cataract management - genetics, aphakic/pseudophakic glaucoma and the surgical management of children under 2 years of age.

Target Audience: Pediatric ophthalmologists, orthoptists, fellows and trainees.

Current Practice: The Genetics of Congenital Cataract - Congenital cataract has a large and heterogeneous genetic aetiology. This heterogeneously delays diagnosis and provides a detailed understanding of the impact of genotype on phenotypic outcomes.

Management of Aphatic and Pseudophakic Glaucoma - Surgery for congenital cataract in the neonate and infant carries significant risk of development of secondary glaucoma. In the majority of children over 6 months old, but aphakia was the preferred option for younger children, due in part to the high frequency of other ocular anomalies. Overall primary IOL implantation conferred no visual benefit for those with unilateral cataracts, but may be associated with better visual outcome following bilateral cataract surgery. 16% developed glaucoma during the first postoperative year. Age at surgery was the most significant factor.


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Purpose/Relevance: This workshop will cover developments in improving congenital cataract management - genetics, aphakic/pseudophakic glaucoma and the surgical management of children under 2 years of age.

Target Audience: Pediatric ophthalmologists, orthoptists, fellows and trainees.

Current Practice: The Genetics of Congenital Cataract - Congenital cataract has a large and heterogeneous genetic aetiology. This heterogeneously delays diagnosis and provides a detailed understanding of the impact of genotype on phenotypic outcomes.

Management of Aphatic and Pseudophakic Glaucoma - Surgery for congenital cataract in the neonate and infant carries significant risk of development of secondary glaucoma. In the majority of children over 6 months old, but aphakia was the preferred option for younger children, due in part to the high frequency of other ocular anomalies. Overall primary IOL implantation conferred no visual benefit for those with unilateral cataracts, but may be associated with better visual outcome following bilateral cataract surgery. 16% developed glaucoma during the first postoperative year. Age at surgery was the most significant factor.

Rehabilitation of Children with Low Vision: Controversies and Consensus
Terry L Schwartz; Rebecca Coakley; Kelly Lusk
Cincinnati Children’s Hospital Medical Center, University of Cincinnati, Cincinnati, Oh

Purpose/Relevance: It is not uncommon for pediatric ophthalmologists to be asked to share opinions about learning braille, obtaining large print, or the possibility of driving for their patients with low vision. These recommendations can be incorporated into educational plans with significant impact on future visual function and independence.

Target Audience: Pediatric ophthalmologists

Current Practice: Recommendations for making appropriate recommendations. Viewed by many as a means to become more independent for employment, low vision driving issues (qualifications, safety data, and controversies) will be presented.

Expected Outcomes: Understanding requisites for literacy and familiarity with assessment of literacy will help the pediatric ophthalmologist become a partner in educational planning. Knowledge of low vision driving will help the doctor anticipate questions and provide current information for teenagers who might qualify for a low vision driving program.

Format: Didactic lecture

Summary: This workshop will present data to better understand decisions surrounding literacy skills and controversies in visually impaired children. Topics will include braille versus print, large print versus the use of optical devices, and timing of interventions. Driving for teens with low vision will be explored through reviewing studies of low vision driving, current status of training programs, and legal regulations.


Should your patients get whole genome sequencing? Should you?
Arleene V Drack MD
University of Iowa, Iowa City, IA

Purpose/Relevance: Whole genome DNA sequencing is a reality and the price is not always prohibitive. How do direct-to-consumer tests differ from genetic testing tells us about ourselves in 2013. Patients are now able to get their own genetic results through new technologies and for a fee. SNPS or genes for a fee. Is whole genome sequencing the gateway to personalized medicine? Is whole genome sequencing the gateway to personalized medicine? They should understand the AAO position statement on genetic testing.

Current Practice: Genetic testing is not always possible to run a battery of ancillary testing and hence clinical acumen is essential.

Best Practice: To optimize literacy skills in children, this course will define literacy, present data regarding literacy instruction (braille, print, and optical devices) and offer strategies for making appropriate recommendations. Viewed by many as a means to become more independent for employment, low vision driving issues (qualifications, safety data, and controversies) will be presented.

Expected Outcomes: Understanding requisites for literacy and familiarity with assessment of literacy will help the pediatric ophthalmologist become a partner in educational planning. Knowledge of low vision driving will help the doctor anticipate questions and provide current information for teenagers who might qualify for a low vision driving program.

Current Practice: Patients are now able to get their own genetic results through new technologies and for a fee.

Best Practice: Patients should be counseled about different types of genetic testing, and when to refer a patient to a geneticist. They should be aware of pharmacogenetics. They should understand the AAO position statement on genetic testing.

Format: Didactic lecture with audience participation.

Summary: Current Practice: Patients are now able to get their own genetic results through new technologies and for a fee. Expected Outcomes: At the conclusion of this presentation, participants will have a working knowledge of the utility of various types of genetic testing. They will be familiar with the recent AAO position paper.


Summary: With the use of multiple short non-strabismus cases, a spectrum of challenging and interesting pediatric ophthalmic features of syndromes, diseases, and neoplastic processes will be provided. An emphasis on the key clinical points will be highlighted.


Elder Wise: Pearls from Pediatric Greats
K. David Epley MD; Alan B Scott MD; Marilyn Miller MD; Eugene Helveston MD; John O’Neill MD; William Scott MD

Purpose/Relevance: Things we learn in residency and fellowship give us a foundation for practicing pediatric ophthalmology. But every good clinician and surgeon realizes that there are many things that go to making an outstanding physician. This workshop will assemble 5 outstanding pediatric ophthalmologists who are pioneers in our field to discuss pearls of wisdom they have learned through years of practice.

Target Audience: Pediatric ophthalmologists, history buffs, orthoptists, anyone who interacts with patients in a healthcare setting.

Current Practice: Pediatric ophthalmologists are often challenged to make the correct diagnosis when symptoms and science don’t fit the classic diagnostic picture.

Best Practice: The panel with 150 years of combined experience in pediatric ophthalmology and strabismus will present their best and most complex cases in order to relay pearls of knowledge to help participants better practice their clinical and surgical skills.

Expected Outcomes: Every physician who attends this workshop will leave with at least 10 pearls of wisdom to help in their medical and surgical practice.

Format: Panel presentations and discussion with audience participation (ideally with polling).

Summary: 5 renowned pediatric ophthalmologists will present pearls of wisdom in a variety of formats that will engage the audience as well as convey knowledge that otherwise takes years to acquire independently.

References: There are no references for this workshop.

A large number of AAO members have asked for a workshop involving elder high profile pediatric ophthalmologists.

Rapid Fire Cases in Pediatric Ophthalmology (Non Strabismus) That Will Change Your Practice
Aparna Ramasubramanian; Carol L Shields; Alex V Levin; Bruce Schnall; Jerry A Shields
Drexel University College of Medicine, Wills Eye Institute, Philadelphia, PA

Purpose/Relevance: There are a multitude of pediatric eye diseases that can present with a single feature or an atypical manifestation and cause diagnostic dilemmas. Furthermore, they could represent an underlying systemic disease, syndrome, or even a malignant process. This workshop will provide an overview of key features that help to diagnose and treat a spectrum of pediatric conditions with ophthalmic manifestations.

Target Audience: Pediatric Ophthalmologists & General Ophthalmologists

Current Practice: Pediatric ophthalmologists often encounter atypical clinical presentations such as a common ocular tumor that presents in an uncommon way or rare clinical diseases that need prompt attention and diagnosis. In the field of pediatric ophthalmology it is not always possible to run a battery of ancillary testing and hence clinical acumen is essential.

Best Practice: Recognition of key clinical features for ophthalmic conditions and systemic diseases for prompt work up and management. Attendees will gain an understanding of key clinical features for ophthalmic conditions for atypical presentations of common diseases that require further workup.

Expected Outcomes: At the conclusion of this presentation, attendees would be able to recognize and treat or appropriately refer patients with (1) eye manifestations of a systemic disease or (2) eye features that suggest a benign or malignant process.

Format: Case Presentation

Summary: With the use of multiple short non-strabismus cases, a spectrum of challenging and interesting pediatric ophthalmic features of syndromes, diseases, and neoplastic processes will be provided. An emphasis on the key clinical points will be highlighted.

Purpose/Relevance: Optical Coherence Tomography (OCT) allows insights in pediatric ophthalmologic diseases. In order to interpret OCT findings, one must be familiar with its basic concepts as well as with findings of recent studies.

Target Audience: Pediatric ophthalmologists, general ophthalmologists, vision researchers.

Current Practice: Physicians may be uncertain about the feasibility of the OCT in children, and - since normative data for children are not always readily available - interpretation of OCT results can be difficult.

Best Practice: Normative data have been established for peripapillary nerve-fiber layer thickness, macular thickness and optic disc parameters in children. These help the physician interpret OCT results in children. New insights into common pediatric disorders including retinopathy of prematurity, pediatric glaucoma and optic nerve disorders, and into retinal disorders of childhood have altered our way of practicing.

Expected Outcomes: When familiar with the OCT findings in certain pediatric ophthalmologic conditions, the clinician will be better able to interpret these findings in the clinical context and use the data better for the care of the patient.

Format: The first part consists of a didactic lecture, presenting the use of OCT in different aspects of pediatric ophthalmology. In the second part, cases will be presented and the value of the OCT in managing these cases will be discussed.

Summary: The capacity and utilization of the OCT in pediatric ophthalmology is discussed. By better understanding the role of the OCT in managing children with eye problems, the clinician will be able to provide better care for his or her patients.

References:

Through the Eyes of Autism: Eye Care for these Special Patients

Joseph L Deren; Eugenie E Hartman; M. Edward Wilson; Stuart R Dankner Jules Stein Eye Institute; UCLA; Univ. of Alabama Birmingham; Med. Univ. South Carolina; Dinker-Fliengang Eye Assoc.

Los Angeles, CA; Birmingham, AL; Charleston, SC; Baltimore, MD

Purpose/Relevance: Autism Spectrum Disorder (ASD) is a lifetime neurodevelopmental disability characterized by impairments in social interaction and communication, and a restricted and repetitive pattern of behavior. ASD prevalence has exploded to 1%. The prevalence is probably due both to increased awareness and a real increase in ASD. ASD is frequently co-morbid with strabismus, amblyopia, infantile cataract, and glaucoma. Ability of pediatric ophthalmologists to detect subtle signs of undiagnosed ASD and work effectively with ASD children is critical to ophthalmic care.

Target Audience: Pediatric ophthalmologists, and ancillary staff, particularly orthoptists.

Current Practice: Untrained intuition typically suggests counterproductive approaches to children with ASD, reinforcing anxiety and phobic reactions, diminishing examination cooperation, and reducing compliance. Behavior modification techniques, those directly directing attention and reward to appropriate behavior, are highly effective but must be clinically tailored. No systematic training has heretofore been offered to pediatric ophthalmologic ophthalmologists to enable them to work with ASD.

Best Practice: Applicants should identify the demands of ASD, know resources available for diagnosis and intervention for children with ASD, recognize subtle autistic behaviors, understand effective eye examinations of children with ASD, and how to discuss ASD with patients’ parents. Vide infra results.

Expected Outcomes: Knowledge will provide attendees with insight to do the foregoing.

Format: Didactic lecture format will introduce basic features of ASD and will share successful experiences for working with ASD children, and personal experiences as parent of children with special needs.

Summary: ASD will be defined in clinical context. Approaches will be presented for ASD diagnoses, treatment and intervention for children with ASD, reinforcing anxiety and phobic reactions, diminishing examination cooperation, and reducing compliance. Application of effective strategies will be discussed. Treatment algorithms will be evidence-based and collaborative with experts where appropriate. Effective approaches can be carried out at each stage, as well as quality of life and family support issues.

References:

Sticky situations in pediatric glaucoma and what they taught us – lessons learned the hard way

Sharon F Freedman MD; Alan D Beck MD; Alex V Levin MD; David S Walton MD

Duke Eye Center, Durham, NC, USA

Purpose/Relevance: Most pediatric ophthalmologists in practice will encounter children with known or sus-pected glaucoma. Diagnosis and management of pediatric glaucoma cases often poses uncommon challenges to the clinician, from those cases that are hard to call ‘glaucoma’ to those with definite glaucoma whose management is tough to decide upon, whose course becomes moly and difficult.

Target Audience: Pediatric Ophthalmologists.

Current Practice: The problem is that pediatric glaucoma is rare enough that everyday clinical practice does not lend itself to facility with current diagnostic and management algorithms for the potentially blinding condition. The key issues are: 1) Recognize the disease when it presents, especially when subtle; 2) Experience with the techniques of diag-nosis; 3) Experience with or access to surgical interventions in an appropriate sequence; 4) Dealing with the sequelae of the disease and its treatment; and long-term. Outcomes studies are limited to clinical series in infancy, and the disease is so uncommon.

Best Practice: In the ideal situation the practitioner will suspect pediatric glaucoma due to thorough understanding of clinical features, and apply therapy in all suspected cases, as well as thorough anterior segment and optic nerve head examination in imaging when appropriate. Treatment algorithms will be evidence-based and collaborative with experts where appropriate. Effective approaches can be carried out at each stage, as well as quality of life and family support issues.

Expected Outcomes: At the conclusion of this workshop, attendees will be able to: 1) recognize the major factors to be considered when making a diagnosis of glaucoma in children; 2) choose appropriate treatment for children with glaucoma who require medical therapy; 3) choose the ethical implications of off-label medical and unproven surgical interventions as treatment for childhood glaucoma.

Format: Case-based panel, including photographs and video (see below under Summary).

Summary: In this case-based workshop, the moderator will present cases to an expert panel, from diagnostic dilemmas, management to surgical challenges, and the experts will share experiences and as well as lessons with the attendees. Photographs and video documentation will be included. Ethical dilemmas will be highlighted in relevant cases throughout the workshop. Audience participation will be encouraged. Cases will be included highlighting issues (but not limited to) tomometry and diagnostic dilemmas, including the use of OCT and ultrasound, angle surgery and related management of pediatric glaucoma, retinopathy of prematurity and its surgical implications. Common children's questions will be addressed, including discussion of primary congenital glaucoma and glaucoma associated with congenital anomalies or cataract surgery. JAAPOS 2013 Feb;17(1):4-8.

Sharon F Freedman, MD; J. David Epley MD; Andrew Doan MD, PhD

Contact Information:
JAAPOS Abstract #113

Purpose/Relevance: The purpose of this workshop is to enable the attendees to understand and identify critical issues in building an online presence free of harmful information that can help build the provider’s practice and protect it against harmful or fraudulent claims.

Target Audience: Pediatric ophthalmologists, practice administrators, anyone who does anything online.

Current Practice: Many doctors and practices have a website, but few are actively managing their online presence and presence. Services like Yelp, Health Grades, AVO, Health Talk, Facebook, Twitter, and many more can help your practice or hurt it. Often the physician feels helpless to manage this aspect of practice, yet never has it been more important as a first impression to your new patients and in interaction with data for your current patients.

Best Practice: Currently, physicians are not doing a good job, in many cases, any job of monitoring their online reviews and websites. This workshop will help the attendees to understand how to manage their online presence and protect against bad reviews and negative comments. Participants will be taught how to edit their personas on the websites most commonly used by patients and parents. Strategies for protecting the participant’s online identity will be given.

Expected Outcomes: Attendees will be able to immediately change how the person and the practice are perceived online, and how to build a positive presence. The participant will also have an armamentarium to armamentarium of negative reviews and help protect his or her online reputation.

Format: Interactive didactic lecture with audience polling/quiz, presentation by experienced physicians with successful pediatric ophthalmology. In the who, how, part, case users.

Participants will be encouraged to bring their laptops/tablets to directly apply the didactic knowledge to better their own online image.

Summary: Physicians are frequently reviewed at websites such as healthgrades.com, vitals.com, angieslist.com, avvo.com, facebook.com, twitter.com and many more. Most physicians are not doing enough to protect their online identity, some are doing nothing at all. Online media will be reviewed with emphasis on how to develop and uphold your online persona and how to protect your reputation.

References:

JAAPOS Abstract #125

Purpose: To provide an overview of online practices that are currently in use and how online reviews/ feedback are obtained for patients. To provide an introduction to the ethical aspects of online feedback.

Format: To introduce the clinician to the online feedback landscape, the types of sites that physicians encounter, how patients share feedback online, and the ethical aspects to consider.

Summary: Physicians are frequently reviewed at websites such as healthgrades.com, vitals.com, angieslist.com, avvo.com, facebook.com, twitter.com and many more. Most physicians are not doing enough to protect their online identity, some are doing nothing at all. Online media will be reviewed with emphasis on how to develop and uphold your online persona and how to protect your reputation.

References:

Workshop 16
Friday 1:15 - 2:30 pm

Workshop 17
Friday 1:15 - 2:30 pm
**Adult Strabismus**

**David Stager Jr; Steven M Archer; Edward G Buckley; Forrest J Ellis; David B Granet; David L Guyton; David G. Hunter**

**Pediatric Ophthalmology and Adult Strabismus, Plano, Texas**

**Purpose/Relevance:** The surgical treatment of the adult with strabismus comprises a significant portion of the clinical and surgical volume of many pediatric ophthalmologists. This workshop is designed to educate attendees regarding surgical treatment of adults with strabismus.

**Target Audience:** Pediatric ophthalmologists interested in treating adults with strabismus.

**Current Practice:** Pediatric ophthalmologists are often intimidated by adults with complicated forms of strabismus. Because they represent huge challenges for therapeutic armamentarium, restrictive motility disorders are often not amenable to routine strabismus approaches.

**Best Practice:** Clinicians will gain a more thorough understanding of the surgical approaches and techniques which yield better outcomes in adults with strabismus.

**Expected Outcomes:** At the conclusion of the workshop, attendees will have a better understanding of effective strategies for managing adults with complicated forms of strabismus.

**Format:** The workshop will include discussions and presentations by a panel of experts. In addition, time for audience participation with questions of the panelists is planned. Throughout the discussions, pertinent scientific literature will be presented and reviewed.

**Summary:** Topics will include challenging cases of adults with strabismus, congenital cranial dysinnervation disorders (CCDDs), restrictive strabismus, and surgical pearls related to adults.

**References:** Tischfield MA et al. Cell. 2010;140:74.

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**Developing an Integrated System for Children’s Vision Care - Report on the Work of the National Center for Children’s Vision and Eye Health**

**Mary Louise Z Collins MD; Jean E Ramsey MD, MPH; Eugenie Hartman PhD; Joseph M Miller MD, MPH; Michael X Repka MD; Kira Baidono**

**Greater Baltimore Medical Center, Baltimore, MD**

**Purpose/Relevance:** The National Center for Children’s Vision and Eye Health (NCCVEH) was established by Prevent Blindness America with support from the Maternal and Child Health Bureau. The mission of the NCCVEH is to improve children’s vision through strong partnerships, sound science, and targeted public policy. This session will outline the work of the NCCVEH, recommendations to enhance the system of vision care for children and the future role of pediatric ophthalmologists in the continuum of eye care.

**Target Audience:** Pediatric ophthalmologists, general ophthalmologists, vision scientists and others interested in public health policy and programs for pediatric vision care.

**Current Practice:** System fragmentation has limited the success of current approaches to pediatric vision care.

**Best Practice:** This workshop will address recommendations of the National Expert Panel (NEP) on development of an integrated system for children’s vision care. The discussion will include best practices for vision screening methods, performance measures, and data collection and reporting, and will also provide some examples of these integrated systems.

**Expected Outcomes:** Attendees will gain knowledge regarding the present barriers to effective pediatric vision care programs and the role for vision in strategic planning of the Maternal and Child Health Bureau. The work of the NCCVEH and the NEP will be presented, including the recommendations of the workgroups and some examples of integrated systems. Based on this information, attendees will understand how to more effectively work to establish integrated pediatric vision care systems.

**Format:** The format used will be a combination of several short didactic lectures followed by open question and answer forum.

**Summary:** In summary, the workshop will provide attendees with information regarding the limitations in current pediatric vision screening programs and introduce the work of the National Center for Children’s Vision and Eye Health (NCCVEH) and the National Expert Panel (NEP). Information and recommendations from the work groups of the NEP, including the Vision Screening, Performance Measures, and Data Collection and Reporting work groups will be presented. Finally, several examples of integrated vision screening systems will be discussed as well as plans for future work of the NCCVEH.

**References:**


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**AAP/AAPPOS Pediatric Neuro-Ophthalmology Workshop. Avoiding Disaster: Lessons Learned from Difficult Cases**

**Daniel J Karr M.D., Edward G Buckley M.D., Jane C Edmond M.D., Gena Heidary M.D., Ph.D, John MacDonald M.D., Michael R Stiatkowski M.D.**

**Purpose/Relevance:** Difficult Cases, those patients we remember most vividly because of great success or tragic failure, frequently produce a disproportionately intense learning experience. This workshop will present pediatric neuro-ophthalmology case examples that significantly influenced each expert’s approach to a specific problem. The panel members will respond with ideas, differential diagnoses, diagnostic testing and treatment considerations at each stage of the presentations from history to conclusion. Each presenter will provide a short final summary statement with their personal ‘clinical pearls’.

**Target Audience:** Pediatric ophthalmologists, general ophthalmologists, fellows and residents.

**Current Practice:** Neuro-ophthalmology conditions are typically complex, frequently confusing and often require additional testing (MRI, CT, visual fields, VEP etc.) for diagnosis and treatment direction. Incorrect or missed diagnoses can result in significant morbidity and mortality.

**Best Practice:** Case presentations by experts in the field provide the closest learning experience to hands on management of a patient. Neuro-ophthalmology is a subspecialty area that lends itself to require frequent review and reinforcement of acquired information.

**Expected Outcomes:** The audience will learn an in depth approach to the understanding, diagnosis and treatment of a limited number of neuro-ophthalmology conditions. They will learn how to reduce misdiagnosis by working through the clinical problems with experts.

**Format:** Progressive case presentation with panel discussion/interaction at each stage of the case presentation from history to conclusion. Audience participation with question-and-answer and commentary will follow each case presentation.

**Summary:** Difficult pediatric neurology cases will be presented. Diagnostic and treatment pitfalls will be examined. Strategies to prevent future mistakes will be highlighted.

**References:**


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**Management issues in non-cataractous lenticular disorders in children**

**Ramesh Kekunnaya; Arif O Khan; Alex V Levin; Ken Nischal; David A Plager**

**L V Prasad Eye Institute, Hyderabad; King Khaled Eye Specialist Hospital, Riyadh; Wills Eye Institute, Philadelphia; UPMC Eye Center, Children’s Hospital of Pittsburgh; Glick Eye Institute, Indiana University Medical Center**

**Purpose/Relevance:** Patients with non-cataractous lenticular disorders present unique challenges in terms of evaluation for systemic and treatment. This workshop contains a panel of experienced surgeons who will provide practical approaches to manage the above cases.

**Target Audience:** Pediatric ophthalmologist; general ophthalmologist.

**Current Practice:** Non-cataractous lenticular disorders are rarely discussed. When a surgeon encounters such a case he/she only has limited and often anecdotal literature for guidance.

**Best Practice:** The ophthalmologist should be able to arrive at proper diagnosis of these conditions, recognize potential systemic association, and offer appropriate advice in terms of treatment.

**Expected Outcomes:** The topics include 1) Evaluation of a case of ectopia lentis and 2) its optical/surgical management; 3) Congenital aphakia; 4) Accommodative spasm; 5) Microspheroaphakia; 6) Interesting cases. At the conclusion of the presentation, attendees will be able to appropriately diagnose the lenticular condition, perform appropriate investigations, rule out possible systemic associations and select appropriate surgical/optical medical management for a particular patient.

**Format:** Didactic lecture/open question and answer forum/ case presentation.

**Summary:** The presentation by the experts in the field will provide practical tips for the comprehensive care, appropriate investigations and recent advances in the management of these conditions.

**References:**

Purpose/Relevance: To review the most recent developments in amblyopia research, including the biological constraints that establish the critical periods of visual development, new therapeutic strategies that can improve visual functions even in adults.

Target Audience: Pediatric ophthalmologists, general ophthalmologists, researchers

Current Practice: Traditionally, treatment has been considered ineffective after closure of critical periods due to a lack of visual plasticity.

Best Practice: We will first summarize results from animal models that shed new insight into the opening (excitatory-inhibitory circuit balance), execution (structural rewiring), and closure of plasticity (molecular brakes) in the visual cortex. Next, we will look at data from children treated for dense bilateral cataracts showing that the closure of the critical period for damage varies from 6 months to 10-14 years of age (depending on the aspect of vision measured). Finally, we will examine data indicating that even after the closure of the critical period, training on an video game for 40 hours over 4 weeks can improve many aspects of vision in adults. Taken together, this evidence suggests that the biology of the brain is heavily invested in the optimal timing and duration of plasticity, and opens new avenues for therapeutic potential for children with amblyopia.

Expected Outcomes: The attendees will gain new knowledge on how the impact of early visual experience is actively maintained throughout life, offering potentially novel strategies for the reactivation of visual plasticity and amelioration from amblyopia even in adulthood.

Format: Didactic Lecture

Summary: We will present evidence on: (1) biological constraints that establish the critical periods of development; (2) different critical periods for damaging as opposed to rehabilitating vision; and (3) improvements in many aspects of vision in adults after playing an action video game for 40 hours over 4 weeks.

References:

The Child with Developmental Delay: Multispecialty Perspectives on Improving Care

David Epley MD; Linda Lawrence MD; Cheryl McCarus CO; Shirley Anderson OTRL, SCLV, CLVT; Sharon Lehman MD, Jonie Jackson CO

Purpose/Relevance: To further knowledge of coordinated care and available resources for children with developmental delay and disability among pediatric ophthalmologists, orthoptists and other attendees.

Target Audience: Pediatric ophthalmologists, orthoptists, allied health care workers, school nurses

Current Practice: There is a lack of uniform formal education in the coordination of care for children with developmental delay and disability. Knowledge about the resources, types of care, and school-related services is sporadic and largely delivered by independent providers, yet most pediatric ophthalmologists and orthoptists see these children on a daily basis. A better understanding of these resources available for children with developmental delay and disability.

Best Practice: Current best practices across the spectrum of providers of care aren’t well documented. This symposium attempts to collate this information in a singular location to cross-examine and answer questions throughout the symposium.

Expected Outcomes: Expanded knowledge base and better understanding of the needs of children with developmental delay and disability will allow for better overall care, improved communication with parents and caregivers, and enhanced ability to provide access to appropriate resources.

Format: Panel discussion with moderator

Summary: We have a panel of 2 school nurses, an occupational therapist, a pediatric ophthalmologist and 2 orthoptists to discuss basic care, access to care, what is needed by these children, how to coordinate care, when referrals are appropriate, what school resources are available, and much more.

References:

New Concepts on Visual Cortical Plasticity: Multiple Critical Periods and Implications for Amblyopia

Agnes Wong, MD, PhD, FRCSC; Terri Lewis, PhD; Takao Hensch, PhD

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Target Audience: Pediatric ophthalmologists, general ophthalmologists, researchers

Current Practice: Traditionally, treatment has been considered ineffective after closure of critical periods due to a lack of visual plasticity.

Best Practice: We will first summarize results from animal models that shed new insight into the opening (excitatory-inhibitory circuit balance), execution (structural rewiring), and closure of plasticity (molecular brakes) in the visual cortex. Next, we will look at data from children treated for dense bilateral cataracts showing that the closure of the critical period for damage varies from 6 months to 10-14 years of age (depending on the aspect of vision measured). Finally, we will examine data indicating that even after the closure of the critical period, training on an video game for 40 hours over 4 weeks can improve many aspects of vision in adults. Taken together, this evidence suggests that the biology of the brain is heavily invested in the optimal timing and duration of plasticity, and opens new avenues for therapeutic potential for children with amblyopia.

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References:

Update on Ocular Anti-Infectives for the Pediatric Ophthalmologist

M. Edward Wilson, MD, Moderator

Steven J. Lichtenstein, MD, FAAP; Raphael S. Menke, MD; Peter A. D’Arienzo, MD, FACS

Target Audience: Pediatric ophthalmologists, general ophthalmologists, other ophthalmologists, allied health professionals

Format: Didactic Lecture, Open Question and Answer Forum, Panel Discussion

New Anti-Infectives: How they work and when we should use them

Purpose: Anti-infectives for ocular use, especially in pediatric use, are constantly changing. This presentation will bring the attendees up to date on the ocular anti-infectives currently available.

Current Practice: Anti-infectives are being used in inappropriate situations as well as not being used in potentially beneficial situations because of the "safe" label discussion.

Best Practice: Utilizing the available medications to their utmost and safest potential. Many physicians will stay strictly within the "FDA approved" uses of an ophthalmic product. They need to realize that these available medications have uses that are safe and effective, even though they are off "FDA approved."

Expected Outcomes: The participants will have an understanding of the available anti-infectives as well as treatment options that can safely be used in their patients to obtain the best outcome possible.

Summary: The attendees should have a better understanding of the available anti-infectives as well as treatment options for these conditions.

Expected Outcomes: Physicians will understand that the use of appropriate medications will not promote resistance and will understand proper dosage frequency and duration. They will be better able to understand how and why resistance occurs and that topical anti-infectives should not be used for resistant organisms when used with proper bacterial culture.

Summary: Resistance of ocular infectives to commonly used antibiotics increases as the use increases. Most resistance comes from the inappropriate use of antibiotics.

Expected Outcomes: The use of potent topical antibiotic choosing fewer/newer inophenotics in the treatment of infectious keratitis continues to increase.

Best Practice: The use of potent topical antibiotic choosing fewer/newer inophenotics in the treatment of infectious keratitis continues to increase.

Expected Outcomes: Physicians who participate in this workshop will be able to assess their risk and choose loss prevention measures geared toward them.

Summary: Physicians who provide care for pediatric ophthalmic conditions and strabismus are concerned about the risk of medical malpractice lawsuits.

Target Audience: Eye surgeons who practice pediatric ophthalmology and perform strabismus surgery.

Current Practice: While eager to implement loss prevention measures, these eye surgeons tend to be overwhelmed with how to coordinate care from and what services regulatory, legal, and professional societies may not know how best to focus their efforts on improving the quality of their care.

Best Practice: This assessment of closed claims will identify practices that could lead to harm or ways and decreases to which those risks.

Expected Outcomes: Physicians who participate in this workshop will be able to assess their risk and choose loss prevention measures geared toward them.

Format: Didactic lecture featuring claims data and case studies followed by question and answer period.

Summary: Summarize material to be presented at the workshop: This workshop will present an analysis of 25 years of claims related to pediatric ophthalmology and strabismus. Frequency, severity (money paid to settle), causes, and trends will be explained. Key lessons on how to improve patient safety and reduce the likelihood of successful claims will be shared.

References: Republished with permission of the Pediatric Ophthalmology and Strabismus Society, Inc.

OMIC (Ophthalmic Mutual Insurance Company)
655 Beach Street, San Francisco, CA 94109

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OMIC (Ophthalmic Mutual Insurance Company)
655 Beach Street, San Francisco, CA 94109
Difficult Problems - Non-Strabismus

Ken K Nischal MD, FRCPht; Elias Traboulsi MD; Lea Ann Lope MD; Federico Velez MD; Mary O’Hara MD
UPMC Children’s Eye Center of Children’s Hospital of Pittsburgh, Pittsburgh, PA

Purpose/Relevance: The clinical range of what we as practitioners see is so varied that it is impossible for one person to have seen all the atypical presentations of common conditions and the typical presentations of rare conditions. This workshop allows us to share some of these cases with the audience.

Target Audience: Pediatric ophthalmologists, orthoptists, vision scientists and trainees

Current Practice: Current practice for each individual is comprised of a bulk of secondary clinical cases. Exposure to tertiary and quaternary cases is limited to those working in a few academic centers across the USA. Managing or recognising rarely presenting scenarios or diseases can be difficult.

Best Practice: Ideally one day we will all have time in our schedules to have tele-medicine style case conferences with other centers to discuss unusual cases. To an extent this is done now with the pediatric listserv but real time diagnosis with videos of cases would be an improvement.

Expected Outcomes: At the conclusion of the workshop the audience and the panel will have shared their experiences and strategies for rare and unusual clinical scenarios. It is the exchange in strategies and approach that should encourage the attendees to consider alternative diagnoses when faced with similarly challenging cases in their own practices.

Format: Each member of the panel will present one clinical scenario and the panel will discuss their approaches to diagnosis and treatment. At the end of each case the audience will be allowed to ask questions. The Moderator may ask the audience for opinions during the case presentation also.

Summary: Five clinical cases with appropriate audio-visual material will be presented for discussion.

Difficult Problems: Strabismus

Sean P Donahue MD, PhD; Edward G. Buckley, MD; Oscar A. Cruz, MD; David G. Hunter, MD; Evelyn A. Paysse, MD
Vanderbilt University Medical Center, Nashville, TN

Purpose/Relevance: The most common ICD-9 codes used by pediatric ophthalmologists concerned strabismus. Patients that present with straightforward unoperated strabismus do not present a challenge to most pediatric ophthalmologists. However, patients may also present with very complex strabismus that pose diagnostic and therapeutic challenges: strabismus secondary to brain injury, brain tumors, cranial nerve palsies, orbital disease or anomalies, and status post multiple extraocular muscle surgeries. This workshop will specifically deal with rarer and more atypical presentations of strabismus that present a knowledge gap to the practicing pediatric ophthalmologist.

Target Audience: Pediatric ophthalmologists in practice and fellowship training, Orthoptists, Ophthalmology Residents

Current Practice: They are reading medical journals, attending CME meetings, talking among their colleagues.

Best Practice: Participants will gain new perspective from the review of cases by pediatric ophthalmologist experts who deal with complex strabismus. New insights will inform clinical and surgical approach when confronted complex strabismus.

Expected Outcomes: At the conclusion of the symposium the attendees will have been taught new skills and refine previous skills in the diagnosis of complex and diverse strabismus conditions, the salient exam features to perform, tests to order, and new surgical skills in the treatment of complicated strabismus

Format: The symposium will consist of expert panel discussion and subsequent open question and answer forum with the audience’s participation. Actual patient vignettes will be presented. The presenter will provide a differential diagnosis, a treatment plan, shedding insight on the disease process, the etiology of the strabismus, and the rationale behind the treatment, and treatment outcome. Also discussed will be the potential reasons for the treatment success or failure

Summary: The panel participants are all internationally recognized experts in the field of strabismus and strabismus surgery. They will each present a difficult case that will be discussed by the other experts, and the results of the treatment will be presented and discussed. Approximately 6 cases will be presented.

Notes

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<th>Sq. Ft</th>
<th>Ceiling Height</th>
<th>Rounds</th>
<th>Ceilings</th>
<th>Hollow</th>
<th>Square</th>
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<td>Reception</td>
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<tr>
<td>Classroom</td>
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</tr>
<tr>
<td>U-Shape</td>
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<tr>
<td>Hollow</td>
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### Westin Copley Place Floor Plans

#### Room  Sq. Ft  Rounds of 10  Theater Reception  Conference  Classroom  U-Shape  Hollow  Square

<table>
<thead>
<tr>
<th>Room</th>
<th>Sq. Ft</th>
<th>Rounds of 10</th>
<th>Theater Reception</th>
<th>Conference</th>
<th>Classroom</th>
<th>U-Shape</th>
<th>Hollow</th>
<th>Square</th>
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#### Notes
Notes