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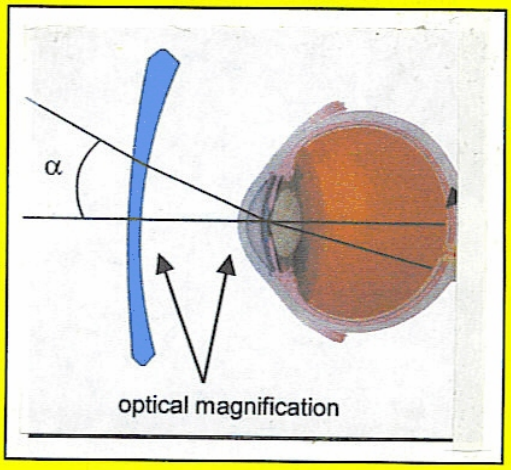

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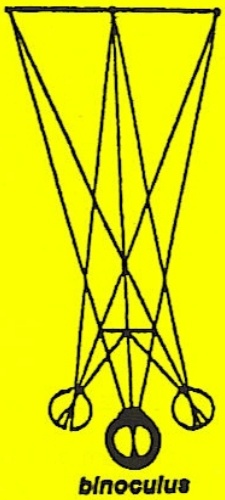

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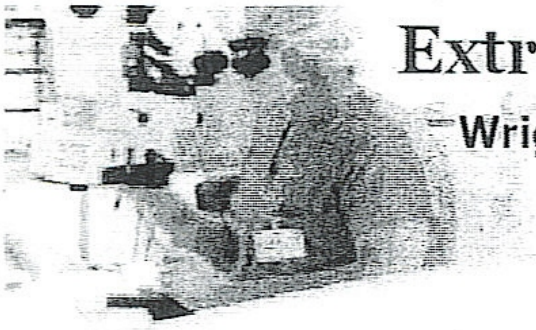

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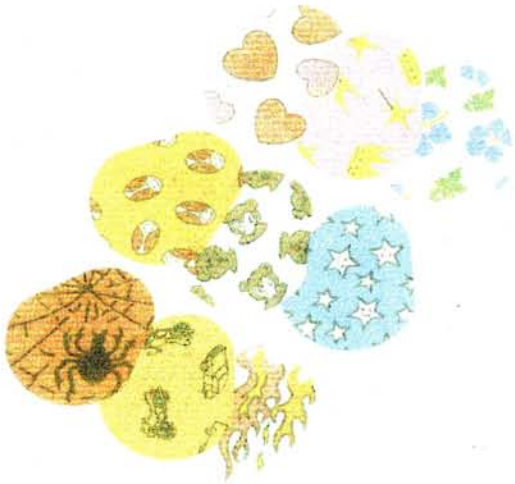

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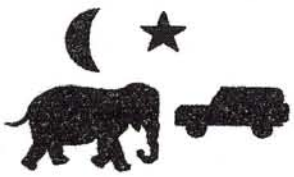

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BINOCULAR VISION & STRABISMUS QUARTERLY©

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BOOK REVIEWS, DESCRIPTIONS

for Binoculus Books advertised on prior pages

Second Quarter of 2007
Volume 22 (No.2):
pages 72-73

SURGICAL MANAGEMENT OF STRABISMUS

A Practical and Updated Approach, 5th edition

EUGENE M. HELVESTON, M.D.

Review by David K. Coats, M.D., Houston, Texas

Six pounds of pure muscle; no fat or byproducts here! That's what the 5th edition of Surgical Management of Strabismus packs. Quintessential strabismologist Eugene Helveston has done it again.

This classic textbook is once again jam-packed from cover-to-cover with all the information that the strabismologist needs to properly plan and execute the management of both simple and complex strabismus disorders.

The text is wonderfully illustrated with step-by-step instructions on how to perform all contemporary procedures that should be in the armamentarium of any serious strabismologist. One of my favorite "extras" in this textbook is a chapter that colorfully explores the history of strabismus surgery from its beginning. What most separates this edition of the textbook from previous editions is the inclusion of an extensive array of case examples complete with histories, clinical photographs, and details of surgical planning. While a few case examples were included in earlier versions, expansion of the case example section in this edition is so extensive that virtually any condition can now be reviewed in detail with a front row seat through the eyes of this world-renowned expert.

Space should be reserved for Surgical Management of Strabismus, 5th edition, in the bookcase of every ophthalmic surgeon. Undoubtedly this reserved space will be vacant most of the time, as this book is most likely to remain open and in constant use on the surgeon's desktop.

THE HISTORY OF STRABISMOLOGY

Edited by Gunter K. Von Noorden, M.D.

THE BOOK

The HISTORY OF STRABISMOLOGY is the first monograph devoted entirely to the development of strabismology in different regions of the world. Each of the co-authors has been assigned a special chapter in which his or her knowledge of the material is particularly profound. The origins of strabology go back to the beginning of medicine, thousands of years ago. The story how this specialty evolved from quackery and superstition in ancient times to its present state of sophistication is a fascinating one. It should be of more than passing interest, not only to those specialized in this field but also to others with an interest in the history of ophthalmology.

The book consists of approximately 400 pages and is abundantly illustrated with fine reproductions of old documents, engravings, drawings and historic instruments, many of which are from ancient and rare manuscripts. Printed on deluxe art paper THE HISTORY OF STRABISMOLOGY is bound by hand and gold embossed on book plate and spine.

THE EDITOR

Gunter K. Von Noorden is a world-renowned author and strabologist. His expertise in the entire field of stabismus is docu-mented in his textbook (now in its 6th edition) and uniquely qualify him to organize and edit a book on the history of strabology.

THE AUTHORS

The authors are prominent strabologists from different parts of the world, internationally known for their contributions. Indeed many have actually played an active part in shaping the history of strabismology during the second half of the 20th century. They are joined by a comprehensive ophthalmolgist who is also an ophthalmic historian of international reputation and by one of the leaders of the orthoptic profession. The following contributed to this book: Henderson C. Almeida, MC, Shinobu Awaya, MD, Alberto Brown-Limon, MD, William E. Gillies, MD, Eugene M. Hel;veston, MD, Joseph Lang, MD, Emma Limon de Brown, MD, Gunter K von Noorden, MD., Hans Rmeky, MD, Geraldo Ribeiro de Barros, MD, and Gill Roper-Hall, DBOT, CO, COMT

SURVEY OF OPHTHALMOLOGY VOLUME 51 • NUMBER 1 • JANUARY–FEBRUARY 2006

MULTIMEDIA REVIEWS

LEE M. JAMPOL AND ANGELO P. TANNA, EDITORS

Burton J. Kushner's Binocular Vision and Strabismus Grand Rounds: A Collection, 1985 to 2002, edited by Burton J. Kushner, and Paul E. Romano, *Dillon, Colorado, Binoculus Publishing,* 2003, 450 pp., illus., hardcover. Price: US$ 89.00 (subscriber rate), $169.00 (nonsubscriber rate), $249.00 (institutional rate).

To quote Dr. Kusher, "Many roads lead to orthophoria." The treatment of strabismus, that "art form" with scientific underpinnings, can be the bane or the joy, or more likely both, of the ophthalmologist's existence. For those of us in pediatric ophthalmology, it is our "bread and butter" and the source of endless discussions and debates. There is enough science to provide a logical approach, and enough art to make things *really* interesting.

This book is a compilation of 68 cases published over 17 years in the journal *Binocular Vision and Strabismus* in its "Grand Rounds" section, edited by Dr. Kushner. The cases are presented in a standardized format, including summary of the therapeutic problem, history, eye exam, and final diagnosis. Dr. Kushner states that he was not attempting to solve a clinical problem for a specific patient but rather presenting an intellectual exercise with input from respected colleagues. Indeed, he does not present his own opinion, nor the actual results following treatment on most of the cases. Several experts in the field present opinions on the diagnosis and treatment. Each case is followed by the editor's perspective which highlights the issues raised. The cases cover clinical topics from nonparalytic vertical strabismus to cataract. There were 249 different individuals who served as discussants for one or more cases. This provides a broad perspective covering many schools of thought.

The cases are numbered and have descriptive titles such as "A Case of 'V-pattern' Esotropia with Excyclotropia after Bilateral Superior Oblique Tucks." These allow for easy selection of cases for clinical purposes or teaching. The cases are interesting and informative analyses of complicated problems, primarily involving strabismus. However, although it is useful to have these case reports, previously published in a journal, collected together in one volume, it would have been more useful to have included outcomes and follow-up. Nonetheless, the compilation provides a thought-provoking read, an aid to clinical problem-solving, and a stimulating jumping-off point for teaching sessions.

Marilyn B. Mets, MD
Chicago, Illinois, USA

doi:10.1016/j.survophthal.2005.11.008

0039-6257/06/$–see front matter

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The designation of individual issues is by the quarter, not the season, because seasons are never the same, but opposite, in the Northern and Southern hemispheres. The seasons are however designated on the cover with the Northern season on the top and, inverted below, the current season in the Southern hemisphere.

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BINOCULAR VISION & Strabismus Quarterly

"... the belief that one's view of reality is the only reality is the most dangerous of all delusions ..."
-Watzlawick, 1976

EDITOR **ISSN 1088-6281** **First Quarter of 2007**
Paul E. Romano, M.D., M.S.O **TABLE OF CONTENTS** **Volume 22, Number 1**

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* Statistical Analysis of Results Mandatory. But give "exact" probability values (i.e., p = .06). Do not use relative p values (i.e.,p >< .05). The term "statistically significant", defined traditionally as a $p \leq .05$, is a totally arbitrary and unscientific term and should not be used (J Lab Clin Med 1988. 111:501). But do consider whether a result may be "clinically/medically significant".

D. BRIAN STIDHAM MEMORIAL LECTURESHIP

LECTURE to be published annually in *Binocular Vision and Strabismus Quarterly*

Donations Solicited to Fund Lectureship

To the Editor:

The Pediatric Ophthalmology community lost a great doctor last October 6, 2005, with the death by murder of D. Brian Stidham.

I am attempting to create an endowed lectureship to remember Brian in our community and within pediatric ophthalmology, and wonder if I could ask you to consider helping in this regard. I know that your journal concentrates on strabismus and binocular vision, but could I interest you in publishing the "Stidham Lecture in Pediatric Ophthalmology and Strabismus" that will hopefully be given on a yearly basis? I would work with the presenter to make certain that a manuscript would be produced that would be of acceptable quality. Having a target journal for the presentation would be a great carrot to draw top speakers to Tucson on a yearly basis to give such a talk.

We have raised $14,000 towards a target of $50,000 endowment that would ensure that the lecture would be perpetuated. I am committed to continue fundraising until the goal is met. If *Binocular Vision and Strabismus Quarterly* would serve as the publisher of the named lecture, I feel certain we will be able to both attract top speakers and donors to remember Brian in the years ahead, and to provide a great lectureship in pediatric ophthalmology and strabismus to our professional community which would enjoy greater readership and distribution.

Joseph M. Miller, M.D., MPH
Head, Ophthalmology and Vision Science
University of Arizona, Tucson, Arizona

In reply:

We are honored to be asked and will most definitely be pleased to publish this lecture each year. **We would encourage our readership to donate to this fund: Checks should be made payable to The University of Arizona Foundation with memo of "Stidham Endowment" and sent to Dr. Miller at U AZ, Ophthalmology, 655 N. Alvernon Way, Ste 108, Tucson AZ 85711.PER**

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2. READ & FOLLOW INSTRUCTIONS FOR AUTHORS! In addition:

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retroequatorial myopexy		posterior fixation suture
suspension-recession		hang back, hang loose
Bielschowsky Head Tilt Test		three step test
strabolog-y, ist		Strabismolog'y, ist
exact p values		"Statistically significant"

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(from Investor's Business Daily Nov. 26, 1997 by Morey Stettner)
"Make Dry Data Come Alive in Your Reports ... tips on making your technical writing come alive:
1. Remember that less is more. ... simplify your language and prune extra words. Eliminate jargon, and keep your sentences and paragraphs short. 'If you write in little bites, you break down lots of information for the readers so that it's easier to absorb,' said Carolyn Mulford, president of The Writing Coach. ...
2. White in the active voice. ... For example, write 'When you review the data, you will note these trends'. Avoid saying 'These trends were noted upon a review of the data.' Another example: Write 'We will examine', not, 'This has been examined'. ...
3. Insert 'talking subheads'. ... unbroken text can intimidate any reader, ... organize your writing in sections with each carrying an easy to understand subhead ... a talking subhead ... alerts the reader of what you're about to discuss ... for instance, instead of heading a section with 'Cost of Scanners' try 'Rising Cost of the Next Generation of Scanners'. ... subheads should average 7 workds.
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TABLES: Don't forget the crowding phenomenon. It works in Tables too. We prefer spaces to lines to separate the items in a Table. You can also get more material within whatever size limits you may have, using spaces instead of lines, especially vertical lines. Horizontal lines are less of a sin. -PER

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Second Quarter of 2007
Volume 22 (No.2):
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Welcome New Editorial Board Member -

ROBERT S. JAMPEL, M.D., M.S.O.,Ph.D.

At the recent meeting of the AAPOS in Seattle, Robert Jampel, MD graciously accepted our invitation to join our Editorial Board. He brings to us a wealth of knowledge and academic experience. Dr. Jampel graduated from the High School of Science in New York City. He earned his AB degree from Columbia in NYC and his MD from Columbia College of Physicians and Surgeons, also in New York. At the University of Michigan he received his ophthalmology training and received an MS in ophthalmology (*like your Editor also did at Georgetown, DC*) and a year later, his PhD in neuroanatomy. He is dually certified in both Ophthalmology and Neurology. Dr. Jampel was Director of the Kresge Eye Institute of Wayne State University for 22 years and is still currently Professor of Ophthalmology there. He has trained many eye residents and eleven graduate fellows. His C.V. lists over 100 publications in Ophthalmology with many his special interest, ocular motility and strabismus. His most recent efforts have been to debate Joseph L. Demer's oculomotor pulley hypotheses.

We welcome him.

Project 3000. Www.project3000.org Search for Patients with Lebers Congenital Amaurosis

Drs. Richard J. Olson and Edwin M. Stone from the University of Iowa are seeking to identify every man, woman and child in the United States - about 3000 - with Lebers Congenital Amaurosis (LCA). Project 3000 will offer state-of-the art genetic testing to identify these individuals. Project 3000 has five major goals: Provide hope; Provide accurate information; Find the remaining genes; Find cures; and Make genetic testing the standard of are. Please go to the website (above) for information you can share with your patients and their families. (319-356-0382)

First Clinical Trail of Gene Therapy for LCA

Researchers of University College London Institute of Ophthalmology and Moorfields Eye Hospital are conducting the first clinical trail to test a new treatment for LCA. The new technique involves inserting healthy copies of the gene into the cells of the retinal to help them to function normally, which should restore vision. Previous work using animal models has demonstrated that this gene therapy can improve and preserve vision.
Contact: Ruth Metcalfe, email: r.metcalfe@ucl.ac.uk.

from the AAOs REPORT April 7, 2007.

New Mexico Patient Safety Takes a Step Back - O.D. Surgery Enacted.

"Ophthalmology was dealt a blow and patient safety put at risk with the passage of a bill allowing medically untrained professionals in New Mexico to perform surgery. On April 5, Gov. Bill Richardson signed legislation that authorizes optometrists to perform procedures such as 'non-laser removal, destruction or drainage of superficial eyelid lesions and conjunctival cysts' and 'anterior puncture of the cornea'. 'The bill was signed despite evidence that New Mexico citizens opposed legislation that allows optometrists to perform surgery' said Cynthia Bradford, MD, Secretary for State Affairs. Ophthalmology, however, was able to limit the scope of the legislation and prevent broader measures from being included in the bill. As introduced in February, S.B. 367 would have allowed New Mexico O.D.s to perform scalpel and laser surgery, injections, and

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expanded O.D. prescription authority to include all oral agents and parenteral drugs (i.e., fluorescein). Only Schedule I II controlled substances would have been outside optometric prescription authority. ..."

Practice Opportunities

Albuquerque, New Mexico: The University of New Mexico, Division of Ophthalmology is seeking an additional faculty member at the Assistant or Associate Professor Level. Responsibilities include medical and surgical patient care as well as teaching and mentoring of medical students, residents and fellows. The facility has a dedicated new $234 million spacious, high-tech Pediatric pavillion. For information to the application process: http://hsc.unm.edu/facultyjobs/ - refer to the surgery heading.

Northern Virginia, Washington D.C. Metropolitan area. Eye Consultants of Northern Virginia is seeking to add a BC/BE, fellowship trained, pediatric ophthalmologist to their staff.. Attractive salary with bonus structure, partner potential and great benefits. Send CV to: Eye Consultants of Northern Virginia, P.C., 8134 Old Keene Mill Rd, Suite 300, Springfield VA 22152. Www.eyeconsult.net. MJSCACCHI@EYECONSULT.NET

Meeting Announcements

Vancouver, British Columbia, Canada. Sept. 7-8, 2007, Pediatric Ophthalmology & Adult Strabismus. Guests Speakers: David Taylor, Larry Tychsen, Elise Heon, Jan-Tjeerd de Faber. Registration and events details: www.cpdkt.ubc.ca

Buenos Aires, Argentina. October 1-4, **2008**. A joint meeting with CLADE (Latin-American Strabismu Council, Latin-American Society of Pediatric Ophthalmology and the AAPOS. Registration fees will be waived for AAPOS members participating in the Sympsosium. To participate, contact Michael X. Repka, MD via email to: mrepka@jhmni.edu

Washington D.C. Pre-AAPOS Meeting, April 2, 2008. Children's National Medical Center. The Angeline Parks Memorial Lecture will be given by Stephen P. Kraft, MD from the Hospital for Sick Children, Toronto, Canada. There is no registration fee but space is limited. Please pre-register by email to skromero@cnme.org.

CULLEN EYE INSTITUTE

BCM Baylor College of Medicine

SAVE THE DATE

The Eleventh Annual
Gunter K. von Noorden
Visiting Professorship in Ophthalmology

September 27-28, 2007

Arthur L. Rosenbaum, M.D.
Chief, Division of Pediatric Ophthalmology
Vice-Chairman, Department of Ophthalmology
Jules Stein Eye Institute
Los Angeles, California

Gunter K. von Noorden Lecture: "Surgical Options in Duane's Syndrome"
September 27, 2007
5:00 p.m. - 6:00 p.m. *Reception*
Cullen Eye Institute, The Neurosensory Center
6501 Fannin, NC 205

6:00 p.m. - 7:00 p.m.
Eleventh Annual Gunter K. von Noorden Lecture
Cullen Eye Institute, The Neurosensory Center
6501 Fannin, NC 205

Grand Rounds and Lecture
September 28, 2007 ~ 8:00 a.m. - 12:00 p.m.
Smith Tower, Suite 1501, 6550 Fannin

MORE INFORMATION TO FOLLOW
For questions, call 832-822-3237

EDITORIAL(s): IN THIS ISSUE GUEST ED:ON PUBLISHING NEGATIVE RESULTS

from *the Wall Street Journal* "Science Journal" September 15, 1006 by Sharon Begley (*edited and selectively [re]printed within legal literary limits*)

New Journals Bet 'Negative Results' Save Time, Money. "... publication bias, [is] the tendency of scientists to report findings that support some point but to bury examples that undercut it. It has existed for years, most seriously in the failure to publish studies that cast doubt on the safety or efficacy of new drugs. Now, guardians of scientific probity are fighting back. A handful of journals that publish only negative results are gaining traction, and new ones are on the drawing boards; ...i.e.; new Journal Of Spurious Correlations. 'Positive'[correlations] means those showing that some intervention had an effect, that some gene is linked to a disease - or, more broadly, that one thing is connected to another in a way that can't be explained by random chance. A 1999 analysis found that the percentage of positive studies in some fields routinely tops 90%.

That is statistically implausible, suggesting that negative results are being deep-sixed. ... Example: In the 1990s, publication bias gave the impression of a link between oral contraceptives and cervical cancer. In fact, a 2000 analysis concluded, studies finding no link were seldom published, with the result that a survey of the literature led to 'a spurious statistical connection'. Keeping a lid on negative results wastes time and money.... The Journal of Negative Results in Biomedicine... After a slow start in 2002, that journal is receiving more and better papers, says Dr. Olsen. One found that, contrary to other reports, the relative length of the bones of a woman's index finger and ring finger may not be related to her exposure to testosterone in utero. ... Questionable correlations between a gene and cancer are the bread and butter of NOGO, the Journal of Negative Observations in Genetic Oncology. ...

Which goes to show that in scientific journals, no less than in superm arket tabloids, you can't believe everything you read - or shouldn't. (Email: science journal @wsj.com)

IN THIS ISSUE

Clausen MM, Arnold RW. Pediatric Eye/Vision Screening: Referral Criteria for the PediaVision PlusOptix S04 Photoscreener compared to Visual Acuity & Digital Photoscreening: "Kindergarten Computer Photoscreening". *Binocul Vis Strabismus Q* 2007; 22:83-89

If you went to Seattle, you saw this on display in the flesh, and even got to use it on the German inventor who was there manning his exhibit in a handsome soccer jersey, which he was told looked like US prison clothing! If screening expert, Bob Arnold, also thinks this is a good and useful method, then it must be, for sure.

Gonzalez E, Barra F, Sanchez I, Antona B, Barrio A. High AC/A Accommodative Esotropia Strabismus Treated with Contact Lenses: A Single Case Design (N=1) Study. *Binocul Vis Strabismus Q* 2007; 22:90-95

This is the first time we have received a case report subtitled this way,. but the authors are correct in so titling it. They go further into some detail as to the advantages and disadvantages of such a scientific method which we had not really considered before. They demonstrate their point well; too bad the therapy idea didn't work as they had hypothesized that it would.

De wit GC. Retinally-Induced Aniseikonia. *Binocul Vis Strabismus Q* 2007; 22:96-101.

De Wit considers for the first time ever, we think, what is both intraocular and interocular aniseikonia! These patients may have intraocular aniseikonia with regard to different visual fields (i.e., retinal areas) in one eye, or between the macula and more peripheral retinal areas. They may also have aniseikonia between the two central vision macular areas of the two eyes.

We continue to support and advance the author's remarkably useful software for aniseikonia diagnosis and correction. And now that the retina surgeons are creating a lot of retinal aniseikonia, this may be the most fertile area for its use now. The optical correction of such variable intraocular aniseikonia is not practical, but fortunately aniseikonia in peripheral field physiologically reduced visual acuity is not the problem that it is for central macular vision.

Hussein MAW, Coats DK, Harris LD, Sanchez CR, Paysse EA. Ultrasound Biomicroscopy (UBM) Characteristics of Scleral Tunnels Created with Suture Needles Commonly Used During Strabismus Surgery. *Binocul Vis Strabismus Q* 2007; 22:102-108.

Four needles with seriously different designs and dimensions showed so little difference in use. I did wonder whether the S28 needle with its point on the bottom, might show some depth hazard different from the three others with the point on the top of the tip. Since that portion of the design would seem to influence the directionability of the needle, one would think. with the sharp end pointing down, you might expect that needle to run deeper` but it didn't.

In fact the authors thought the biggest factor determining the depth of the needle pass might well be how visible the needle was in the sclera, and that turns out to be simply, the bigger (and fatter, at least in width) the needle is, the more visible it is! There is a trend in their data suggesting that the biggest flattest needle did wind up going the deepest of all four! And as long as one can see translucent sclera above the needle, you have not penetrated the sclera and should be safe, even if you are in "near penetration" territory! If I were still sewing muscles to the globe, I think that alone would make me choose the old S14 unless there wasn't room where I was working to maneuver that big needle!

Mims III JL. Strabology of the 33rd Meeting of the AAPOS, Keystone, Colorado. *Binocul Vis Strabismus Q* 2007; 22:10-124.

Another fantastic meeting report. Thank you, JIM!

See also Hyde Park(prior pages), and abstracts, page 109. -per

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ABSTRACTS

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Vision / Visual Acuity / Amblyopia

Treatment of Strabismic Amblyopia with Refractive Correction. Cotter SA, Edwards AR, Arnold RW et al and the Pediatric Eye Disease Investigator Group (Am J Ophthalmol 2007; 143:1060-1063) [Authors Abstract, edited]

Purpose: To [study treatment] of. untreated strabismic amblyopia [by] spectacle correction.

Design: Prospective, interventional case series.

Methods: patients [n=12] with previously untreated strabismic amblyopia were prescribed spectacles and examined at five week intervals until visual acuity was not [further] improved...

Results: Amblyopic eye acuity improved by 2 lines or more from spectacle corrected baseline acuity in 9 of 12 patients (75%), resolving in three (interocular difference $\leq$1 line). Mean change from baseline to maximum improvement was 2.2 ± 1.8 lines. Improvement continued for up to 25 weeks.

Conclusions: These results support the suggestion from a prior study that **strabismic amblyopia can improve and even resolve with spectacle correction alone.** Larger studies with concurrent controls are needed to confirm ... these findings. (Dr. Cotter Jaeb Center Health Research, 15310 Amberly Dr, Ste 350, Tampa FL, 33647)

Strabismus, Pathophysiology

Binocular Vision and Refractive Surgery. Finlay AL (Contact Lens and Anterior Eye 2007; 30:76-83) [Author Abstract]

Binocular status can have an effect on the outcome of refractive surgery. Some accommodative deviations and anisometropia can be managed effectively. Fully accommodative esotropia has been successfully treated in young patients but the outcome can be less predictable in older patients. High anisometropes are usually unaffected by the change in aniseikonia following refractive surgery but there are exceptions. Failure to recognize and appropriately classify a binocular vision anomaly pre-surgically can result in symptoms that are difficult to manage postoperatively. Refractive surgery producing a binocular vision anomaly where there was non preoperatively is less common. I present a **review of the literature discussing the relationship between binocular vision anomalies and refractive surgery,** illustrating the findings with published reports of successful and unsuccessful binocular postoperative outcomes. I argue that **predicting the binocular outcome should be considered preoperatively for every refractive surgery patient.** (Alison L. Finlay, Dept Optometry and Visual Science, City University, London EC1V 0HB,UK)

Strabismus Treatment Outcomes

Improved Motor Coordination in Children After Late Surgery to Treat Congenital Esotropia. Caputo R, Rinelli F, Bancale A et al. (Eur J Paediatr Neurol March 2007. From the AAOs Speciality News and Views: Pediatric/ Strabismus - June 2007.

Caputo et al of Florence, Italy, recently reported on the impact of strabismus surgery for congenital esotropia on motor coordination in children over 4 years of age. They studied 19 children with congenital esotropia using the Movement Assessment Battery for Children (Movement ABC) one week before and 3 months after surgery for congenital esotropia. In each case, surgery was performed **after age 4**. The results were compared to 23 age-matched controls, who were tested in a similar time frame.

Interestingly, more than half of the strabismic children demonstrated abnormal or borderline results on Movement ABC testing prior to surgery, compared with 17% of the controls. During the second test, none of the patients in either the study or the control group showed any abnormalities except with ball skills. The strabismic children generally showed greater improvements than did the control group.

The researchers suggested that **surgical correction of congenital esotropia, even after 4 years of age, is associated with improvements in perceptual motor and motor function.** Anecdotally, parents frequently remark how much their child's motor function has improved after strabismus surgery, adding apparent support to the findings of this study. However, while these results are enticing, it should be noted that even the control group improved, and the potential for a learning curve effect, normal childhood development, or bias should be considered.

According to this paper, the Movement ABC is a battery of 8 tests that includes "posting coins, threading beads, bicycle trail, catching beanbag, rolling ball into goal, 1 leg balance, jumping over core, walking [with] heels raised."

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HYDE PARK EDITORIAL: The Editor's Soapbox, Sandbox & B'LOG (Prehistoric) Since 1985

True stereoscopic TV and Computer Viewing; Athletic Vision Training; Pay for Performance Poops; Wrongful Thinking X2 : Cognitive Behavioral Therapy; Cheap Law Degrees; Medal of Honor; Happiness is Relative

prism membranes.

They have done it by sandwiching two LCD screens, one of which is quite transparent and, of course, the images on each of the two screens are different, taken from a pair of stereoscopically separated cameras (or engineered as in video games), and that is where we will, for sure, see them first.

EYES AND SEEING

On Various methods of improving visual performance in athletes:

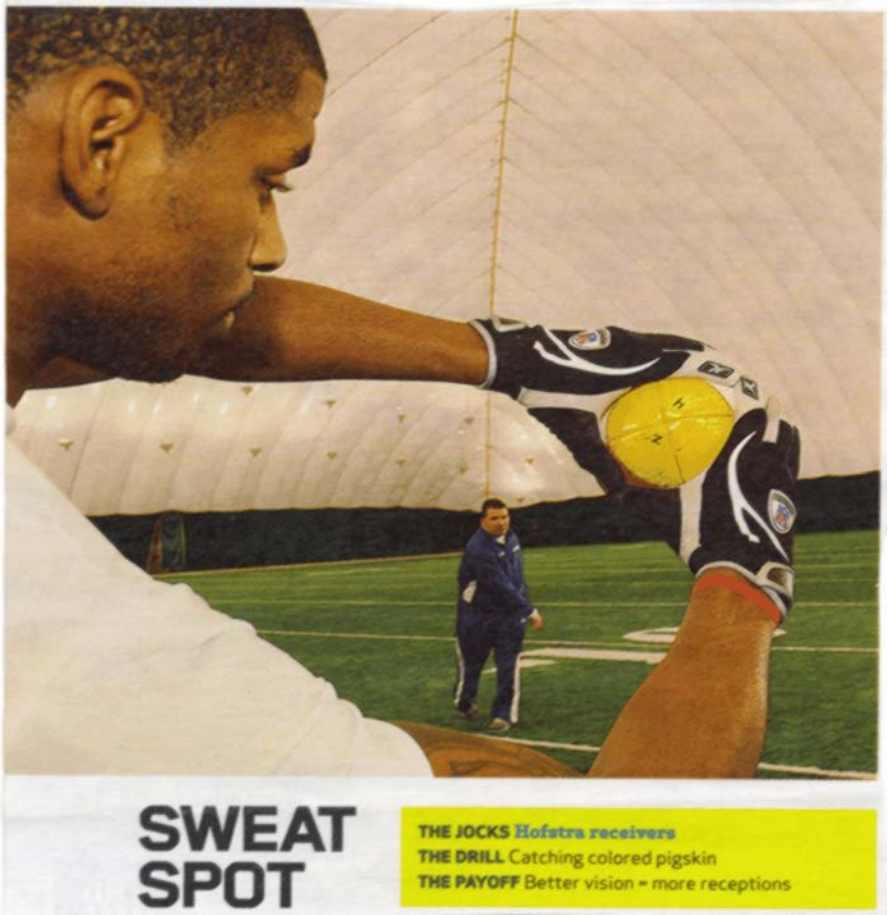
STEREOSCOPIC BINOCULAR VISION

ON LCD SCREENS
TV AND CPU MONITORS

WITHOUT
HAPLOSCOPIC/ANAGLYPHIC
GLASSES OR DEVICES

That's not news. Joseph Lang gave us those neat no specs stereotests a long time ago. Those plastic Fresnel prism sheets were around long before he so cleverly employed them for Lang stereotests I and II.

But a California firm has figured out how to give you true stereoscopic vision for images on LCD computer monitors and LCD HD TVscreens without any specs and without those plastic Fresnel



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Teaching Others to See How Top Athletes See

WIRED—JUNE

Thanks to new technology, the seemingly uncanny ability of many top athletes to anticipate opponents' maneuvers might now be taught to average competitors.

Getty Images

Often, the best players in a sport aren't the fittest or strongest, but those with "field vision"—knowledge of where teammates are at all times, where the ball is headed and what opponents plan to do. Such talent has long been assumed to be innate, and impossible to teach, reports Jennifer Kahn in Wired. But now, a movement in sports training aims to use technology to show ordinary athletes how to think like superstars.

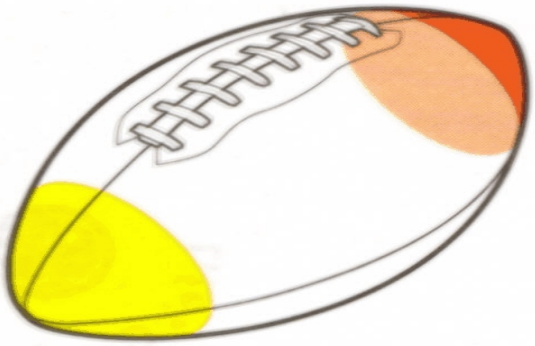
Damian Farrow, a scientist at the Australian Institute of Sport outside Canberra, relies on a host of gadgets to identify how elite athletes operate. One device that tracks where players' eyes turn during a game showed that the best players continually dart their eyes around the field, while those who make poor passing decisions focus for too long on certain targets.

By tracking vision in another way, he found that top tennis players unconsciously read their opponents' body language a third of a second before the ball is hit to predict where a serve is headed. Since last year, he has been trying to teach volleyball players to do the same by having them wear glasses that suddenly obscure their sight just before the other team spikes the ball.

Mr. Farrow says not all of the new approaches being used in professional and amateur sports are effective. In particular, he is dismissive of an approach used by some Major League Baseball teams in which players are instructed to increase the speed of their responses to a computer game to improve their field vision. Elite and average athletes perform equally well on the test, he says, so its application is limited.

Mr. Farrow also criticizes the emphasis that many elite youth sports academies place on structured drills. Unstructured play can be the best way for young players to develop perceptual skill that will pay off down the road, he says. "What do we do instead? We put children in regimented ... programs, where their perceptual abilities are corralled and limited."

IT'S NOT OFTEN THAT coaches create drills during a visit to the doctor's office. But after reading about the link between the mind and eyesight in his ophthalmologist's waiting room, Hofstra receivers coach Jaime Elizondo devised a way for his corps to fine-tune their vision. Just like that, football color-by-numbers was born. The mechanics are simple: Elizondo paints each end of a football a different bright color, on which he writes numbers or symbols. As the receivers run their routes, Elizondo throws the footballs, and each receiver must yell the ball's color as it spirals toward him, honing his broad vision. After the catch, he tucks the ball—following it with his eyes—and sharpens his fine vision by calling out the number or symbol written on it. "The colored part helps the receiver pick up the ball early in its flight," Elizondo says. "The fine vision aspect forces him to extend his hands and focus on catching the ball with his fingers rather than pocket-catching." The Saints' Marquis Colston, a Hofstra alum, credits the drill for helping him cut his dropped passes from double digits in 2004 to just a handful during his senior year. "I trapped the ball much better," Colston says. "Picking up the colors made me focus more." After their first season using the drill, Hofstra's receiving corps entered 2006 as one of the top-rated units in the country. Maybe Elizondo should visit the doctor more often.



-ANNA K. CLEMMONS

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Elsewhere in Medicine

PAY FOR PERFORMANCE POOPS

from *The Wall Street Journal* June 6, 2007 by Thomas M. Burton and Theo Francis.

Pay Shows Scant Effect on Medical Treatment. "A central premise of the government's Medicare planners in recent years has been a concept called 'pay for performance' - the idea that medical care can be improved by financially rewarding better treatment. But the results of a Medicare agency pilot project, published this week, suggest the effort may be less effective than proponents hope.

Researchers at Duke University, examining heart attack treatment at 500 hospitals, found that hospitals that received financial incentives to follow treatment guidelines didn't improve their practices significantly [*?statistically? -Ed*] more than hospitals that got no financial benefit. ... not associated...with improvement in quality of care or outcomes for acute myocardial infarction' or heart attack. ... [or in] in-hospital mortality...'

It's possible the financial penalties for not complying weren't sufficient. 'Those with the poorest performance risked future financial penalty,' researchers said, but didn't actually pay such a penalty. ... 'One read on this is that the carrots have to be bigger.' ...raise the question of what the Medicare system will do next...

WRONGFUL THINKING

from *TIME* March 26, 2007 by Christine Gorman.

Where Doctors Go Wrong. A revealing new book dissects how physicians think and why they go astray. "... began to intensively examine how doctors think and how they get side-tracked from the truth. He learned that about 80% of medical mistakes are the result of predictable mental traps, or cognitive errors, that bedevil all human beings. Only 20% are due to technical mishaps -mixed up test results or hard-to-decipher hand writing - that typically loom larger in patients' minds and on television shows.

The result of Groopman's journey is *How Doctors Think* (Houghton Mifflin; 307 pages), an engagingly written book that is must reading for every physician who cares for patients and every patient who wishes to get the best care. Groopman says patients can prompt broader, sharper and less prejudiced thinking by asking doctors open-ended questions and learning to identify some of their common thinking mistakes:

Error 1: Recognize The Type

Doctors, like most of us, are often led astray by stereotypes that are based on someone's appearance, emotional state or circumstances. Thus a homeless man's disorientation might be quickly attributed to alcoholism when the real culprit is diabetes. ... [*Ed NOTE: My first real M.D. ER experience was the reverse: I treated a drunk as diabetic coma! - not so bad an error! -PER*]

Error 2. I Just Saw a Case Like This.

We all tend to be influenced by the last experience we had or something that made a deep impression on us. ... be alert and ready to ask questions anytime a doctor says "there's a lot of this going around".

Error 3. I've Got To Do Something.

Physicians typically prefer to act even when in doubt about the nature of the problem. And yet this kind of "commission bias" can lead to all sorts of new problems if the treatment turns out to be incorrect. ...

Error 4. I Hate (or Love) This Patient.

Groopman cautions that emotions are more of an issue than most physicians like to admit. Doctors who are particularly fond of a patient have been known to miss the diagnosis of a life-threatening cancer because they just didn't want it to be true. But negative emotions can be just as blinding., sometimes stopping a doctor from going the extra mile. "If you sense that your doctor is irritated with you, that he or she doesn't like you" says Groopman "then it's time to get a new doctor. Studies show that most patients are pretty accurate in describing their doctors' feelings toward them.

... a lot of medicine still comes down to a doctor or two puzzling out what might be wrong with your body. Experience, common assumptions and human nature can guide them or lead them astray. By asking a few questions - especially if you think your doctor isn't asking enough of them -you can raise the odds that your physician won't get detoured ..."

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?CBT?

= **COGNITIVE BEHAVIORAL THERAPY**

Rx for more wrongful thinking!

from *The Wall Street Journal* March 27, 2007 as taken from *FORBES* April 9, 2007.

The Informed Reader. Insights and Items of Interest From Other Sources. Health Care. 'CBT' Advances in Treatment of Some Mental Illnesses. "When it comes to treating certain mild to moderate forms of mental illnesses, cognitive behavioral therapy, or CBT, is gaining ground on drug therapy, and 'the talking cure' of analysis.

Rather than delve into patients' past traumas to fix anxieties through conversation or medicate the symptoms, CBT teaches patients to keep bad thoughts at bay ... 'If you were abused, you accept it,'... coached depressed patients to evaluate their reactions to minor setbacks and assess them more realistically... breathing exercises and 'exposure Rx' to deal with anxiety...and insomnia. ...

CBT has been as effective as medication for some ailments. In a 240 patient trial, 16 CBT sessions worked as well as Paxil. ... better than a Lunesta-style drug at getting patients to sleep. Plus CBT has no side effects.

Health insurers are especially attracted to CBT since it aims to heal a patient after 20 to 25 visits, in contrast to the lifelong conversation with therapists depicted in Woody Allen Movies. ... few psychiatrists have received rigorous training in CBT, since hospitals only started requiring it in 2001. 'It is the psychiatrist that makes the difference, not a particular kind of therapy. ..."

Pain Management

ENCORE: SOUND OF MUSIC:
"A SPOONFUL OF SUGAR HELPS THE MEDICINE GO DOWN....."

from *The Wall Street Journal* April 3, 2007 by Yuliya Chernova.

Just A Spoonful of Sugar ... The old remedy is among pain-management techniques doctors are using for infants. "... Sugar water, ingested via a dropper or on a pacifier dipped in the solution, has been shown to reduce pain for infants up to six months old.

Many neonatal units give a ...sugar packet...in...a tablespoon of water before shots and other procedures such as catheterizations and blood drawings. The topical numbing cream EMLA, which is common in hospital for intravenous punctures, is approved by the FDA for injection-pain... in children starting with newborns. Some research [supports] the effectiveness of anesthetic sprays that temporarily cool the skin around an injection site.

Parental behavior, too, can have an impact, say pediatricians and psychologists. What works, studies show, is less reassuring and apologizing, more humor, distracting conversation and a confident, relaxed attitude. Nursing or holding an infant during shots has also been shown to help.

... babies feel pain intensely. ... babies can anticipate and feel more pain after having been previously exposed to something painful, for example, circumcision. ... children will get 20 or more immunizations before they are 2 years old, plus blood drawings...

EMLA prescription numbing cream, manufactured by Abrazis BioScience Inc., for example, costs about $17.99 for two applications pads at Walgreens.com. ... it also takes about an hour to work and must be applied ahead of time. ... cooling sprays, such as the prescription-only Fluori-Methan from Gebauer can act faster and cost only around 50 cents per use. ... if two shots are necessary for vaccinations, they are administered simultaneously by two people. ... *[I"ve never been offered any of these pain reliefs! Maybe I will have to bring my own along next time I go to the hospital - Ed]* ...breast feed an infant while the shot is administered, ... advocated by the AAP. ..."

Alternate Careers

FOLLOW ED RAAB !!!

from *The Wall Street Journal* June 5, 2007, "Career Journal by Aja Carmichael.

How Health-Law Degree Can Open New Career Opportunities., "... seeking the [new] degree, a master of science in jurisprudence concentrating in health law.

... The training - which is offered at about six universities - is designed to produce multiskilled employees able to perform

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regulatory and compliance work, risk management, and contract negotiation for hospitals and pharmaceutical and health insurance companies. ... for working professionals unable to devote the three years needed to earn a law degree. Classes cost $755 a credit, or a total of $22,650 for the degree.

... Among the companies hiring applicants and encouraging their own employees to pursue the health law degree are Novartis AG, Schering-Plough Corp, Humana Inc, and Merck & Co. ... 'It's a short version of law school.' ... 'It gives you enough training to think like a lawyer without practicing like one'. ... Michigan State University's law school hopes to capitalize on the heightened interest by offering health law at the master of jurisprudence level in several years. Increased regulation is creating the rising need. ..."

Autos / Commuting

from *The Wall Street Journal* April 9, 2007 as taken from *The New Yorker* April 16, 2007.

The Informed Reader. Insights and items of interest from other sources. Lifestyles. A Lonely Road Home for Commuters: How Longer Drives Exact Social Costs. "... the number of people who travel 90 minutes to work - deemed an 'extreme commute' by the Census Bureau - has doubled since 1990, reaching 3.5 million. Nine out of 10 commuters travel by car, and 88% of those drivers do so alone.

Long periods in the car not only provoke loneliness, they reduce time for sleep, sports and socializing. Generally, 'every ten minutes of commuting results in 10% fewer social connections' ... People tend to undervalue those losses. ... an hour long commute requires a 40% boost in salary to keep the commuters as 'satisfied' with their lives as non-commuters. **Atlanta**, [is] 'the purest specimen of a vexed commuter town.' Traveling 10 miles can take 45 minutes."

Miscellaneous

WHERE OUR FREEDOM AND LIBERTY COME FROM::::

from *The Wall Street Journal* May 26-27, 2007 by Peter Collier.

American Honor. The Stories Behind Memorial Day. Once we knew who and what to honor on Memorial Day: Those who had given all their tomorrows, as was said of the men who stormed the beaches of Normandy, for our todays.

But in a [today's] world saturated with selfhood, where every death is by definition a death in vain, the notion of sacrifice today provokes puzzlement more often than admiration. We support the troops, of course, but we also believe that war, being hell, can easily touch them with an evil no cause for engagement can wash away. And in any case we are more comfortable supporting them as victims than as warriors.

Former football star Pat Tillman and Marine Cpl. Jason Dunham were killed on the same day: April 22, 2004. But as details of his death fitfully emerged from Afghanistan, Tillman has become a metaphor for the current conflict - a victim of fratricide, disillusionment, coverup and possibly conspiracy. By comparison, Dunham, who saved several of his comrades in Iraq by falling on an insurgent's grenade, is the [real] unknown soldier. The New York Times, which featured Abu Ghraib on its front page for 32 consecutive days, put the story of Dunham's Medal of Honor on the third page of section B [for one day].

Not long ago I was asked to write the biographical sketches for a book featuring formal photographs of all our living Medal of Honor recipients. As I talked with them, I was, of course, chilled by the primal power of their stories.

But I also felt pathos: They had become strangers, honored strangers, but strangers nonetheless - in our midst. ... We impoverish ourselves by shunting these heroes and their experiences to the back pages of our national consciousness. Their stories are not just boys' adventure tales writ larger. They are a kind of moral instruction. They remind of something we've heard many times before but is worth repeating on a wartime Memorial Day when we're uncertain about what we celebrate.

We're the land of the free for one reason only: We're also the home of the brave.

Mr. Collier wrote the text for "Medal of Honor: Portraits of Valor Beyond the Call of Duty". (Workman, 2006)

But...

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Hyde Park Editorial

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On Happiness

from *The Wall Street Journal* May 2, 2007 by Jonathan Clements. **Getting Going. No Satisfaction: Why What You Have Is Never Enough.**

"We may have life and liberty. But the pursuit of happiness isn't going so well. As a country, we are richer than ever. Yet surveys show that Americans are no happier than they were 30 years ago. They key problem: We aren't very good at figuring out what will make us happy. ...fancier cars and fatter paychecks - and, initially, such things boost our happiness. But the glow of satisfaction quickly fades and soon we're yearning for something else. Similarly, we tell our friends that our kids are our greatest joy. Research, however, suggests that the arrival of children lowers parents' reported happiness, as they struggle with the daily stresses involved. ...

"We aren't built to be happy. Rather, we are built to survive and reproduce. ... The promise of happiness, meanwhile, is just a trick to jolly us along. 'This is an incentive scheme for the benefit of our genes' ...

"**We're bad at forecasting.** ... When we predict what will make us happy, we're also influenced by how we feel today. ... Maybe most important, we fail to anticipate how quickly we will adapt to improvements in our lives. We think everything will be wonderful when we move into the bigger house. We don't realize that, after a few months, we will take the extra space for granted. Experience should help us avoid repeating such mistakes. But it doesn't, in part because we don't accurately recall how we really felt. ...

"... Try a reality check ... Don't rely on the opinions of people. ... Instead, spend some time observing these folks - and see whether they're happy. ..."

from *The Wall Street Journal* May 15, 2007 Letters To The Editor. **The Pursuit of Happiness Seems to Bring the Most Happiness.**

".. What makes us happy is the pursuit itself. There is no viable, sustainable state of actually being happy. The3 pursuit is like a game. We score points, and that makes us happy; having points scored against us makes us unhappy. When the game is over, the happiness doesn't last even when the game ends in victory. Instead, our thoughts turn to the next game. ... poor people aren't nearly as unhappy as would be expected. Even the most impoverished among us have our pursuits. A piece of tin to add to the cardboard shack might produce as much happiness to one person as a new Lexus to another. In either case, the pursuit takes us to a better state. And in both cases, unhappiness begins to set in quickly if the pursuit doesn't continue to score points. ..." Richard P. Voss, Atlanta.

"... If you visit impoverished people in Third World countries, you'll notice they often seem happier than most American who have far more. I believe that's because they are spiritually at peace with themselves, even as they continuously strive to improve their lot in life." David Doolittle, Atlanta.

from *Money Magazine*, April 2007. "Your Money & Your Life" by Jean Chatzky. **Shopping for Happiness? Here's What to buy. When you're looking to feel warm all over, don't acquire things. Head for the aisle marked 'experience'.**

"... science has set us straight on two points: First, once you have escaped poverty, more money won't buy you more happiness. There's little difference in the overall happiness of millionaires and the middle class. And second, if you are going to spend your money in search of greater happiness, you're better off buying experiences rather than things. ... Goods tarnish over time. Experiences, on the other hand, ... can get better as you remember them, particularly if you're one of those people who tend to embellish a bit. (How big was that fish again? ... Keep a happiness diary. Before you turn out the light, jot down what made you happy that day and assign the experience a score of 1 to 10. After a couple of weeks, you'll realize that certain experiences make you happier than others and that you have good times even on very bad days. **Savor the warm-up.** 'Anticipation is where the greatest pleasure lies'. ... focus on those that have a long lead time - and then enjoy the journey there. If the experience is a vacation, for instance, savor the planning. Read guidebooks. Surf the Web. Discuss options with your traveling companions. You'll find yourself excited about the whole process, not just the trip itself. **Do something new.** ... For some people novelty is particularly stimulating. About 25% of us may have a variant of dopamine receptor in our brain that makes us especially curious. ..."

Binocular Vision & Strabismus Quarterly© A Medical Scientific E-Periodical | Pediatric Eye/Vision Screening: Referral Criteria for PediaVisionPlusOptix S04 Photoscreener Compared to Visual Acuity & Digital Photoscreening:"Kindergarten Computer Photoscreening" M.M. Clausen, BA and R.W. Arnold, MD | Second Quarter of 2007 Volume 22 (No.2): Pages 83-89

Original Scientific Article

Pediatric Eye/Vision Screening: Referral Criteria for the PediaVision PlusOptix S04 Photoscreener Compared to Visual Acuity & Digital Photoscreening: "Kindergarten Computer Photoscreening"

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ABSTRACT: ***Background and Purpose:*** Carefully interpreted photoscreen programs yield high predictive value and favorable sensitivity for amblyopia in pre-school children, but most require a long learning curve. The new PediaVision photoscreener appears to offer advantages and is evaluated in comparison with other established screening methods.

Methods: The PlusOptix S04 (PediaVision) computer-interpreted, infrared photoscreener was compared to digital physician-interpreted (Gateway DV-S20) photoscreening and patched Surround HOTV acuity testing in Kindergarten students.

Results: The estimated sensitivity and predictive value and speed of the objective photoscreeners exceeded visual acuity testing. The PediaVision photscreener, in addition, allowed a practical range of referral refractive criteria to be determined and utilized.

Conclusion: The PlusOptix allows user-chosen, age-related referral criteria, and a quick, child friendly photoscreening technique that should be ideal for many Kindergarten and preschool eye/vision screening programs.

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Financial Disclosure: The Alaska Blind Child Discovery (ABCD) has received discounted vision screen technology from various manufacturers including PlusOptix and Gateway.

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INTRODUCTION

American children truly deserve eye and vision screening for the early detection of amblyopia (1,2). Conventional vision screening has relied on visual acuity measurement in children old enough to identify optotypes. Objective screening for ocular risk factors for amblyopia can be performed in even younger children and may be substantially quicker than acuity screening (3). Unfortunately very few American children are photoscreened. Perhaps the ideal photoscreener has not yet been validated. The comments in a former publication (4) still have merit:

"The ideal photoscreener is portable, simple, and user-friendly for children and parents. It should be quick and inexpensive. It should focus on active children in reduced illumination. It should be capable of instantaneously demonstrating a good image, capable of obtaining orthogonal images and capable of storing and transmitting images for interpretation. The ideal photoscreener allows efficient and infallible identification of each child. The ideal photoscreener also provides rapid interpretation of the image so the parent can either a) be reassured of probable normality, or b) seek a confirmatory complete eye examination soon. Inconclusive interpretations due to inadequate photoscreen image quality or fixation are frustrating for parents". (4)

Another photoscreener has become commercially available since the Vision in Preschoolers Studies (5,6). We have acquired and investigated this upgrade of the PowerRefractor called the "PlusOptix S04" (PlusOptix Gbmh, Nurenberg, Germany, [marketed in the U.S. by PediaVision, LLC, 500 NE 2nd St., Pompano Beach, FL 33060, 1-888-514-73338, www.pediavision.com, or contact the designer, Christian Schmidt directly at c.schmidt@plusoptix.com.

The purpose of this study is to report, investigate and compare this pediatric photoscreener to digital physician-interpreted photoscreening and patched surround HOTV visual acuity testing in Kindergarten students.

METHODS

This ongoing vision screening study has received institutional review from Providence Hospital and from the Anchorage School District and Grace Christian School Board. Details of the ABCD (Alaska Blind Child Discovery) program can be viewed on www.abcd-vision.org.

Objective and subjective methods of vision screening were offered to younger elementary students and validated in Anchorage during Spring 2004 (7). This study, done during the Fall of 2006, compared patched, surround HOTV acuity testing, digital photoscreening with subsequent physician interpretation and PlusOptix S04 (PediaVision) infrared photoscreening in the same tent facility.

Testing Environment:

Parents gave consent with brief ocular history on standard ABCD paperwork. Lists of names with birthdates of each Kindergarten and pre-K student were transmitted from each school nurse to the primary vision screener (author MMC) and entered into the PlusOptix software database. On the morning of each scheduled screening, a PVC pipe and dark cloth examination tent (dimensions 2.5 m x 1.0 m x 1.3m) was erected near the classrooms; the tent prevented distractions and excess luminance allowing better pupil dilation for photoscreening.

HOTV Visual Acuity Cards:

Children were tested at a chart distance of 10-feet (~3 meters) using a modified surround HOTV card set (Precision Vision, Lasalle, IL, Cat number 2021). First they were familiarized with the optotypes on the flip cards and the matching card. Then the non-tested eye was patched with child-friendly, ABCD "No-Peeking" eye patches (Ad Tape and Label, Wisconsin). From 3 meters, the critical line first optotypes were presented in random order (20/40 size for Kindergarten and younger, 20/32 older than Kindergarten). If the child was unable to pass two of four of the critical lines, then larger logMAR options are shown until the child either achieves a successful line (smallest optotypes child is able to pass 3 of four optotypes). A child unable to pass the critical line was then offered the chance to pass using the integral pinhole "spectacles" built into the matching card. A child failing the pinhole can attempt the critical line on the built-in child surround HOTV near card. For the children who pass the critical line (three of four correct), then smaller optotypes are shown until a threshold smallest optotypes is achieved for that eye.

After the first (right eye) is tested, the patch is carefully transferred to the other eye and the sequence repeated. Children were tested with their spectacles if available.

Digital physician-interpreted photoscreening
Gateway DV-S20:

The Gateway DV-S20 is a simple digital flash 2 Megapixel camera with fixed optical lens (No optical zoom), automatic flash in low luminance without "red eye reduction." The short flash-to-lens distance, mimizing the eccentricity of the light source, make it an efficient, inexpensive photoscreener. Children are given a large nametag taped to the upper torso, and then seated in a decreased luminance tent at a distance of 2 meters from the camera. The camera is set to fine resolution. A 120V A/C adapter is preferred over the AA battery option. The camera has the possibility of generating a blue LED flash for more remote portraits. However, we have found valid photoscreening just by urging the child to "look at the camera" held directly in front of the screener's face. At least two flash images are taken; one with camera held vertically and one with the camera rotated 90 degrees.

Although the Gateway DV-S20 can record up to 40 MB on its internal memory, we instead use an SD flash memory card of at least 256 MB capacity. Images are downloaded to a computer imaging program (Apple I-Photo® preferred, Cupertino, Calif), cropped and then physician interpreted using the "Delta Center Crescent" method (8).

Infrared Refractometer Photoscreener
PlusOptix S04: (see Figure 1, right ->)

The PlusOptix S04 is a portable, hand held infrared photorefractor system with accompanying Windows-based database and interpretation capacity. The unit and computer run on A/C power and can output to a printer or label printer. A major difference and advantage for this device is that interpretation threshold criteria can be entered for a wide range of patient ages. Patient identification can be entered at the time of screening, or well in advance of a busy clinic. The camera hand piece is activated with a single trigger, and aimed and focused while viewing the camera image on the computer screen. The child's attention is captivated by age-appropriate audio and their fixation / accommodation directed by a series of flashing LEDs. The PlusOptix interprets each image and outputs refractive estimates (full sphere, cylinder and axis OU), pupil size and dot-graph and measurement of fixation / alignment of each eye, and binocular alignment..

The Gateway DV-S20 digital camera and the PlusOptix S04 with software on a portable Windows-based portable computer were placed in one end of the examination tent with the student seated at the other. Visual acuity testing was performed next to the tent. The order of acuity testing versus the objective testing varied for these kindergarten children.

Figure 1 *(Clausen and Arnold): PediaVision PlusOptix SO4 pediatric eye/vision infrared photoscreener with computer. Note the camera image on the computer screen of the child'seyes and their red reflexes. Illustration taken fromthe US distributor's brochure. For further info, view the website: www. PediaVision.com.*

RESULTS

ASD-ABCD 2006 (this study) screened 624 early elementary school children: 8 first grade, 90 3rd grade leaving 424 Kindergarten subjects. The breakdown of interpretation status for the three vision screening tests for these children with 'True" and "False" confirmatory exams by AAPOS standards (9) is shown in Table 1, below.

For these 73 limited followups, we can estimate that the Positive Predictive Values (PPV) for Gateway are 89%, for PlusOptix 84% and for patched HOTV acuity 75%. The estimated sensitivity / specificity for Gateway DV-S20 would be 100%/94%, for PlusOptix 67% / 94% and for HOTV acuity 25% / 96%.

The newer PlusOptix was then compared to our established Gateway DV-S20 in an attempt to determine referral criteria (Table 2). These are derived from the receiver-operator Characteristic curve that was generated for various permutations of referral criteria for anisometropia, hyperopia and astigmatism (See Figure 2, Top next page).

Table 1: RESULTS : Available Confirmatory Exam Validations (73 F or T)

Comparison for Gateway DV-S20, PlusOptix (ABCD preferred interpretation) and HOTV patched acuity testing in Kindergarten (n= 424).

T = True Positive by AAPOS guidelines[9]
F = AAPOS normal exams.

Gateway	PlusOptix+	Acuity	total	F	T
refer	refer	refer	21	1	6
refer	refer	pass	26	2	10
refer	pass	refer	0		
refer	pass	pass	29	0	8
pass	refer	refer	0		
pass	refer	pass	6	1	
pass	pass	refer	13	1	
pass	pass	pass	329	44	0
			424		

Table 2: RESULTS: Referral criteria in the kindergarten age range for the PlusOptix S04 derived from ADBC physician-interpreted photoscreening[8].

Referral Intent	Anisometropia	Hyperopia	Astigmatism	Myopia
Sensitive	≥ 1.00 D	≥ 2.00 D	≥ 1.25 D	> 2 D
Specific	≥ 2.00	≥ 3.00 D	≥ 2.00 D	≥ 3 D
ABCD-preferred	≥ 1.00 D	> 2.50 D	> 1.50 D	> 2.00

CONCLUSION

As of January 2007, photoscreening for amblyopia has not yet received definitive endorsement from the Vision Screening Authorities of the American Academy of Pediatrics (AAP) (10) On the other hand, photoscreeners and remote auto-refractors had sensitivities comparable to patched

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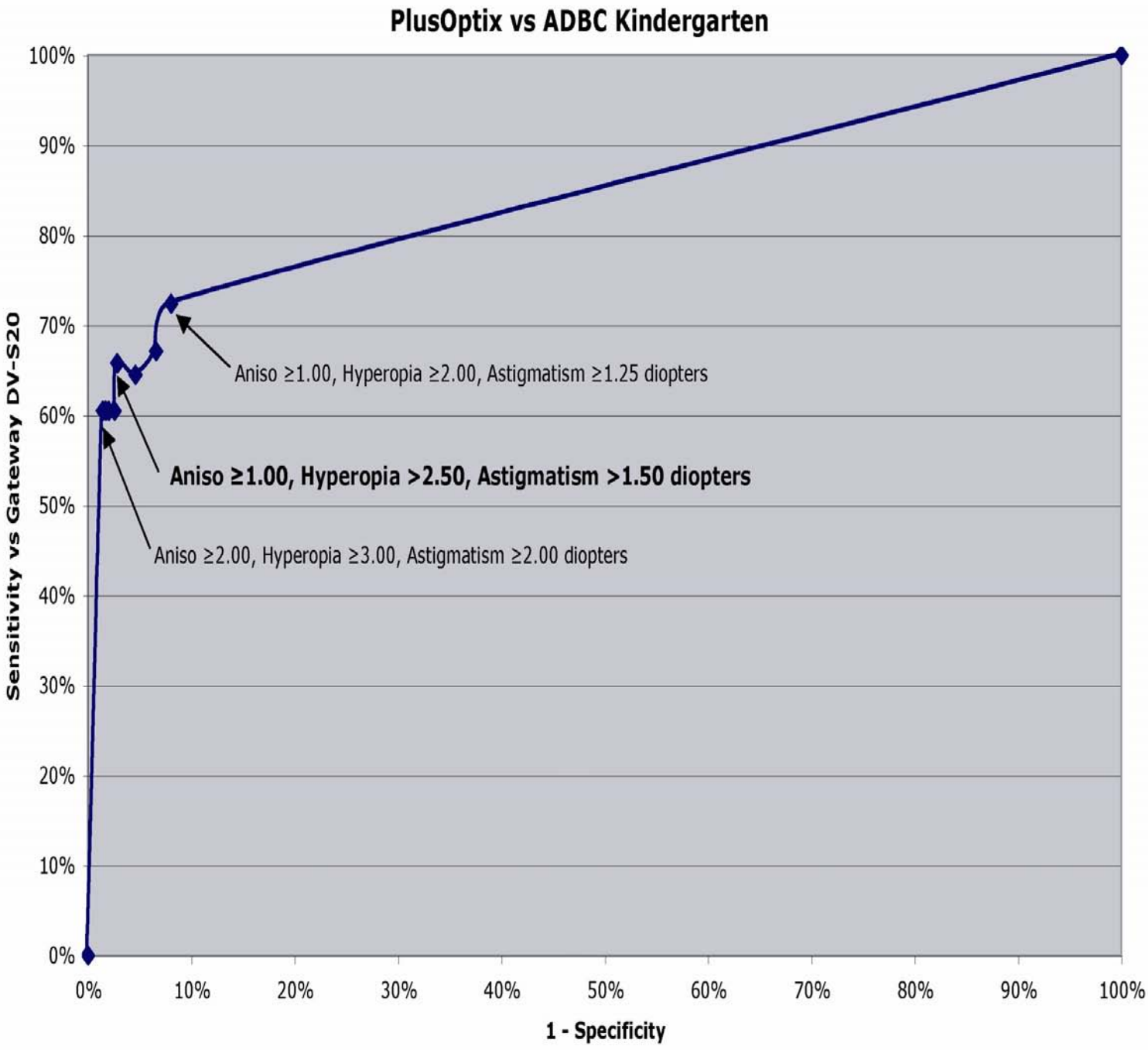

Figure 2 (Clausen and Arnold): RESULTS: The Receiver-Operator Characteristic Curve for the PlusOptix S04 compared with ADBC Physician-Interpreted photoscreen in Kindergarten children.

acuity testing in the Vision in Preschoolers Studies (VIPS)(5,6). Since amblyopia is an evolving process for many children throughout the critical first decade, AAP does NOT recommend a single age-based vision screen or comprehensive examination, but rather an age-appropriate series of vision screening tests (2). Just like the investigators in VIPS modified referral criteria to improve sensitivity for remote autorefractors, photoscreen programs can alter the

referral criteria based on photoscreen crescent location, pupil size and ocular alignment. Programs with a series of fairly sensitive tests with sufficient specificity to yield high positive predictive value are probably better accepted by community eye doctors, pediatricians and parents than overly sensitive tests with too high a false positive rate (11).

While many different types of photoscreeners can show an optical alteration in the pupil reflex (8), variable interpretation of these has dampened interest in photoscreening (12) and resulted in prolonged learning curves (11) and in variable referral rates between regional programs (13). Photoscreeners such as the MTI (Medical Technology Incorporated, Cedar Falls, Iowa) record pupil reflex images that must be carefully interpreted or ideally sent to an experienced reading center with delayed (non-ideal) notification of parents. The I-Screen system utilizes a central reading center in Memphis, Tennessee for prompt internet-transferred images (14). The EyeDx system (SanDiego, California) utilizes a digital camera with serial cable connection to a computer with software interpretation of red reflex (4 15.

The PlusOptix S04 and the Gateway DV-S20 differ in the character of fixation target; the Gateway was just a handheld digital camera in a dim tent whereas the PlusOptix emits child-friendly sounds and prompts fixation and probably accommodation with a group of flashing LEDs. The difference in prompting accommodation by the cameras when validated with AAPOS guideline refractive errors, may explain the seemingly less sensitive PlusOptix. Many children with supra-validation threshold hyperopia are capable of sufficient accommodation to yield a "false negative" result (16).

In our experience, both objective tests outperformed acuity testing in Kindergarten children. VIPS on the other hand, showed modified LEA and HOTV acuity testing to outperform externally interpreted photoscreening in preschoolers (5,6). Photoscreening can outperform deliberate conventional acuity testing in pediatrician's office preschool screening (17). While ABCD was happy with ADBC (amblyopia detection by camera) as an intermediate, portable digital step to follow Polaroid photoscreening, the rapid computer interpretation with age-based, user definable referral criteria makes the PlusOptix S04 a most potent weapons against amblyopia for any program that can obtain them.

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Case Report

High AC/A Accommodative Esotropia Strabismus Treated with Contact Lenses: A Single Case Design (N=1) Study

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ABSTRACT: ***Background and Purpose:*** The purpose was to determine the efficacy of two types of contact lenses (spherical disposable and aplanatic) as treatment in a patient with esotropia with a high Accomodative Convergence/Accommodation Ratio (AC/A). Due to the possibility of the appearance of accommodative insufficiency in this kind of patient,(i.e., following many years of bifocal glasses use), the elimination of the plus addition lens is advisable. Nevertheless, in some patients, this change leads to the appearance of a residual angle of esodeviation in near vision. It was expected that monofocal aplanatic contact lenses could achieve, due to their optical characteristics, an accurate and orthotropic binocular alignment, without aggravating an undesirable manifestation of the accommodative insufficiency.

Methods: An experimental design of a single case (N=1) was used in which the subject acted as his own control. With bifocal glasses the subject displayed stability in his binocular and accommodative system at every distance of vision for the past three years. We compared the efficacy of two different types of hydrophilic contact lenses to control the angle of deviation, both at distance and at near vision.

Results: Neither of the two contact lenses produced the results of stability and the correct binocular alignment that had been achieved with bifocal glasses. This subject experienced a worse manifest esodeviation in distance vision with aplanatic lenses than with the disposable ones.

Conclusions: These monofocal contact lenses did not create acceptable binocular alignment and stability in a subject with a high AC/A accommodative esotropia.

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INTRODUCTION

Accommodative esotropia is a binocular vision disorder that normally presents a specific set of characteristics. It appears usually between 2 and 6 years of age, with a mean age of 2.5 years old, and is generally accompanied by a significant hypermetropia, although it can also occur without the existence of this ametropia (1). The deviation is concomitant, and generally the angle presented is larger at near than in distance vision, with differences over 10△. It usually starts as an intermittent and variable strabismus and subsequently leads to a constant deviation if not treated in time. This kind of strabismus normally is not solved spontaneously during infancy and usually persists during adolescence and even during adult age (2). Patients suffering from this kind of strabismus are dependant on an optical means of correction.

These characteristics can vary considerably depending on individual patients' convergence response for each accommodation unit (AC/A ratio). The AC/A ratio has, as average, 4△/D but can range from 0 to 12△/D. It is commonly accepted that an AC/A ratio is low when it ranges from 0 to 2△/D; normal, from 3 to 6△/D; and high when it is 7△/D or more. In subjects with accommodative esotropia with high AC/A the ametropia found is usually diverse, being hypermetropic and emmetropic as well as myopic.

The purpose of accommodative esotropia treatment is to achieve single binocular vision both in distance and near vision. This objective can be achieved either with optical and surgical procedures, as well as with topical medicine (3,4). With respect to optical procedures, correction with a spherical positive lens is, in many cases, the first option for the elimination of the ocular deviation. When the patient presents with hypermetropia and a normal AC/A ratio, the correction can eliminate both distance and near deviation angles. But if, apart from hypermetropia, the subject also has a high AC/A ratio, ametropic correction with a positive spherical lens will eliminate the angle of deviation in distance vision while a residual angle remains in near vision. The residual angle in near vision will normally disappear by being controlled with the addition of bifocal glasses which at the beginning of the treatment is usually between 2 and 3 D, and afterwards can decrease gradually as age increases (5).

The use of bifocal glasses, although very effective from the point of view of the correction of the different deviation angles in distance and near vision, presents some problems. Firstly, the bifocal lens segment clearly hinders vision when looking down. During adolescence, problems with appearance also arise, although this can be mitigated with a no-segment-line progressive plus lens.

Also, in practice, it is known that many children don't use or wear their glasses during considerable periods of the day. Conversely, according to Calcutt & Kinnear (6), there are questions about whether the wearing of a bifocal lens for long periods could impair the binocular accommodation amplitude, while the monocular amplitude remains intact. Due to this possibility of the appearance of accommodative insufficiency in this kind of patient after the use of bifocals for many years, the elimination of the addition as soon as possible is advised. Unfortunately, in some patients, this elimination of the addition provokes the reappearance of a residual angle of esodeviation in near vision.

An alternative to optical treatment with glasses are contact lenses, which seem to offer good results in many cases, especially in older children that require less of a plus addition. Also, contact lenses are very useful for those who reject the use of glasses. Calcutt (7) found that the deviation could be controlled with monofocal contact lenses in those cases in which glasses had already been used, leading her to recommend their use in these cases. The following mechanism is thought to explain this good response to contact lenses: In hypermetropic patients, the convergence and the accommodation required for clear near vision are less with contact lenses than with glasses (with myopic patients, the opposite occurs). So that the use of contact lenses by hypermetropic subjects with accommodative esotropia and high AC/A ratio would be favorable since the lenses would decrease the requirements of both accommodation and convergence.

Bifocal contact lenses have been recommended by Rich & Glusman (8), who found, in three adolescent patients with accommodative esotropia and a high AC/A, the same angle of deviation and stereopsis with bifocal glasses as with bifocal contact lenses. These patients preferred the latter prescription for reasons of appearance.

Aplanatic lenses allow correct additions of less than 2 D because of the increase in depth of field and the decrease in the spherical aberration. These lenses should theoretically achieve the correct binocular alignment both at distance and

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near vision with monofocal contact lenses withoutprovoking the undesirable effects on the deviation, already mentioned.

However, there is not agreement in the literature about the efficacy of contact lenses in the treatment of accommodative esotropia with high AC/A. Morton et al (9) compared the effect of bifocal contact lenses with the effect of gas permeable aplanatic contact lenses (RGP) on 6 adolescent subjects with accommodative esotropia. All the subjects presented with a high AC/A and their near and far deviation angles were totally controlled with bifocal glasses. They found that these patients maintained large angles of deviation and they came to the conclusion that neither of the two types of lenses adequately treated these patients' problem. Nevertheless, Moore (10) reported success in correct binocular alignment, both at distance and near, in one adolescent with accommodative esotropia and high AC/A using RGP aplanatic lenses.

The purpose of this study was to study the efficacy of the hydrophilic aplanatic contact lens as a treatment in a patient with accommodative esotropia and high AC/A. The hypothesis was that aplanatic contact lenses, due to their special characteristics, could potentially have the effect of total correction of the angle of the esodeviation, something that cannot be achieved with any other type of monofocal contact lenses with conventional spherical design.

METHODS

Contact Lenses Used

Two types of hydrophilic contact lenses have been used: aplanatic Unilens 38™ Multifocal (Unilens) and Frequency 55 disposable (CooperVision). Unilens aplanatic contact lenses present interesting characteristics from the clinical point of view. They are monofocal and increase the depth of field, diminishing the spherical aberration. They correct presbyopia up to 2 D and astigmatism up to 1 D.

Experimental Design

We have used experimental methods of a single case with a design of alternate treatments. From the outset, this kind of method attempts to avoid the problems associated with using experimental designs for group comparison. These problems include: (a) the difficulty of assembling a large enough group of patients in a clinical environment; (b) the problem of obtaining average results which reflect the situation of each one of the patients, since although all of them have the same diagnostic label, they present clear differences; (c) the problem of the impossibility of generalization on the findings obtained; (d) certain ethical objections with regard to the refusal of a treatment that is considered favorable for a group of subjects (11).

Conversely, the single case designs allow rigorously controlled investigation and presents advantages which include their better adaptation to a clinical environment, with conclusions that are appropriate for each patient. Of course, this type of design is not applicable to all kinds of anomalies, but according to Sackett et al (12), it is especially applicable if: (a) it deals with chronic problems; (b) there is any doubt about the effectiveness of a treatment; (c) that treatment has a rapid effect; and (d) after the interruption of that treatment the effects cease rapidly.

There are several types of single case designs (13) that imply the utilization of baseline measurements of the dependent variable to be studied (A), and of measurement after the execution of the treatment that is tested (B). They range from the easiest form (A-B) with only one measurement of baseline and only with one measure post-treatment, to the so-called treatment of inversion (A-B-A-B-A). In our study we have employed two varieties of treatment with contact lenses, using the correction angle achieved with glasses as a reference. We have realized the comparison of methods with a design of alternate treatments. One of the advantages of these kinds of designs is that there is no situation where one phase necessarily cancels the treatment; the treatments are simply alternated, one of them always being present. Another advantage is that it is possible to avoid relatively long baseline periods and possible cancellation of the treatment, and therefore results can be evaluated in a short period of time.

CASE REPORT

The tenets of the Declaration of Helsinki were followed: Informed consent was obtained from the parents of the patient after the nature of the study had been fully explained. The patient was 11 years old at the beginning of treatment. The refraction for distance vision was +1.50 D in both eyes. With this refraction and an addition of +2.0 D for near in bifocal glasses the patient was orthotropic for both distance and near for the past 3 years.

After the process of adaptation to contact lenses (both to aplanatic and to disposable ones),

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the patient had a 3 month rest period where he used only his bifocal glasses. Then, for the next 6 months, he alternated the disposable and the aplanatic contact lenses in periods of one month each. The subject used contact lenses an average of 10 hours a day, was totally comfortable and had no adaptation problems.

The subject was re-examined every week (named as sessions). At each session the following measures were taken: visual acuity; stereopsis (TNO and Titmus) and angle of strabismic deviation. Measurements of the angle were taken both at distance and near using the cover test with a prism bar. The tests were always carried out by the same examiner at six o'clock in the afternoon.

Statistical Analysis

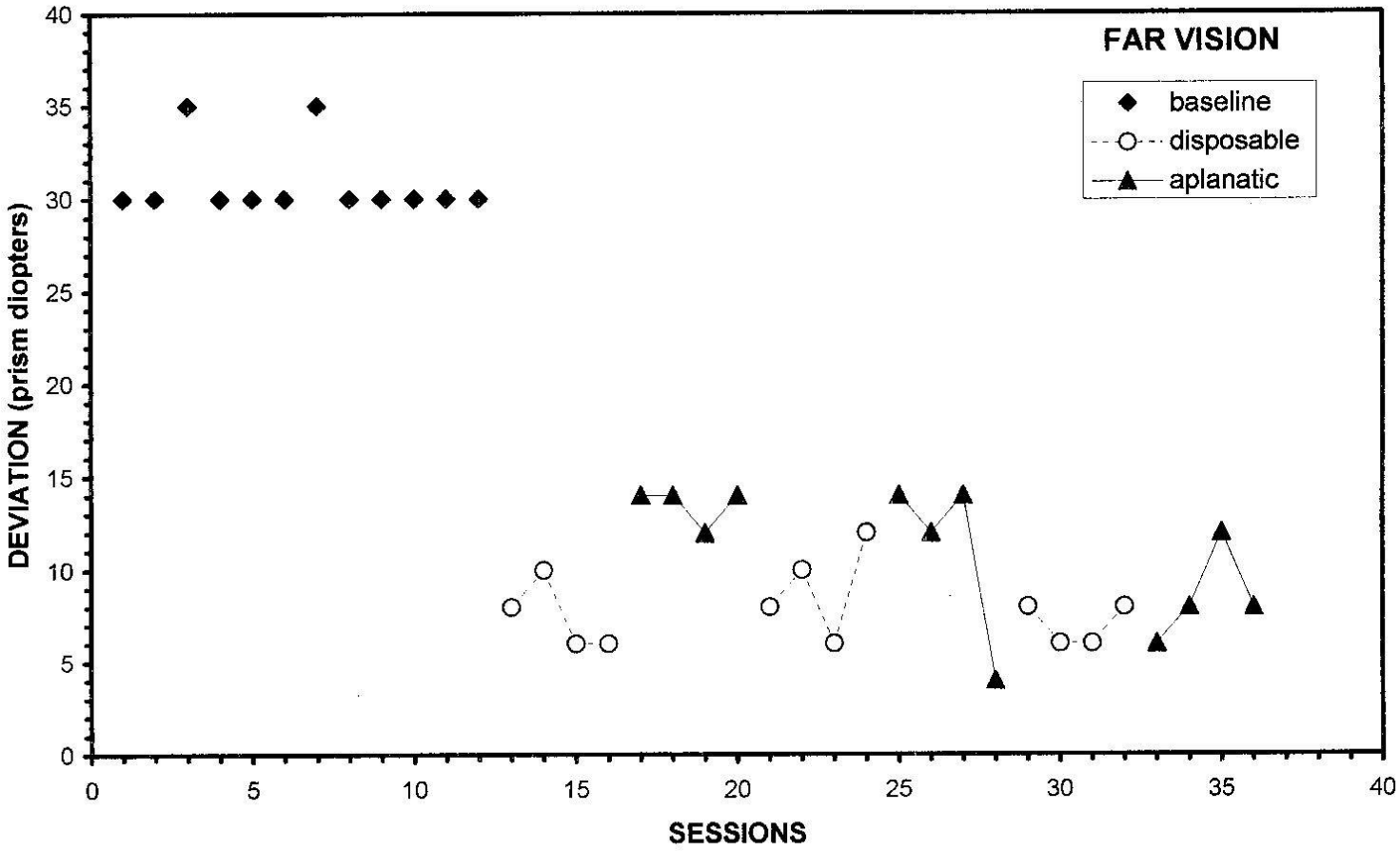

Figure 1 *(Gonzalez E): RESULTS: at FAR (DISTANT) FIXATION: High AC/A strabismic esodeviation angle in prism diopters over 40 week experiment. UNCorrected with bifocal spectacles ("baseline") and then alternating periods of disposable contact lenses and aplanatic contact lenses*

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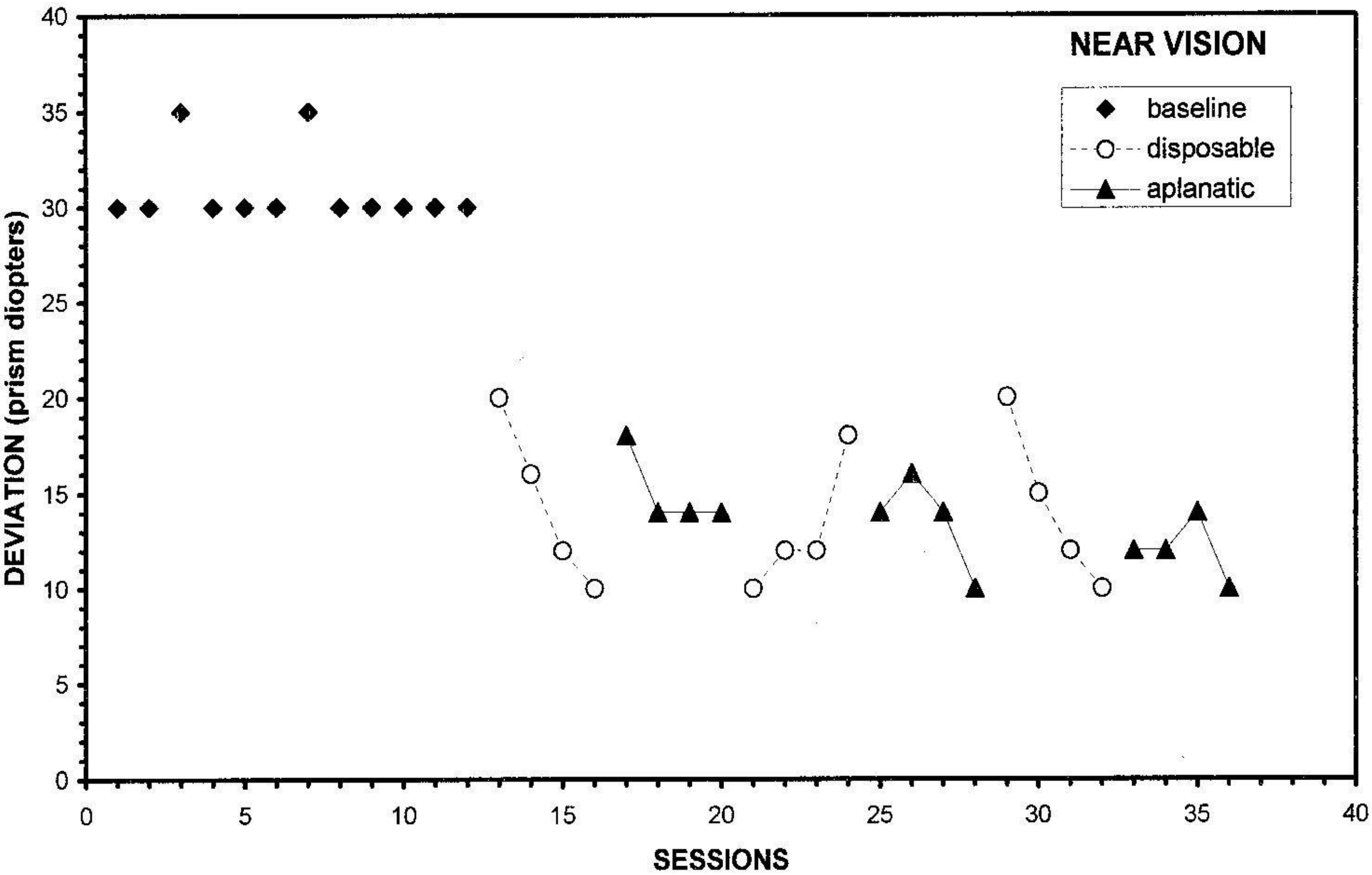
Figure 2 (Gonzalez E): RESULTS at NEAR FIXATION: High AC/A strabismic esodeviation angle in prism diopters, over 40 week experiment. UnCorrected with bifocal spectacles ("baseline") and then alternating periods of disposable contact lenses and aplanatic contact lenses



Generally, the single case methodology is based on the visual observation of graph results and on the clinical opinion of the investigator, without the need of subsequent statistical analysis of the results. Nevertheless, it is recommended (13) to apply a T-test to analyze if the difference of means between the two treatments had "statistical significance" (p<0.05).

RESULTS

With both types of contact lenses, the patient showed good visual acuity, normal stereopsis, measured with Titmus and TNO tests, and straight eyes at distance and near. When the cover test was done, an intermittent and alternating esotropia appeared.

We found that, unlike the bifocal glasses, neither of the two types of contact lenses produced a total correction of the eso deviation. **Figures 1 below and 2, top next page** show the angles of deviation with disposable and aplanatic contact lenses for distance and near, respectively. The great variability in the data obtained with aplanatic contact lenses at distance is especially relevant. It can be said that neither of the lenses corrected the deviation totally, but the aplanatic ones are evidently worse than the disposable ones for distance, although this changed at near.

A simple visual inspection of Figures 1 and 2 permits us to say that there are differences in the angle when comparing disposable and aplanatic lenses, both at distance and near. The T-test shows "statistically significant" differences between the two types of lenses at distance (p=0.016). The deviation angle is bigger with the aplanatic lenses than with disposable lenses at distance. A T-test of difference in the deviation wasn't "statistically significant"at near (p=0.747).

DISCUSSION

Although the efficacy of bifocal glasses in the treatment of ocular deviation is proven in subjects with accommodative esotropia and high AC/A, bifocal glasses show some problems that make the search for alternative treatments

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advisable.

Several types of contact lenses have been used, with the aim of achieving the same results obtained with bifocal glasses. Specifically, it was supposed that the use of aplanatic contact lenses, according to their optical characteristics, could correct the angle at any distance, as well as having all the other advantages of contact lenses. This would be particularly true in the cases in which the necessary addition is not greater than +2.0 D.

This study has allowed us to determine the inadequacy of contact lenses in general to offer a global solution of the accommodative esotropia strabismus of the patient, especially when compared with results from bifocal glasses. However, as only a phoria persists with contact lenses, we can conclude that contact lenses could (may) be a good treatment option for specific activities (sports, social events, etc) in patients with accommodative esotropia with high AC/A.

As in a previous study (9) advantages were not found in any type of contact lenses to control the deviation angle in accommodative esotropia with a high AC/A, in contrast to the advantages found in the use of bifocal glasses. Our results in one of these patients likewise do not endorse the best performance of aplanatic contact lenses compared with non-aplanatic ones.

CONCLUSIONS

We conclude that, for positive additions up to +2.0 D, bifocal glasses compensate the deviation better than any of the alternatives tested with contact lenses. A "statistically significant" difference can be observed between the results obtained with disposable lenses and the ones obtained with the aplanatic lenses for distance deviation only, where we can see an increase in the angle and a greater variability of the angle with the aplanatic lenses.

We are conscious of the fact that this study is based on a single case, so we cannot generally extend the conclusions to other subjects with the same anomaly. Nevertheless, we find the single case investigation methodology very useful, mainly because it adapts itself well to the work conditions of the clinical environment and can help the clinician to make treatment decisions.

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Retinally-induced aniseikonia

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Abstract

Purpose: To show that retinally-induced aniseikonia may vary as a function of visual field angle (i.e., field-dependent aniseikonia), how this could be explained, and what implications this has for managing the aniseikonia. *Design:* Observational case series. *Method:* Self-administration using software that can be assumed the predecessor of the Aniseikonia Inspector version 2. Aniseikonia was tested in the vertical and horizontal direction. In each direction aniseikonia was tested for visual field angles of 0.5 to 8 degrees. *Patients:* Three patients with different retinal conditions: an epiretinal membrane (ERM), a retinal detachment (RD), and a retinoschisis. *Results:* All patients had field-dependent aniseikonia, with aniseikonia variations of up to 20% over the measured visual field. The aniseikonia for the ERM patient was similar in the vertical and horizontal direction, while this was not the case for the RD patient and the retinoschisis patient. The retinoschisis patient even had negative aniseikonia in one direction and positive aniseikonia in the other direction. *Conclusions:* When reporting the aniseikonia of patients with retinal conditions, one cannot speak of 'the' aniseikonia (i.e., a single value or a single value for each direction), because it is most likely field dependent. It is also important to use a test that only measures static aniseikonia (direct comparison tests with long viewing times may be less suitable). Correction of field-dependent aniseikonia is relatively difficult, because an optical correction is field-independent. Nevertheless, optically correcting the aniseikonia for part of the visual field often improves the vision comfort considerably. If necessary, an optical correction could be augmented with a unilateral partial transparency occlusion or a unilateral partial field occlusion for more vision comfort.

Introduction

Aniseikonia is a binocular vision anomaly in which the two eyes perceive images of different size and/or shape. It is often associated with optical magnification differences in anisometropia, in pseudophakia, or as a result of refractive surgery. However, as depicted in Fig. 1, besides the optical magnification difference there are two additional factors contributing to the perceived image size difference: the retinal receptor distribution and the cortical processing of the sampled image[1]. A retinal receptor distribution effect has been used to explain the poor relation between calculated retinal image sizes and perceived image sizes in axial anisometropia and consequently the shortcomings of Knapp's law in clinical practice[2-4]. Moreover, aniseikonia is being associated with different retinal conditions in which a change of the retinal receptor distribution (stretching or compression) seems to be the cause of the aniseikonia. Associated retinal conditions are for example: an epiretinal membrane[5-10], vitreomacular traction[6], macular edema[11-13], re-attached retinal detachment[12,14,15], macular holes[16], and in this article I will also present a case of aniseikonia in a patient with a retinoschisis.

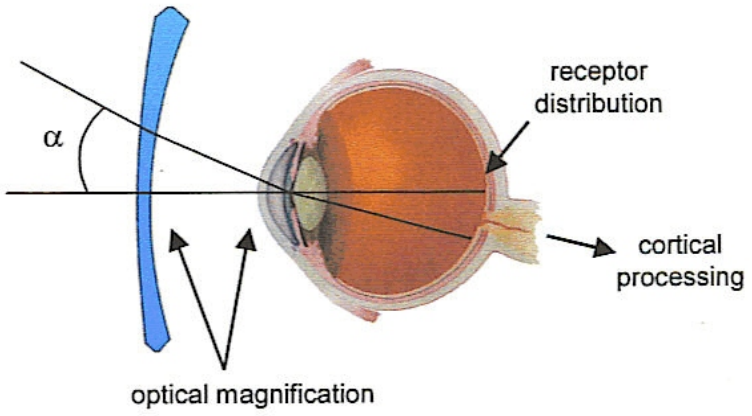

***Figure 1**: Schematic presentation of the ocular sources determining aniseikonia and the visualization of a visual field angle α (for simplicity the optical and visual axis are assumed equal here).*

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The general hypothesis of the occurrence of aniseikonia associated with retinal conditions is that due to a stretching or compression of the retina the receptors are displaced, creating respectively micropsia or macropsia (see Fig. 2 and Table 1). If this dysmetropsia occurs in one eye and not in the other eye (or with a different amount in the other eye), then the binocular vision result is aniseikonia with possible symptoms such as headaches, asthenopia, reading difficulties, depth perception problems, or double vision.

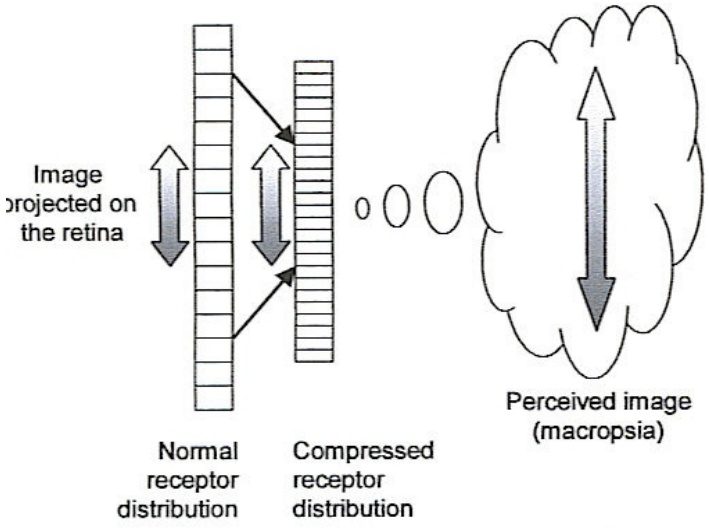

Figure 2: *Schematic presentation of the change in perceived image size when the receptor distribution changes. Note that in this schematic the receptors are drawn equidistant, while in reality the distance between the receptors will be variable. However, of importance here is only the change in receptor distribution before and after the onset of the retinal condition. (For a more accurate image, see Fig. 4).*

Table 1: *Usual type of dysmetropsia for different retinal conditions*

Retinal condition	Usual type of dysmetropsia
Epiretinal membrane	Macropsia[5-7,10]
Macular edema	Micropsia[11-13]
Re-attached retinal detachment	Micropsia[12,14,15]
Macular holes	Micropsia[16]

In many references dealing with aniseikonia associated with retinal conditions, the aniseikonia is only measured for one particular field angle (i.e., angular distance from a peripheral point to the center of the fovea in object space, see Fig. 1). This means that only one pair of binocular corresponding retinal points are found. The purpose of this article is to show that for retinal conditions the amount of aniseikonia may vary as a function of the visual field angle (i.e., field-dependent aniseikonia), how this could be explained, and what implications this has for the management of aniseikonia.

Patients

Although aniseikonia is considered a manageable ocular discomfort suffered by a significant amount of patients[17,18], not many eye care providers are currently equipped to manage aniseikonia. As the developer of the aniseikonia management software tool 'The Aniseikonia Inspector™', I sometimes get requests from patients to investigate their aniseikonia (in collaboration with their eye care provider). Since the software is written for a regular personal computer and easy enough to self-administer, the patients reported in this study each agreed to be tested on their home personal computer using the internet and e-mail as a way of communication. This article will present the field dependency of aniseikonia in three patients with the following unilateral retinal conditions as the probable cause of the aniseikonia: 1) an epiretinal membrane OS, 2) a reattached rhegmatogenous retinal detachment – macula off OD, and 3) a retinoschisis OS.

Patient 1 has also been described in more detail in a previous article[5]. This 60-year-old male judge with a visual acuity in both eyes of 20/20 wore spectacle lenses with the following prescription: right eye, 0.00 –0.25x95; left eye +0.75 –1.25x85. The remarkable finding in an ophthalmic examination included an early cortical cataract in the right eye, vitreous detachment in the left eye, and an epiretinal membrane (ERM) in the left eye.

Patient 2 is a 62-year-old manager with a visual acuity in both eyes of 20/20 and a spectacle lenses prescription of: right eye, -5.75 -1.00x75; left eye –4.75 –1.75x90. The patient was diagnosed with a rhegmatogenous retinal detachment (RD) – macula off in the right eye approximately half a year before the aniseikonia measurements. He underwent cryotherapy to the

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retina, vitrectomy, and injection of gas/air into vitreous right eye.

Patient 3 is a 42-year-old male professor in science with a visual acuity in both eyes of 20/25 and a contact lens prescription of: right eye, -16.75; left eye: -14.00. Based on optical coherence tomography images, the patient was diagnosed with a retinoschisis in the left eye involving also the macula. The retinoschisis seemed to have developed a little more than a year before the aniseikonia measurements and was still present during the aniseikonia measurements.

The basic complaint of all patients was that the images in both eyes looked different in size. The RD-patient (2) and especially the retinoschisis patient (3) also complained that the images in the affected eye were altered in shape (a circle looked elliptical). In all patients the aniseikonia led to reading difficulties, possibly causing headaches or asthenopia. The main complaint of the RD-patient was the reduction of spatial awareness and depth perception, which also affected the patient's psychological well-being.

Methods

The aniseikonia in these patients was measured using custom software, which can be assumed the predecessor of the Aniseikonia Inspector™, version 2 (Optical Diagnostics, The Netherlands). The test method is based on the so-called direct comparison method in which a haploscopic condition is created by using red-green spectacles and color matched red-green haploscopic targets. A series of images of two adjacent rectangles (each image with differently sized rectangles) is presented to the patient, each image for only 0.5 seconds. While fixating at the center between the rectangles the patient has to identify for each image which rectangle is perceived as larger. This gives a psychometric curve from which the patient's aniseikonia is extracted using a maximum likelihood procedure. The visual field angle at which the aniseikonia is measured, is set by the size of the rectangles and a fixed distance between the patient's eyes and the computer screen (the rectangle subtends twice the visual field angle). More detailed information about the test method can be found in reference 5.

Results

Figure 3 shows the aniseikonia measurement results for the three patients as a function of field angle in two directions (vertically and horizontally). Included is also the data of a normal control subject (the author) looking with his left eye through a 4% size lens to show that optically induced aniseikonia is either not or little field dependent[5], in accordance with the general perception of aniseikonia. It shows that for all three patients the aniseikonia has a clear field dependency. The absolute values of the aniseikonia are relatively high, considering that patients may start to suffer from aniseikonic symptoms with aniseikonia values as low as 3% (and even less in sensitive individuals). The high aniseikonia values also agree with the fact that the patients noted that they all saw a clear image size difference between the two eyes by closing one eye at a time. For smaller (but still binocular vision challenging and symptomatic) aniseikonia values an image size difference might be difficult to notice by closing one eye at a time.

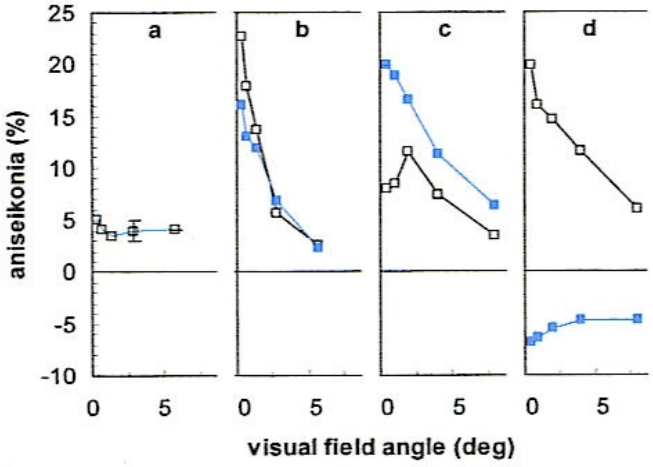

***Figure 3**: Aniseikonia as a function of visual field angle in the vertical (open squares) and horizontal direction (filled squares). a) a normal looking with his left eye through a 4% size lens (error bar represents the standard deviation of 4 measurements); b) the epiretinal membrane patient (OS), c) the retinal detachment patient (OD); d) the retinoschisis patient (OS)*

Except for the ERM patient, the aniseikonia was also quite different for the vertical and horizontal direction. Again, this agreed with the observations of the patients. For example, the retinoschisis patient described that with his

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affected eye cars looked 'funny' in that they were relatively narrow and high. Also he noted that due to the different aspect ratio, letters looked different in both eyes, as if the font changed depending on which eye he looked through.

Discussion

The results show that the aniseikonia of patients with retinal conditions may be field dependent. This means that the explanation of a uniform stretching or compression of the retinal receptors (as shown in Fig. 2) is in need of a modification. If there are stretching or compression forces close to the fovea, it speaks to reason that this would have little effect on the receptor distribution far away in the periphery. Therefore, a change in the receptor distribution close to the fovea will need to be non-uniform. This is schematically shown in Fig. 4. In this example the receptors are compressed at the center while a little further peripheral they are stretched to finally being unaltered in a position even further out in the periphery. The aniseikonia in this example would be field-dependent with a larger effect for smaller field angles, similar to the aniseikonia of the ERM patient in Fig. 3. Note that, following common practice, the aniseikonia presented in Fig. 3 is the aniseikonia relative to the right eye. This means that a positive aniseikonia value would require an image magnification in the right eye or an image minification in the left eye in order to correct the aniseikonia. Since the ERM was in the left eye, this means that the ERM caused macropsia, which is in accordance with Table 1 and Fig. 4.

Figure 2 shows that the RD-patient also had a positive amount of aniseikonia. Since the retinal detachment was in the right eye, this means that it caused micropsia. The opposite of Fig. 4 seems to happen. Due to the retinal detachment and/or re-attachment, the receptors closest to the fovea have stretched, while further out in the periphery they are compressed (or wrinkled). For small field angles there is a difference in aniseikonia values between the vertical and horizontal direction. This seems to indicate that the forces in play during the detachment and/or re-attachment were not symmetrical around the fovea. The retinoschisis patient shows an even larger asymmetry, because macropsia is caused in the vertical direction and micropsia in the horizontal direction.

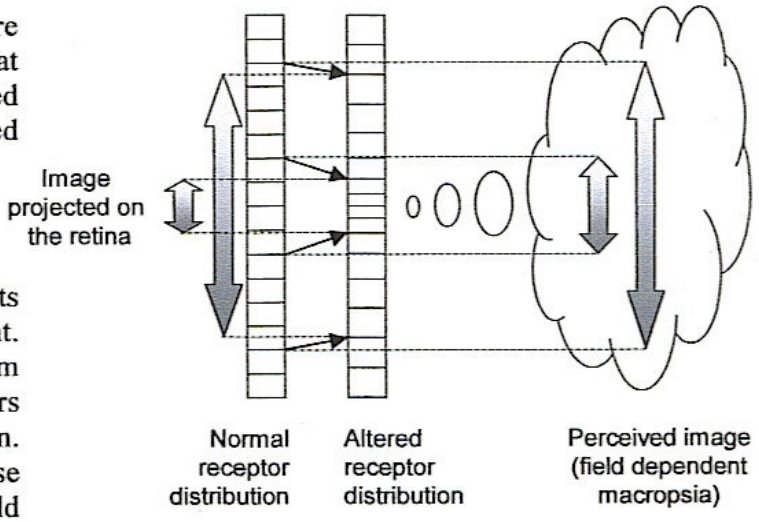

Figure 4: *Same as Fig. 2 only now the change in receptor distribution is non-uniform, resulting in a field-dependent dysmetropsia. I.e., in this example, the small arrow is perceived relatively much larger than the big arrow (appr. 80% increase vs. 10% increase).*

The common way to correct aniseikonia is to change the magnification properties of the auxiliary optics in front of the eyes. This can be done for example by: a) changing the shape of the spectacle lenses, b) changing the vertex distances (including the possibility of contact lenses), c) creating a weak telescope system by using spectacle lenses together with contact lenses, d) changing the power of one of the spectacle lenses (reducing also the visual acuity), or e) a combination of the above. With the advent of computer software (e.g., the Aniseikonia Inspector) the task of determining a prescription to correct a certain amount of aniseikonia has become relatively simple and easy for the practitioner. However, the problem with correcting field-dependent aniseikonia through optical means is that the correction will almost not vary with field angle. This means that effectively the graphs of Fig. 2 can be shifted up or down. Therefore, not all of the field-dependent aniseikonia can be corrected at the same time by standard optical corrections. Nevertheless, both the ERM and RD patient have gained considerably improved visual comfort by correcting between 5 and 10% of the aniseikonia. Unfortunately, the retinoschisis patient could not be provided with an optical correction because any overall correction would reduce the aniseikonia in one direction, but at the same time increase the aniseikonia in the other direction.

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Subjective experiments with size lenses did seem to reveal though that corrections in the vertical direction would give slightly better improvement than corrections in the horizontal direction. An optical solution that would correct different amounts of aniseikonia in different directions could be considered, but this would need to be accomplished with bitoric lenses (difficult to make, expensive, and can only provide limited amounts of correction) or with cylinder contact lens – glasses combination. The retinoschisis patient did not pursue this last option. The RD patient did try a contact lens – glasses combination, but with limited success. Even though it clearly did provide the intended (static) aniseikonic correction, it also introduced a different kind of visual discomfort: dynamic aniseikonia (i.e., induced anisophoria). Dynamic aniseikonia is defined as a heterophoria whose magnitude varies with the direction of gaze due to a glasses-induced varying prismatic effect as the eyes deviate from the optical axes of the spectacle lenses[19]. The tolerance level for dynamic aniseikonia will depend on the fusional reserves of the patient. When designing a prescription to correct aniseikonia, it is therefore also important to look at the induced prismatic effect of the spectacle lenses.

If an optical correction does not improve the binocular vision comfort enough, a (partial) occlusion may also be tried. A full unilateral occlusion should be a last resort. Patients are usually not too happy when a full occlusion option is proposed, especially after just having had surgery to fix a retinal problem. Also, fully occluding one eye may not be the solution if the patient is especially troubled by a lack of binocular depth perception due to the aniseikonia as this by definition makes vision monocular and no longer binocular. A less drastic approach that also proved beneficial for some field-dependent aniseikonia patients is to blur or block just part (a section) of the visual field. For example, the RD and retinoschisis patient both gained some relief by blocking only the central field in one eye by placing an opaque spot at the center of one of their spectacle lenses (even though the eyes could gaze beside the spot). The RD patient also performed subjective experiments with blocking only the peripheral view in one eye and this also seemed to help some. Therefore, it might be that the difference in aniseikonia values between the central vision and more peripheral vision is especially aggravating for field-dependent aniseikonia patients. Instead of blocking (part of) the visual field of one eye, an even better solution might be to reduce the vision in one eye by applying a partial occlusion foil on one spectacle lens[20] or by changing the refraction correction to sub-acuity-optimum in one eye. This way also (some of) the stereovision is left, but now the solution not only applies for viewing in one direction only. The RD patient also discovered a totally different 'solution' that seemed to help. He intermittently blocked the vision in one eye (e.g. by moving a finger quickly up and down before one eye or with modified shutter glasses), which resulted in less strain on the binocular vision and giving comfortable depth perception.

Conclusion

Under the assumption that retinally-induced aniseikonia is caused by a change in the receptor distribution, the aniseikonia is most likely field dependent. That is, far away from the retinal location where forces exist(ed) to change the receptor distribution, the receptors are likely not to have changed (or changed less) in position. It is important to realize that one cannot speak of 'the' (specific amount of) aniseikonia in these patients. When studying and reporting aniseikonia in these patients, one would need to specify also at what field angle the aniseikonia was measured. Better yet, the aniseikonia should be graphed as a function of field angle.

Because many of the retinally-induced aniseikonia patients are isometropes or near-isometropes, the aniseikonia is mostly static. It is therefore important that the aniseikonia test does not measure (also) dynamic aniseikonia, as may happen in direct-comparison tests with long viewing times where the gaze can roam around to compare the two targets[19]. In the measurements for this article this was accomplished by limiting the viewing time of the targets to only 0.5 seconds.

The field dependency of retinally-induced aniseikonia makes it more difficult to correct. Normal optical solutions are not field dependent and can therefore only provide a partial

correction. Nevertheless, a partial correction can often provide the patient with a significant improvement in their binocular vision comfort. If necessary, an optical solution could be augmented with a partial occlusion to reduce the visual acuity in one eye or even blocking (or partial occluding) just a part of the visual field.

Even though retinally-induced aniseikonia patients are relatively difficult to correct, they might also be the aniseikonia group with the most severe symptoms. It is therefore important that further research be performed on, for example, the incidence of retinally-induced aniseikonia, if there are any surgical procedures that reduce or limit the amount of aniseikonia, and what the most effective optical correction method is (for example what field angles and what direction to target in the correction).

Acknowledgements

The author would like to thank the retinal detachment patient discussed in this article for his financial support and for the valuable discussions on the topic of field-dependent aniseikonia. The image of the eye used in this article is at the courtesy of National Eye Institute, National Institute of Health (http://www.nei.nih.gov/photo/eyean/index.asp).

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Original Scientific Article

Ultrasound Biomicroscopy (UBM) Characteristics of Scleral Tunnels Created with Suture Needles Commonly Used During Strabismus Surgery

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ABSTRACT: ***Purpose:*** To enhance the safety and efficacy of surgical treatment of strabismus, we sought to measure and determine the ultrasound biomicroscopy (UBM) profile of scleral tunnels created with needles commonly used during strabismus surgery, to determine which needles are less likely to create the complication of scleral perforation.

Methods: Adult cadaver eyes were secured in a styrofoam head. Intraocular pressure was maintained between 15 and 21 mm Hg. Then S14, S24, S28 and TG100 needles were used to create scleral tunnels simulating those created during routine strabismus surgery. Ten scleral tunnels were created with each needle type at 3 different sites on the globe, for a total of 120 passes. The thickness of the sclera and the maximum depth and length of each scleral tunnel were measured using UBM.

Results: The mean tunnel depth below the scleral surface (±SD) was 0.43 ±0.11 mm, 0.37 ±0.09, 0.40 ±0.08 and 0.34 ±0.07 mm, for the S14, S24, S28 and TG 100 needles, respectively (P=0.002, One way ANOVA). For both the S14 and S28 needles, there was a "statistically significant" ($P \leq 0.05$) linear trend of an increase in the depth of the pass as the length of the pass increased (P=0.01 for the S14 and P=0.02 for the S28 {Pearson Correlation 2 tailed test}). A similar trend was found with the S24 needle but the trend was not "statistically significant" (P=0.35). No such trend was found with the TG100 needle.

Conclusion: Needle design had a definite impact on the characteristics of scleral tunnels created to simulate those made during strabismus surgery and may influence needle selection by the surgeon for different or various surgical circumstances, but the differences were not such as to predicate for or against the general use of any of these four needles for strabismus surgery.

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INTRODUCTION

Inadvertent penetration of the globe by through and through perforation of the sclera by a suture needle, is a widely recognized mis-adventure in strabismus surgery (1-3). The potential consequences of scleral perforation include endophthalmitis, retinal injury, posterior segment hemorrhage, cataract and retinal detachment (1,2,4).

Scleral perforation is most likely to occur during re-attachment of the extraocular muscle to the sclera with sutures. The sclera is a thin fibrous structure with a thickness ranging from 0.4 mm to 1 mm, depending on the location on the globe of the measurement (5). Although the incidence of scleral perforation has been studied before, most of the studies analyzed only the clinically recognizable or clinically suspicious perforations (1,2). In reality, scleral perforation may often go unrecognized until signs and symptoms of one or more of the all too serious aforementioned consequences appear (6).

Goldstein, Prepas & Conrad (7) evaluated suture tunnel characteristics based on histological analysis of 40 needle passes in the sclera of a rabbit model, which may not reliably simulate human surgery. They reported that a needle with an acute curve produced a shorter pass through similar depth compared with a shallow curved needle. A needle with a cutting edge on the inferior (bottom) aspect tended to produce a pass that was deeper than a needle with its cutting edge on the superior aspect of the needle. The use of spatulated needles with side cutting edges only is thought to have reduced the risk of scleral perforation (8).

See the Discussion, pages 106-108 for a more complete history of prior research.

Ultrasound Biomicroscopy (UBM) is a high resolution ultrasound technique that allows excellent visualization of the anterior segment of the eye (9). Previous studies have shown that UBM can accurately determine the inner limits of sclerostomies (9,10).

The aim of this study was to conduct UBM analysis of the scleral tunnel characteristics created in eye bank eyes by needles commonly used now during strabismus surgery (see Table, right, next page -->).

METHODS

Adult cadaver eyes were secured in a styrofoam head. Intraocular pressure was maintained between 15 and 21 mm Hg using a butterfly canula attached to an air filled syringe. Intraocular pressure was measured and adjusted as needed prior to each suture pass. Scleral tunnels simulating those created during strabismus surgery were created using S14, S24, S28 and TG100 needles. Ten scleral tunnels were created with each needle type at each of 3 different sites on the globe:

1. at a rectus muscle insertion;
2. 6 mm posterior to a rectus muscle insertion;
3. 10 mm posterior to a rectus muscle insertion,

for a total of 120 passes. A uniform standard was followed with each suture pass such that each needle was passed superficial enough to be seen

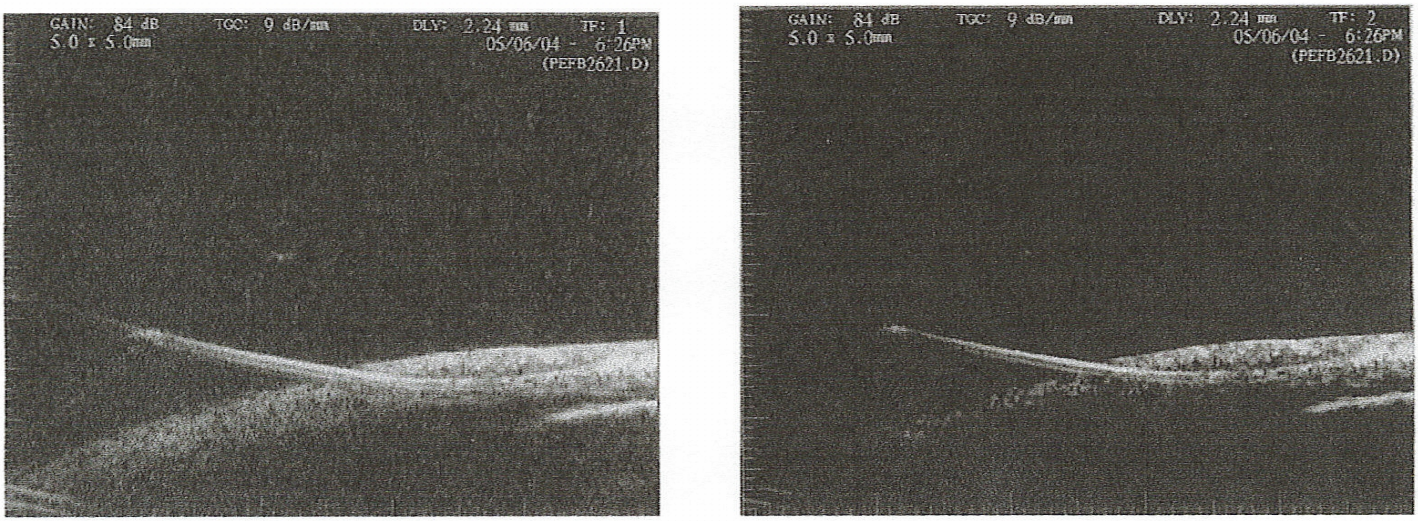

Figure 1 *(Hussein et al): Ultrasonic BioMicroscopy (UBM) images demonstrating a suture pass in the sclera of a human cadaver eye. The suture has been left in place during the ultrasound. (A, Left) no scleral perforation; (B, Right) note scleral perforation.*

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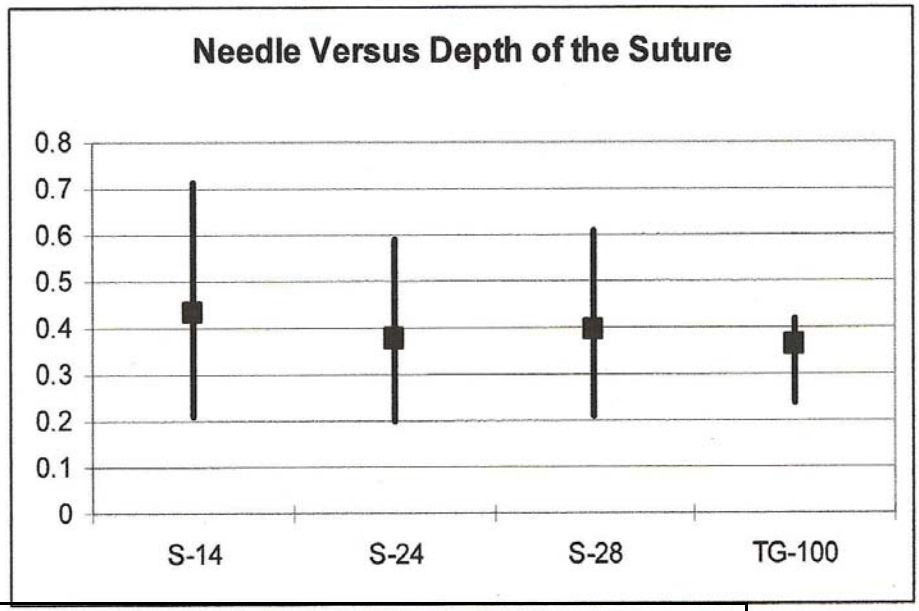
Table: Methods: Spatulated Suture Needles Commonly Used for Strabismus Surgery: Characteristics Manufacturer: Ethicon, Sommerville, New Jersey, USA

Type of Needle	S14	S24	S28	TG 100
Cross Section				
Point of Needle	Top	Top	Bottom	Top
Curvature (degrees)	112	90	164	97
Chord length (mm)	7.23	7.31	5.28	5.94
Radius (mm)	4.37	5.16	2.67	3.96
Thickness (mm)	0.33	0.33	0.2	0.2

through the sclera at all times. One surgeon, (MAWH), masked regarding the type of needle used, created all passes. The location of the pass and the type of needle used were randomized. The suture was left in the scleral tunnels and UBM performed on each tunnel. (See Fig 1, prior page)

The thickness of the sclera and the maximum depth and length of each scleral tunnel was determined from the UBM images using a scaled cursor. A suture depth/scleral thickness ratio was calculated for each pass. Measurements were performed by a technician who was masked regarding the specific type of needle used. Comparison of the mean scleral tunnel depth (measured at the deepest point of the scleral pass) for each of the 4 needle types was made using a one way ANOVA test. Trend lines were created and analyzed to correlate the depth and length of the scleral passes for each of the 4 needle types. The "statistical significance" of this relationship was tested using the Pearson correlation. Correlation was considered "statistically significant" at the traditional and conventional $p \leq 0.05$ level (2-tailed). A scleral "perforation" was considered present when the pass depth equaled or exceeded the scleral thickness. A "near perforation" was considered present when the pass depth equaled or exceeded 90% of the scleral thickness but was less than 100% thickness.



2 *(Hussein et al): Average depth (■) and range ¦ of depth al needle passes in human eye bank eyes.*

RESULTS

All suture passes met the published recommendations for minimal acceptable length and depth of 1.5 mm in length and 200 microns (0.2 mm) in depth (11).

One full scleral perforation (0.008%) occurred; this pass was created by an S28 needle. "Near scleral perforations" occurred 4 times (0.03%), twice by an S24 needle and once each by an S28 and S14 needle. Overall, the percentage of full scleral perforation and "near perforation" was 3.8%. Four of these passes were located at 10 mm from the muscle insertion while one pass, created by an S28 needle, was located at 6 mm from the muscle insertion.

There was no "statistically significant" difference in the pass depth at each of the 3 sites tested. The mean tunnel depth (±SD) was 0.43 ±0.11 mm, 0.37 ±0.09, 0.40 ±0.08 and 0.34 ±0.07 mm, for the S14, S24, S28 and TG 100 needles, respectively (P=.002,

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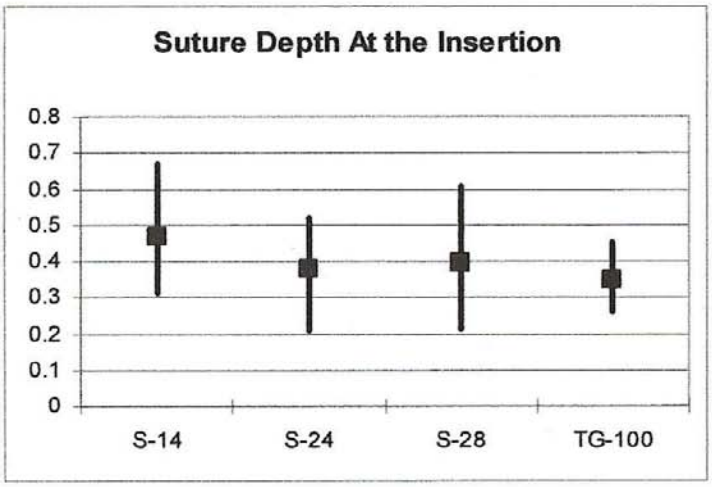

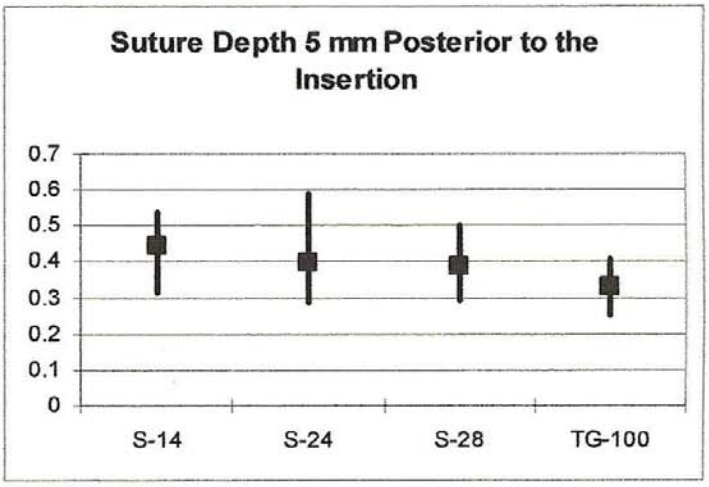

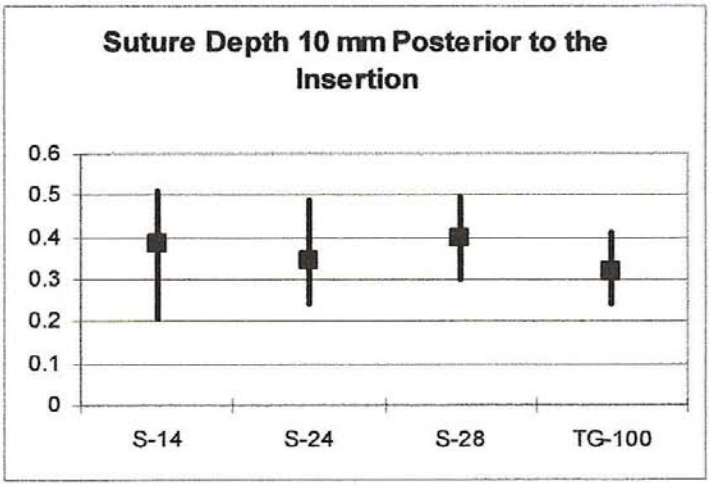

Figure 3 (Hussein et al): Results: Ratio *of the depth of the suture pass and scleral thickness of needles passed, average depth (■) and range ¦*
at the muscle insertion (top left);
at 6 mm from (posterior to) the muscle insertion (top, right);
at 10 mm from (posterior to) the muscle insertion (bottom, right).

One way ANOVA) <-see **Figure 2**). The depth of S14 passes was "statistically significantly" greater than those of the S24 (P=0.032, Turkey HSD), and the TG100 (P=0.001, Turkey HSD). When results were adjusted for the three different suturing locations, the results were "statistically significantly" different only for the 6 mm posterior to the insertion location (P=0.03, One way ANOVA). The number of passes at each location, however, was small. The pass depth/scleral thickness ratio and the average length of the suture passes are shown in **Figures 3 above and 4, right ->>**.
needles, there was a linear trend of increasing depth of pass as the length of the pass increased. This trend was greatest for the S14 needle. The opposite trend was found with the TG100 needle,

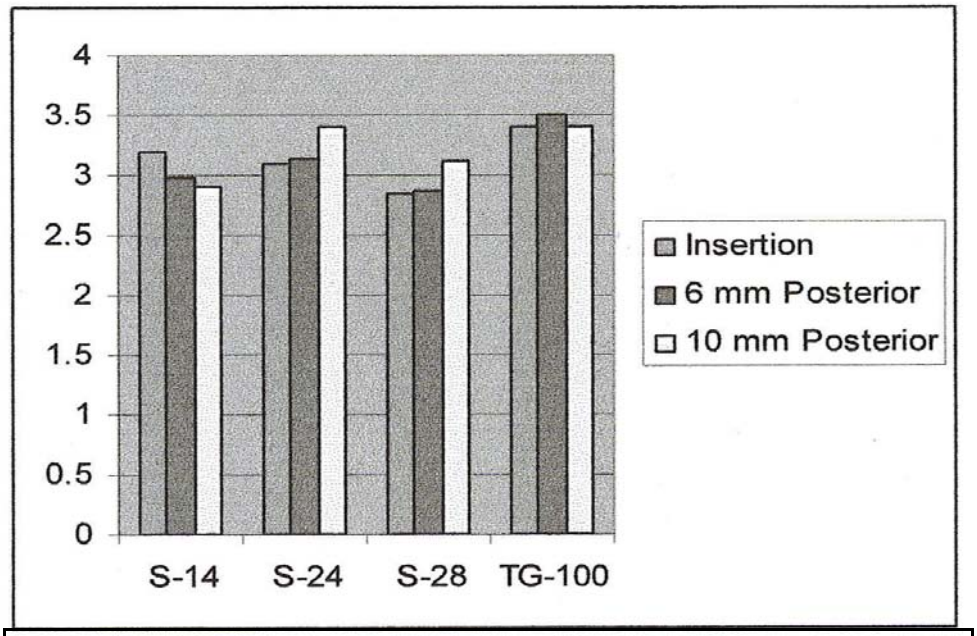

Figure 4 *(Hussein et al): RESULTS: Lengths of scleral tunnels created using four different needle types in human eye bank eyes at the muscle insertion, 6 mm posterior to the insertion and 10 mm posterior to the insertion.*

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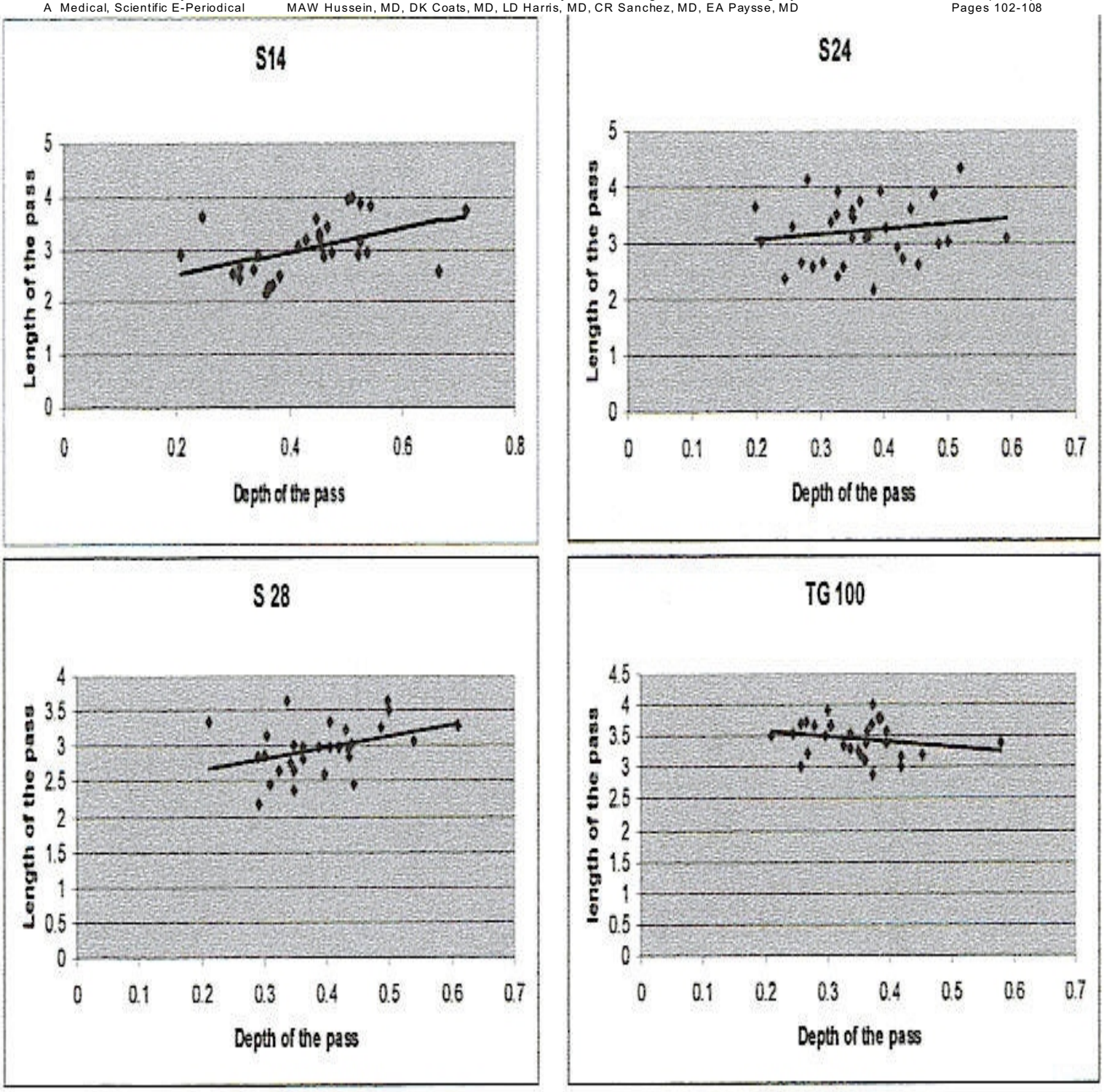

Figure 5 *(Hussein et al): RESULTS: Relationship between the length of the suture pass and the depth of the suture pass in human eye bank eyes. Note that except for the TG100, the depth of the pass tends to increase as the length of the pass increases.*

where the pass depth tended to decrease slightly as the length of the pass increased (**see Figure 5, above**). Using Pearson correlation these trends were "statistically significant" only for the S14 needle (P=0.011, 2-tailed test), and the S28 needle (P=0.026, 2-tailed test).

DISCUSSION

The true incidence of actual full and near scleral perforation during strabismus surgery is unknown (and will remain so), with a wide range of reported values from 0.03% to 2.8% (1,8,12-

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14). This large variation may, in part, be due to inconsistency in defining the occurrence of a scleral perforation and the fact that most scleral perforations are asymptomatic and may go unrecognized. Previously, perforations were attributed in part to the use of the reverse cutting needles. The introduction of spatulated needles is believed to have reduced the incidence of the scleral perforation (8). Despite advancements in the needle design, however, any scleral perforation during strabismus surgery still represents a serious hazard because of the potential consequential complications and may increase the risk of endophthalmitis and/or retinal detachment and resulting loss of vision.

Using a rabbit model and histopathology, Goldstein and co-workers (7) concluded that the S29 needle tended to create deeper passes than the S14 needles. The scleral characteristics of a rabbit's eye may not adequately simulate that of a human eye. Additionally, Goldstein evaluated the depth of the passes following sectioning of the sclera and histological staining. Histopathologic sectioning of the sclera may produce artifacts and distortions of the pass, thus evaluation of passes in a human eye bank eye by UBM may be a more valid experimental comparison.

Dang, Racu & Isenberg (8) found a higher risk of perforation with the S24 needle when compared to the S29 needle. It is important to note, however, that they were evaluating the incidence of clinically demonstrable scleral perforations, which may or may not reflect the actual characteristics of the scleral passes and incidence of perforations. Also, many different surgeons were involved in their study, another important potential limitation of their study.

Rather than relying on clinical evidence of scleral perforation in live patients, we evaluated tunnel characteristics using UBM, which allowed detailed analysis of each suture pass. This allowed us to evaluate both perforations and near perforations and to compare scleral tunnel characteristics created by the several commonly used needle types. The use of human eye bank eyes allowed a better simulation of actual human surgery, and allowed a single surgeon to create multiple passes in a short period of time. Although this study was not designed to analyze the incidence of clinical scleral perforation, our experimental results are consistent with and parallel clinical studies reporting a low incidence of scleral perforation when using spatulated needles.

Some important differences between the four needles tested were found. The S14 needle was found to create the deepest passes while the TG100 tended to create the shallowest passes. Pass depth tended to become deeper as the length of the pass increased for the S14, S24 and S28 needles. This finding may be related to differences in needle characteristics, including wire diameter, curvature, and the length (see again Table 1 on third page of this paper). The larger size of the S14 needle is even more apparent as it is passed more deeply into the sclera. The greater ability to visualize the needle as it is passed through the sclera, combined with its shallow curve, may encourage the surgeon to pass this needle more deeply into the sclera. **Figure 6 below** demonstrates the greater visibility of the S14 needle compared with the S28 needle

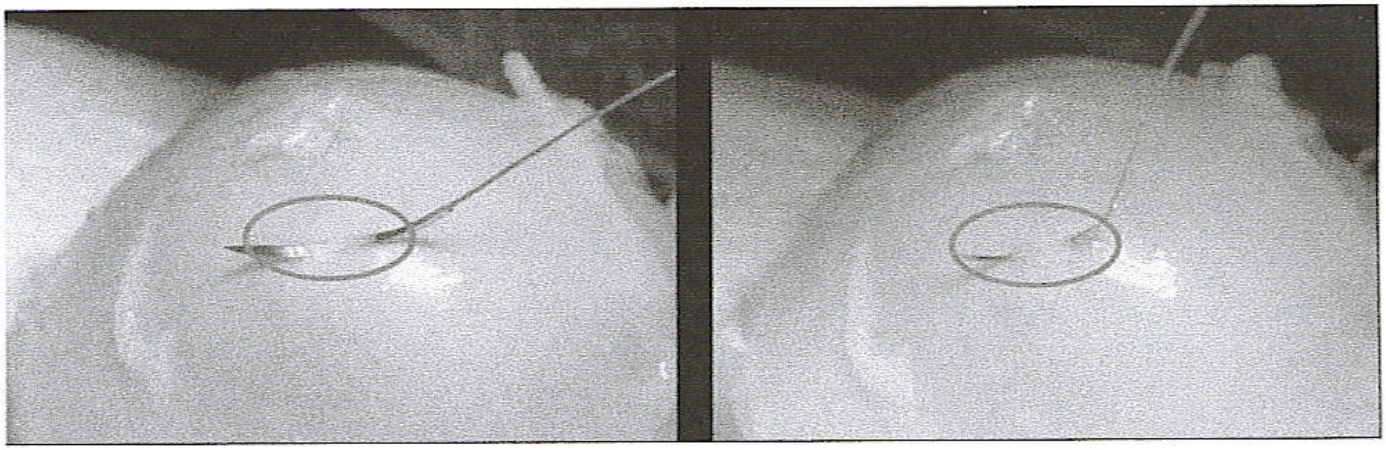

Figure 6 *(Hussein et al): An S14 needle (A, Left frame) and an S28 needle (B, Right frame) placed in the* ***same scleral tunnel,*** *demonstrating the notably greater visibility of the larger diameter S14 needle in the scleral tunnel. Such a difference and the implied safety thereof, may encourage the surgeon using the S14 needle to make deeper scleral passes and discourage the surgeon using the S28 needle from making equally deep passes.*

when each needle is placed in the same scleral tunnel. Reduced ability to visualize the smaller needles during the scleral pass may act to discourage the deeper passes by the surgeon.

This study was not designed to establish a safety profile for individual needles, but rather to evaluate tunnel characteristics associated with several needles commonly used in strabismus surgery to secure a muscle to the sclera. The surgeon's familiarity with the scleral tunnel characteristics created by each needle could impact needle choice and/or suture technique and could have an impact on the risk of scleral perforation. Each of the needles studied may have a role to play in strabismus surgery, depending on the techniques used by the surgeon, and the operative situation. For example, use of the S14 needle to secure a muscle to the thin sclera just posterior to the muscle insertion might be avoided in favor of the TG100 which tends to produce a more shallow pass. One the other hand, the S14 might be very useful for suturing a resected muscle to the insertion where the sclera is thicker. These and related decisions should be made by the surgeon at the time of surgery.

CONCLUSION

In summary, this study has demonstrated a low incidence of scleral perforation and near scleral perforation in a human cadaver eye model used to simulate scleral passes during strabismus surgery. Needle design clearly affects the characteristics of the scleral tunnel created during needle passes made to simulate the process of suturing a muscle to the sclera. Familiarity of surgeons with the scleral tunnel created by each needle type may aid strabismus surgeons in selection of needle design and with surgical technique.

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J.L. Mims, III, M.D.

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Strabology Report of the 33rd Annual Meeting of the American Association for Pediatric Ophthalmology and Strabismus

Westin Seattle, Seattle, Washington

April 11 – 15, 2007

Meeting Reported by: James L. Mims III, M.D.

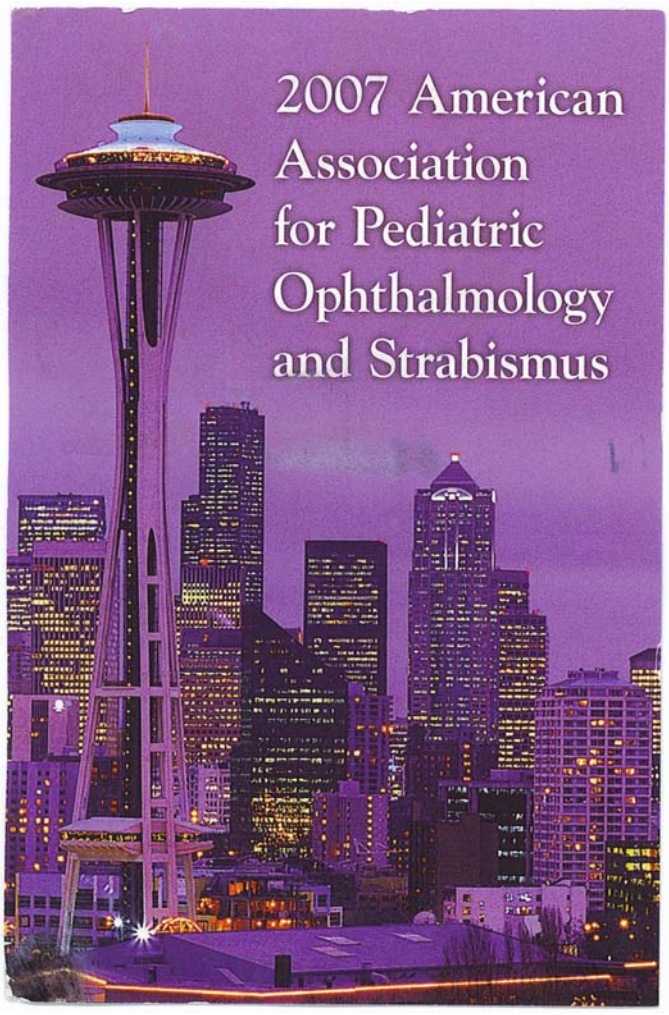
Secretary for Program: Sharon F. Friedman, M.D.

President: Christie L. Morse, M.D.

Scientific Meeting Coordinator: Maria A. Schweers,CO.

Hubel and Wiesel

How many thousand times have their names, together, tripped lightly off your tongue as you explained to parents and residents why it so important to treat esotropia at a young age? The second morning of the meeting, I went down to breakfast early, and found George Beauchamp MD chatting with a kindly older gentlemen who could have been sent over by central casting to play the quintessential grandfather. In his usual gentlemanly way George said casually, "Jim, have you met Dr. Hubel?" Massive Tsunami waves of goose bumps washed over my body as I blurted out, "THE Dr. Hubel?". Ever so casually, as though he were introducing one of his beautiful grandchildren, Dr. Beauchamp said, "I'd like you to meet David H. Hubel." (left side,next page.)



George Beauchamp MD, the Chairman of the Board of the Children's Eye Fouundation, told me later that he began with a simple idea. He wanted to enhance the prestige of the Marshall M. Parks, MD Medal for Excellence and it occurred to him that awarding it to Nobel Prize winners could accomplish that. Who better for Pediatric Ophthalmologists than Torsten N. Wiesel, MD and David H. Hubel, MD? He didn't even know if they were still alive, but pursued his dream and made it a reality when he presented Torsten N. Wiesel, MD and David H. Hubel, MD with the Marshall M. Parks, MD Silver Medal for Excellence on Thursday, April 12, the second day of the meeting. That afternoon, to a room so packed with fans that they had to take out the tables and bring in extra chairs, Hubel and Wiesel (right) reminisced about their 25 years of scientific research collaboration. Their tales of malignant galloping serendipity and incredible persistence (making one key observation after 9 hours of recording from a single cell in a cat brain!) held us all spellbound. If you want more of the same, purchase a book recommended to me by Gill Roper-Hall, DBOT CO, **The Brain and Visual Perception: 25 Years of Collaboration** by Torsten N. Wiesel, MD and David H. Hubel, MD,. Special note to George R.

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.Beauchamp, MD: **Thanks, George, you really outdid yourself!!** And look for his much anticipated book this summer, **Slaves to Medicine** by George R. Beauchamp, MD.

New Officers

The new President of AAPOS, with his term officially starting July 1, 2007, will be Edward G. Buckley, MD, taking over from the current President, Christie L. Morse, MD. The present Vice-President Elect, Bradley C. Black, MD, will move up to Vice-President, and the new Vice-President Elect will be C. Gail Summers, MD. (Note: Summers and Morse teamed up to send letters to all members of the American Academy of Ophthalmology listed in their roster as having Pediatric Ophthalmology as a primary focus, and to all known previous Fellows in Pediatric Ophthalmology, specifically and individually inviting them to become dues paying members of AAPOS. The result of this effort led to 63 new members, double the number of new members for the previous year.) Steve Rubin, MD who has done such a wonderful job of getting us better interest on all our accounts, will be replaced as Treasurer by another computer and math whiz, Constance "Connie" E. West, MD, author of the optics cram book used by many new ophthalmologists sitting for the boards, **Last Minute Optics**. David K. Epley, MD is the New Director at Large.

Costenbader Lecture

John D. Baker, MD presented the 34th Annual (the first one was given at the Costenbader Club the year before the first AAPOS Annual Meeting) Frank D. Costenbader Lecture, "Natural History of Treated Childhood Intermittent Exotropia and "Causes" of Adult Exotropia". Baker presented a 20-year follow-up of 30 pediatric patients with intermittent exotropia (X(T)). Twenty-eight of 30 had received bilateral lateral rectus recessions (LROU) and two had received a recess-resect of the extraocular muscle of one eye (R&R). Six required a second surgery for undercorrection [Ref: Mims III JL. Outcome of 5 mm resection of one medial rectus extraocular muscle for recurrent exotropia. BV&SQ 2003;18:143.], and one required a bilateral medial rectus recession (MROU) for consecutive esotropia. Two of the 30 required a third surgery. The average age of his previously pediatric patients was now 29.4 years. All of those who were doing well as teenagers were also doing well in regard to their strabismus as thirty-year-old former patients of Dr. Baker. Among the adults presenting as adults, 32% had noticed exotropia as a child.

Leonard Apt Lecture

The 2007 Leonard Apt Lecture was delivered by Carol D. Berkowitz, MD, FAAP and titled: Child Abuse Prevention: How Many Ounces Will It Take. From her Abstract: "... The time has come to develop programs aimed at reducing the likelihood that children will be harmed by their caregivers. Programs ... have been developed ... The challenge will be to see that these programs are more widely implemented."

First Prizes: Presentations That Will Impact My Clinical Practice

There were many surgical pearls at this meeting. For this author, two were new and important. In the workshop "Difficult Problems Strabismus" ably moderated by David A Plager, MD, Andrea Molinari, MD from Quito, Ecuador, had a nice slide to illustrate the Queré test, a test for contracture of the medial rectus. The case she was presenting was a persistent 6th N palsy after a motor vehicle accident (MVA) in a 22 year old male. She did a Scott Foster lateral transposition of the vertical rectus muscles with lateral fixation sutures and the question was whether to recess the antagonist MR in the same eye. Scott Foster, MD generally does not recommend this because (1) it can produce an overcorrection (2) it can limit adduction which the Scott Foster alone generally will not. The Queré test is performed after the suture is in the tip of the MR and after it is disinserted. The tip of the normal (non-contractured) MR can easily be pulled laterally (by grasping the sutures in the tip of the muscle) to the extent that the tip of the muscle is over the center of the pupil. She demonstrated a positive Queré test in her slide in that the tip of the MR could not be easily pulled more temporal than the nasal limbus. This told her that the MR should be recessed, which she did, and the (initial, at least) result was excellent.

Megumi Izuka, MD and Burton Kushner, MD provided another important pearl in their paper emphasizing the importance of severing the

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Frenulum that connects the inner surface, the ventral surface, of the SR and the outer surface, the dorsal surface, of the superior oblique tendon. (There is another Frenulum, also important, which connects the outer surface, the dorsal surface of the SR with the inner surface, the ventral surface, of the levator.) Izuka and Kushner measured the deflection of the SO tendon after disinsertion of the SR with temporary suspension 6, 8, 10, 12, and 14 mm from the SR insertion in random order before and after cutting the Frenulum between the dorsal surface of the SO tendon and the ventral surface of the SR muscle. They found a one to one correlation between the posterior movement of the SO tendon and the amount of SR recession for recessions up to 10 mm. [I am embarrassed to report that in performing about 80 bilateral SR recessions 10 mm with 3 mm of nasal transposition for DVD, I have produced two iatrogenic Brown's syndromes which required subsequent partial advancement of the offending SR. I shall certainly be more careful about severing the Frenulum on the ventral surface of the SR in the future!

Two other pearls for the office examination were impressive. In the Adult Strabismus Workshop ably moderated by Arthur L Rosenbaum, MD, David L Guyton, MD almost convinced me to spend the $400 for the new Lancaster Red-Green test being made by Richmond Products (in which I have no financial interest) with his visually spectacular presentations, but the most immediately useful pearl came from the floor from Maury Marmor, MD. Marmor advised first putting up prisms to correct for the horizontal and vertical deviations and then to use the largest letter on the BVAT or similar. The O on the BVAT is a perfect circle. If the patient can fuse the O, but not the E with the prisms compensating for the vertical and the horizontal deviations, then you know that you must correct for torsion. (Guyton reminded everyone that about 4 degrees of torsion can usually be compensated for sensorially and another 4 degrees can usually be tolerated by the patient who will build torsional fusional amplitudes over time.)

The other pearl for the office examination was provided by Cindy Pritchard, CO and George S Ellis Jr ,MD. In 2005 they had previously presented a retrospective analysis of patients diagnosed with pseudostrabismus. Twelve percent presented later with true strabismus. For that group, no risk factors could be identified that would predict who would prove to have a true strabismus later. They modified the alternate cover test with its standard 3-5 seconds of occlusion of each eye to extend the time of occlusion to a minimum of 15 seconds before alternating the cover. Using this approach, they discovered 4 children with true ET among 64 patients who previously would have been labeled as pseudoET.

The PEDIG provided another change to my practice; I certainly shall be offering patching 2 hours daily with video games or other visually demanding work to older children 7 to 12 years old who have never patched before and who have worse than 20/40 in the amblyopic eye. Fortunately, such patients are rare in my practice.

More First Prizes; Important New Basic Science Advances

The most impressive genuinely new basic science advance was summarized in a poster by David A Johnson, MD PhD, who found significant permanent scotomas (not just facultative scotomas) in the dominant eye of amblyopes using a scanning laser ophthalmoscope (already nicely published in **Binocular Vision & Strabismus Quarterly** 2007; 22 (No.1):17-48.)

The other "new" basic science advance was previously presented as part of the Marshall Parks Lecture at the AAO meeting in Las Vegas by Alan Scott, MD. At this AAPOS meeting at the Difficult Problems Strabismus workshop, he presented another case for whom he strengthened the lateral rectus by injecting the same Bupivacaine that cataract surgeons have used with tightening and hypertrophy of EOM reported as complications. In the classic case, the IR receives an inadvertent injection during an attempted retrobulbar anesthetic injection,.and the patient develops a hypotropia in the primary position worse in downgaze due to hypertrophy and worse in upgaze due to restriction. Scott has been using the side effect of hypertrophy to strengthen the muscle receiving the injection. He points out that the injected muscle is only briefly paretic but permanently injured. In response to this injury, the muscle fibers begin undergoing hypertrophy and continue undergoing

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hypertrophy beyond what would be necessary to restore the pre-injection strength of the muscle. Instead of Botox®, he calls this use of the standard Bupivacaine concentration "Myotox". Because this is simply a new use for a drug already on the market, there is no way for him personally to profit from Myotox, but, eventually, many of our patients may benefit. Because a large volume, 1.5 to 2 ml of the standard 0.75 concentration seems to work better than smaller, more reasonable volumes of injected liquid, perhaps the company making Bupivacaine could make a more concentrated form of Bupivacaine and market it (at a higher price, no doubt) as Myotox®. In the case he presented, he reduced a symptomatic recurrent 10 ET to an asymptomatic 4 ET with one injection. It should be noted that Alan Scott, MD is incredibly skilled at injecting Botox® via a hollow EMG needle with auditory signals from a portable EMG device with speaker, all of his own design.

Esotropia

Twenty-seven years ago, at the 1980 AAPOS meeting. the first time we went to the Hotel Del Coronado in San Diego, I asked the program chairman, Otis Paul. MD, if I could present a scientific poster, since there were none. I created a small poster on a poster board, and set it on a tripod. Since it was the first scientific poster ever presented at an AAPOS meeting, I guess it was poster # 1 for that meeting. The poster described the use of a muted headlight producing a corneal reflex. The corneal reflex made it easier to pick up the correct loose prism the first time and left both hands free for the cover test.

At this year's meeting, 2007, I had the privilege of presenting poster # 1 again for the first time since 1980. Wow! Twice in one career! [Note tongue planted firmly in cheek.] The great thing about having a poster with a low number is that a larger number of thoughtful colleagues come by and visit and offer genuinely useful constructive criticisms. Briefly, we had 10 years of measurements of the angle of ocular alignment measured at stable Stage II of general anesthesia, all carefully and naively measured with the surgeon's fiberoptic headlight and a sterile prism bar using the classic modified Krimsky technique. As Guyton has pointed out, the deviation is usually symmetrical under anesthesia. (Guyton DL. The 10th Bielschowsky Lecture. Changes in Strabismus Over Time; The roles of vergence tonus and muscle length adaptation. BV&SQ 2006; 21:81-92.) I simply moved my head to one side a bit to put the reflex in one eye into the normal position. The prism bar was then used to make the reflexes symmetrical and simultaneously to measure the size of the deviation with Krimsky accuracy. This technique for measuring the angle under anesthesia is very similar to the technique described in the first (1980, San Diego) poster and hopefully these skills made the intraoperative angle measurements more accurate.

These data were gathered carefully and naively in the vain hope that the angle under anesthesia would stay in a multivariate analysis to predict the effect of the surgery and thereby increase the likelihood that the baby would be orthotropic after the first surgery. Mims and Miller defined the difference between the preop' angle measured in the awake child in the clinic before surgery and the angle measured under anesthesia as the exoshift under anesthesia. They found the exoshift under anesthesia undiminished at the second in comparison to the first surgery among 27 infants with undercorrections or late recurrent esotropia at the second surgery, but substantially reduced among 17 infants orthotropic horizontally at the second surgery who were receiving the second surgery for DVD or OAIO. Among a group of 16 late consecutive exotropes, the exoshift had reduced to normal as defined by a separate group of 21 children orthotropic horizontally receiving their surgery for superior oblique palsy.

Miller and Mims concluded that MR recessions successful in reducing infantile ET to near orthotropia reduce the preop' MR hyperinnervation substantially, with some residual hyperinnervation perhaps needed to compensate for contracture of the antagonist LR (and perhaps for the reduction of the torque vector for the larger recessions). In contrast, however, among infantile esotropes requiring a second surgery for a recurrent ET averaging half the size of the original deviation, previous MR recessions did not result in any reduction in the initial MR hyperinnervation of infantile esotropia. The small residual hyperinnervation required to compensate for contracture of the antagonist LR to

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maintain orthotropia reverts to normal in consecutive exotropia.

There were several other presentations on esotropia. James R Drover, PhD, David R Stager Sr, MD, Sarah E Morale, BS, Joel Leffler, MD, and Eileen E Birch, PhD devised the Infant Developmental Skills Survey, a 25-item questionnaire designed to assess 10 sensorimotor and 15 gross motor skills. The questionnaire was completed by 47 sets of parents before and after successful surgery for infantile ET. Prior to having their eyes straightened, infantile esotropes were delayed in their achievement of developmental milestones. Following successful surgery, they showed rapid motor development and within a few months demonstrated motor skills comparable to those of normal children. [They caught up. Of course the placebo effect of surgery could be a confounding factor in this study. I prefer the study performed by Maynard Wheeler, MD 30 year ago. Wheeler and co-workers placed a video camera above infants sitting in the chair in the middle of a play table and had them play with various toys that required stereopsis to play with skillfully. They took the video recordings before and after successful surgery for infantile ET, and showed them to developmental psychologists in a blinded fashion. (Because the camera was above the patient, the evaluating psychologists could not tell whether the baby was cross-eyed as they viewed the tape.) The psychologists could reliably pick out which infants were orthotropic and which were preoperative and still esotropic.]

Another poster from the Retina Foundation of the Southwest by Joost Felius, PhD, Christina S. Cheng, BS, David R Stager Sr, MD, Xiaohong Wang, MD, and Eileen E Birch, PhD reported the use of an infrared eccentric photoscreener to measure gaze position and refractive status while infants watched accommodative targets at distances of 1.0 to 0.25 meter. The response AC/A ratio was defined as the measured change in convergence per measured change of accommodation. A mean response of 0.7 meter-angle per diopters was found in the normal group; in the infantile esotropes, 60% showed abnormally high AC/A ratio before surgery vs. 9% after surgery.

Nathan Hamaker, MD, Scott E. Olitsky, MD, Denise Hug, MD, Laura P Smith, MD, Merrill Stass-Isern, MD, and Timothy Hug, OD placed the full hyperopic correction (1% Cyclogyl®) in a trial frame on 23 acquired esotropes. 10 were still ET under the influence of both the Cyclogyl® and the glasses, and these 10 were still ET after one month of wearing the glasses. [These 10 could have been scheduled for surgery at the first visit, according to their results.] Nine others were ortho in the combination of the full hyperopic correction in spectacles and remained ortho after 4 weeks of wearing the full hyperopic correction. Four others were ortho under the influence of both the glasses and the Cyclogyl®, but were ET on returning after 4 weeks of wearing the full plus correction. These 4 could be explained by the fine print in the poster not seen in the abstract; these investigators arbitrarily added one diopter of hyperopic correction to whatever they found on retinoscopy before performing the alternate cover test with the patient under the influence of both the Cyclogyl® and full amount of hyperopia found on retinoscopy PLUS an arbitrary additional diopter of power in the trial frame. Their test, performed on the first visit, was 100% specific for determining which patient could be scheduled for surgery at the first visit, but 29% evaluated using their technique with the tentative conclusion that the ET would be controlled with hyperopic spectacles would prove to have needed surgery after all on the second visit.

Shaival S Shah, BA, BS and Ashish M Mehta, MD examined 115 siblings of 81 children with accommodative esotropia (what Everett Moody, MD calls a "tagalong visit"). Among these siblings, 15% had strabismus, 37% had hyperopia above +3.00, and 9% had anisometropia of one or more diopters. Myung Mi Kim, MD and Tae Yoon Lii, MD of Daegu, Korea, reviewed 40 patients with accommodative esotropia who became orthophoric without glasses and 58 who had a persistent ET without glasses. All were older than age 10 years, all had at least 5 years of follow-up, and all had hyperopia of at least +2.00 spherical equivalent. Factors predicting successful weaning of glasses over time were smaller distance deviation (mean 24 vs 30 ET), less hyperopia (avg +3.9 vs 5.3 diopters hyperopia, and shorter time between initial Rx of glasses and initiation of weaning were predictive of successful weaning of glasses.

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To understand why Jack Baker, MD in his Costenbader lecture commented that among his group of 5 Pediatric Ophthalmologists only 6 new cases of infantile ET had been seen in the previous 12 months, you have to know which ethnic groups in the USA are reproducing themselves and which are not. In the latest issue of J AAPOS we find that intermittent exotropia is much more common than infantile esotropia in Singapore (Ling Y. Pediatric ophthalmology in Singapore. J AAPOS 2007; 1:3-4), precisely the same genetic pool that provided 90% of the gene pool for the American "Indians", and therefore 50% of the gene pool of Mexican-Americans who are doing such a fine job of producing the beautiful children who comprise 80% of my practice that demographers refer to the change as "the browning of America." The folks having children have more X(T) than infantile ET in their genes. Mystery solved.

Don't believe it's that simple? Check out the data from Brian G Mohney, MD, Amy E Greenberg, BS, and Nancy N Diehl, BS in Poster 6 from the blue-eyed blonde Nordic population of the Mayo Clinic in Rochester, Minnesota. These tabulators found that among 632 cases of childhood strabismus, 61% were ET, 32% were XT, and 7% were hypertropic. This is precisely the group with one grandchild for every four grandparents. (like the family so compassionately depicted in the Johhny Depp version of Willy Wonka and The Chocolate Factory). Among those with ET in the Mayo Clinic population, one-third had infantile ET. [In my practice, I do see infantile ET born to relatively large non-Hispanic "white" families among a subgroup whose sense of values leads them to live in relatively small towns 30 to 70 miles north and east of San Antonio and have lots of babies.]

Bo-Young Chun, MD and Jung-Yoon, MD compared 43 patients with ET and 2 years of patching for amblyopia with 43 controls with ET and no patching. They found a reduction in angle from 31 ET (range 15 to 50 ET) down to 24ET (0 to 45 ET) ($p<0.01$). Seo Wei Leo, MD and Monte A Del Monte, MD treated one patient with myopic (-11.50 sph) strabismus fixus with recessions of the MR and IR and looped together the SR and the LR. with the important addition of lateral fixation sutures to the edges of the SR and the LR where they fell on the globe once the loop of non-absorbable suture was placed. In conversation at the poster (not reported in the poster) Dr. Leo revealed that she had also operated another patient in Singapore with only the loop connecting the SR and the LR and this failed at one year follow-up. Apparently, the lateral fixation sutures (rather like the Scott Foster) are important for long term stability in these thankfully rare cases.

Extrapolating from this now recognized mechanism of the inferiorly slipped LR in myopic strabismus fixus. (The globe is so large there simply isn't room for the LR in its normal position, so it slips inferiorly where its action is weakened enough to produce the esotropia.), Robert A Clark, MD, Andrew E Choy, MD, and Joseph L Demer, MD, PhD propose that a similar mechanism explains some cases of residual ET after a MROU that should have been adequate. They reported 4 children, 6 mos to 2.5 years old, only one of whom had high myopia, whose recurrent ET after MROU was accompanied by intraoperative observations of inferior displacement of the LR retroequatorially. (As the resection is done, the posterior path of the LR seems inferiorly directed in their photographs.) These surgeon-authors actually added posterior fixation sutures to elevate the resected lateral rectus muscles. [I am opposed to this; the retroequatorial posterior fixation suture means that this muscle can probably be never operated again, a heavy penalty in treating consecutive exotropia! Their series of 4 patients is, of course, a completely uncontrolled series; they probably would have done just as well with simple resections and without the retroequatorial myopexies.]

Tamara Wygnanski-Jaffe, MD, Beatrice Zwilling, and Hana Leiba, MD looked for increases in cylinder power in 108 children with hypermetropia with and without esotropia for 3.9 years. In the youngest age group (less than 2 years old), the mean increase in cylinder power was 0.3 D. Among the children 2 to 4 years old, the mean increase was 0.2 D. Among children over 4 years of age, the mean increase in astigmatism was 0.08D. These authors declared that this much change was of no clinical significance.

Magdalene D Israel, MB BS DO(Ophth), Anupam Deka, BS (Opto) from northeastern India produced orthotropia in 16 of 19 patients with ET with only a unilateral MR recession of 6 mm. The

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average pre-op ET was 30 to 35 PD in these patients, and virtually everyone looking at and discussing the poster said they would not expect this much effect from a unilateral 6 mm recession. Significantly, one of these non-believers was from far Northern India. [Are children's eye globes smaller in diameter in Northern India than in Southern India?]

Exotropia

In a poster in which the presenters concluded that "mother may not always know best", Christine J Powell, Deborah Buck, Michael P. Clark, and Sarah R. Hatt of Newcastle-upon-Tyne used a questionnaire to assess the impact of X(T) on the quality of life as perceived by the child versus as perceived by the parent. The children in their study were more aware of the problem ("Do other children tease you?") than the parents. [This does not match my experience; usually the parent is bothered more than the child unless the problem is merely a high exophoria always controlled and referred to my office by an alert optometrist or an unusually knowledgeable pediatrician.].

In another poster, Jeff A McKenzie, BS, Jason A Capo, BS, Brian G Mohney, MD, Kevin Nusz, MD, Nancy N Diehl, BS, and James P Burke, PhD of the Mayo Clinic studied the medical records of all children <19 years old diagnosed with X(T) in a single county surrounding Rochester, Minnesota, from Jan 1, 1975 through Dec 31, 1994, to determine how many subsequently developed psychiatric disease. Each case was paired one-to-one with a non-strabismic birth and gender-matched control. Incredibly, a mental health disorder was diagnosed in 98 of their 183 X(T) patients (53.6%!) followed to a mean age of 22 years. This high 53.6% was significantly more than 30.1% subsequent mental health disorders found among the controls ($p<0.0001$). The psychiatric diagnoses ($p<0.0001$), use of psychotropic drugs ($p=0.0017$), and mental health ER visits ($p=0.0001$) were all significantly more common among exotropic patients compared to the non-strabismus controls. [This does not match my impressions nor those of Dr Baker, but we haven't done this type of study on our X(T)'s. Why does there seem to be do much mental illness in Rochester?]

David A Leske, MS, Brian G Mahoney, MD, Sarah R Hyatt, DBO, and Jonathan M Holmes, BM BCh studied 13 patients with X(T), ages 3 to 13 years for level of control at different times of a single day a minimum of 4 times in one day, a minimum of 2 hours interval between measurements, and according to a scale of control of their own devising. Seven of 13 patients (54%) showed no change in distance or near control throughout the day, while the remaining 6 (46%) demonstrated significant changes throughout the day. Variable patients changed by as much as 3 levels on their scale, including phoric to spontaneously tropic, and vice versa. **Significantly, the distance angle did not change during the day in any patient** [their most valuable single finding].

In another study based on the assumption that the level of control of X(T) is important in deciding when to operate, Phillip W Laird, Sarah R Hatt, David A Leske, and Jonathan M Holmes induced convergence stress in 25 visually normal adults with 40 PD base out prism with stepwise reduction of 5 PD to 20PD, with stepwise reduction of 2 PD down to zero with measurement of distance stereoacuity using the Frisby Davis Distance, Distance Randot, and distance binocular visual acuity at every step. They found that the transition from non-fused to fused was accompanied by a gradual recovery of fine stereoacuity in most of their (all non-strabismic) subjects. Because this degradation of stereoacuity did not correlate with reduced binocular visual acuity, they concluded that accommodative convergence may not be recruited to restore and maintain binocularity and they hypothesized that distance stereoacuity may be a useful method to monitor for deterioration in X(T). [Because large 9 or 10 mm unilateral recessions in children ages 18 months to 7 years routinely work so well with an extremely low incidence of consecutive exotropia (1 consecutive esotropia in a personal series of 200), the whole issue of level of control has become irrelevant in my practice. If the parents are seeing the deviation, then it is safe to proceed to an 8.5 to 11 mm recession of one lateral rectus.]

Finally, this same group reported significant improvement in distance stereoacuity measured with the Frisby Davis Distance in a group of 10 patients with X(T) and poor distance stereoacuity pre-operatively ($N=14$, $p=0.004$).

Yoonae A Cho, MD PhD, Kyun-Hyung Kim,

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MD, and Young-Woo Suh, MD of Seoul, Korea, reported the long term outcome (6–168 mos, average 30 mos) of X(T) surgery in 585 children who received patching of the dominant eye 2-3 hours daily for 6 mos preop' and at least 6 mos postop'. They obtained orthotropia in 93.3% at six mos and 63.3% at 4 years after surgery. Because their results were better than Maruo et al of Japan (Maruo T, Kubota N, Sakaue T, Usui C. Intermittent exotropia surgery in children: Long term outcome regarding changes in binocular alignment. A study of 666 cases. **BV&SQ** 2001; 16:265), they concluded that the 2-3 hours of daily patching was having a significant effect. [Obviously, this is one place where a controlled, single blind study with random assignment to patching or no patching would be required to prove the matter.]

Richard A Saunders, MD presented 11 patients with X(T) operated at an average age of 17 months with LROU with reduction of 1 mm from standard tables for children under 18 mos of age. 3/11 required a second surgery. 40 arc sec stereo was obtained in 3 patients, with 100 arc sec in 2, 140-400 arc sec in 2, and none (not even gross stereo) in 3. Reviewer Burton Kushner, MD pointed out that this study did not prove that early surgery for X(T) provided a better sensory result, but did demonstrate that an excellent sensory result could be obtained with early surgery. [Will someone with hundreds of cases of X(T) operated prior to age 5 years with 8.5 to 11 mm recession of one LR please check their stereo, etc. There seems to be a need for this.]

Hyun Taek Lim, MD, David R. Smith, MD CM FRCSC, Stephen P Kraft, MD, FRCSC, J Raymond Buncic, MD CM FRCSC identified 52 children (mean age 8 years) with X(T) and DVD. Most of their cases showed an increase of DVD on ipsilateral head tilt. They advised operating only for the XT in this context, just as we all learned in our Fellowships.

Three additional presentations covered more esoteric aspects and etiologies of exotropia. In a return to a practice which I have always regarded as somewhat barbaric, Ayman Al Khaier, MSc FRCSEd, Emma Dawson, DBO, and John P Lee, FRCS FRCOphth of Moorfields used traction sutures through the insertions of the vertical rectus muscles and through silicone tubes (nasolacrimal intubation tubes) placed on the outer surface of the eyelids in 25 patients with 3rd N palsies, leaving the sutures in place an average of 6 weeks. [For children with congenital 3rd N palsies, a more feasible approach is large 13 mm recessions of both lateral rectus muscles with tenotomy of the superior oblique on the affected side.] Andrew R Jones, MRCOphth, Patrick Watts, FRCOphth, Robert F Walters, FRCOphth, and Michael Drage, FRCA reviewed 5 patients who presented with ocular motility defects after surgical treatment of trigeminal neuralgia. The 3 patients who had received microvascular decompression of the trigeminal ganglion recovered without strabismus surgery in 5 to 8 months, Of the 2 patients who had been treated with percutaneous controlled radiofrequency trigeminal rhizotomy, one recovered from a 3rd N palsy at 6 months post-op, and the other has persistent 3rd, 4th, and 6th, N palsies with more than 6 months followup. Finally, Steven Ortiz, MD and Mark Borchert, MD reminded everyone to consider pediatric ocular myasthenia gravis among children presenting with blepharoptosis and strabismus. Their series of 21 patients presented with a mean age of onset of symptoms of 28.7 months. The initial presenting sign was blepharptosis in 95% and strabismus in 76%, with exotropia occurring most frequently.

War is Declared Over the Inferior Oblique

The battle lines were drawn in the most recent (February 2007) issue of the Journal of AAPOS when Forrest J. Ellis MD in an editorial challenged the idea that the neurofibrovascular bundle becomes a new origin of the inferior oblique (abbreviation: IO), when the IO is recessed and anteriorized (abbreviation: RATIO). (Ref. Ellis FJ. The pen, the pencil, and the inferior oblique**. JAAPOS** 2007;11:7-9). Forrest J. Ellis MD is the son of the much beloved Forrest D. Ellis MD who was Helveston's partner for many years in Indianapolis and who played a major part in the training of residents and Fellows. Ellis the younger, begins in his editorial by being unnecessarily desultory (insulting) in calling RATIO a "J-deformity." He should know better because the original term "J-deformity" was used by Helveston to describe a strabismus pattern resulting from inadvertently bringing the mid-portion of the IO forward as part of a LR resection performed without adequate separation of the inner surface of the LR from the outer surface of the IO [another Frenulum?].

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Since this was a complication of an inadequately performed surgery, a term with an insulting connotation (Surgeon, you have deformed your patient!) was appropriately coined as typical of the clear writing style of Dr. Helveston. Simply using the universally recognized term "recession and anterior transposition of the IO" (RATIO) would be less antagonistic.

Both in a paper written in his Fellowship with David Guyton MD and in this editorial,FJ Ellis accurately discerned the cause of anti-elevation syndrome (abbreviated AES) (Stein LA, Ellis FJ. Apparent contralateral inferior oblique overaction after unilateral inferior oblique muscle weakening procedures. **JAAPOS** 1997; 1:2-7.) This was the first paper published in the then-new Journal o AAPOS, and the clever analysis in this paper makes it a classic and a treat to read even today. The tipping point, the most important part of the analysis in this 1997 paper was made possible because of the previous courage of BVQ editor Paul Romano MD MSO in publishing a paper (Elliot RL, Parks MM. A comparison of inferior oblique muscle weakening by anterior transposition or denervation-extirpation. **Binocular Vision Eye Muscle Surgery Q** 1992; 7:205-210.) that had been rejected from several other journals because it seemed not to make any sense. (personal communication from one of the authors of this paper, Richard L. Elliot MD who told me about the multiple rejections of this paper at lunch at the start of the 2000 AAPOS meeting at the Hotel Del Coronado in San Diego). In this paper by Elliot and Parks, denervation extirpation was performed in one eye and RATIO was performed in the other eye in a series of patients and, incredibly, they found that the eye that received the denervation extirpation demonstrated 67% recurrent inferior oblique overaction in comparison to the eye that had received RATIO. FJ Ellis accurately discerned that this made no sense at all unless the RATIO was causing the IO overaction in the other eye as a *secondary* overaction. He extends his analysis in the just-published editorial in JAAPOS to apply probably correct criticism of the landmark paper by Parks in which Parks performed asymmetric IO Surgery and came to conclusions about which IO weakening procedures were best. (Ref. Parks MM. The weakening procedure for eliminating overaction of the inferior oblique muscle. **Am J Ophthalmol** 1972; 73:107-22) We all owe a dept of gratitude to FJ Ellis for making this conceptual contribution. It is probably simply fallacious to attempt to determine which IO weakening procedure is the best by doing asymmetric surgery; the procedure performed on the fixing and abducting eye can produce a *secondary* overaction of the contralateral IO.

Ellis, the younger, goes astray, however, in ignoring the entire history of the development of RATIO. Elliot, Leonard Apt, and Mims III simultaneously made the observation in the mid-1980's that RATIO would instantaneously eliminate DVD and/or prevent the future development of DVD. Mims published first, initially with a letter-to-the editor in response to Bremer, Rogers, and Quick's paper reporting primary position hypotropia after unilateral anterior transposition of the inferior oblique (Bremer DL, Rogers GL, Quick LD. Primary position hypotropia after anterior transposition of the inferior oblique. **Arch Ophthalmol** 1986; 104:229-232.) (Mims III JL. Benefits of bilateral anterior transposition of the inferior oblique. **Arch Ophthalmol** 198; 104:800-802) and then with an "expedited" publication: Mims III JL, Wood RC. Bilateral anterior transposition of the inferior obliques. **Arch Ophthalmol** 1989; 107:41-44. [I always suspected that Paul Romano MD MSO influenced Morton Goldberg MD, then the editor of Archives of Ophthalmology, to make it an "expedited" publication. Thanks, Paul.] The next major event in this history was David Stager Sr MD following his son, David Stager Jr, MD, who at that time was a freshman in medical school, back into the anatomy labs to produce his classic AOS thesis describing the neurofibrovascular bundle of the IO. (Stager DR. The neurofibrovascular bundle of the inferior oblique muscle as its ancillary origin. **Tr Am Ophth Soc** 1996; XCIV:1074-1094.) This was impressive for its innovative use of transducers to demonsrate the stoutness and strength of the neurofibrovascular bundle. **It should be noted that not one of the references cited above in this paragraph appear in FJ Ellis' editorial!** By the time David Stager JR was a senior at Southwestern Medical School, Stager Sr and Stager Jr teamed up with the full time pediatric ophthalmologist at Southwestern, David R Weakley MD, to publish their most important findings in Arch Ophthalmol (Stager DR, Weakley DR, Stager DR. Anterior transposition of the inferior oblique. Anatomic Assessment of the

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Neurovascular Bundle. **Arch Ophthalmol** 1992; 110:360-362. FEY cites this last reference, but seems not to grasp its most important details.

Salvos and fusillades in this war proceeded from the podium in two different major settings, one a paper by FJ Ellis, and the other a workshop moderated by Stager Jr. The paper was "Mechanism of Action of the Inferior Oblique following Anterior Transposition by Forrest J Ellis MD and David L Guyton MD, who further studied a previously reported data base (Ellis FJ, Stein L, Guyton DL. Masked bilateral superior oblique paresis: a simple overcorrection phenomenon. **Ophthalmology** 1998; 105:544-551) and concluded that AES is not due to down pulling of the IO of the other eye on up gaze, but perhaps is due to extorsion persisting after RATIO, leading to anatomic infraplacement of the LR of the abducting and fixing eye as the primary mechanism of AES. From the floor, David Stager Sr MD (in the opinion of this reviewer) totally demolished the logic in this paper. [Also, Robert Clark MD, Joe Demer's sidekick, has studied OAIO in SOP and told me that he concluded that torsion is not the answer in that context either. See Clark RA, Miller JM, Demer JL. Displacement of the medial rectus pulley in superior oblique palsy. **Invest Ophthalmol Vis Sci** 1998; 39:207-12) Further, Burton J. Kushner MD opined in the workshop described below that torsion is not the etiology of AES.

The other major battle in this vigorous conceptual war was a workshop moderated by David Stager Jr MD, with David Guyton MD, Burton J Kushner MD, and David Stager Sr MD on the panel. Armed with his new 17-inch Macintosh Powerbook with 10.3 operating system (the weapon of choice of Kushner, Demer, and most notoriously, David Granet MD of San Diego)., Stager Jr began with a direct frontal attack on the aforementioned editorial using the in-your-face rolling block program which is signature for this Macintosh,. He then settled down to four classic cases with a solution for each type of case based on good results and theory of mechanism of the surgeries based on a clear understanding of the nature of the neurofibrovascular bundle.

Case #1 was a 3 y.o. child with ET and OAIO. The panel consensus was recession if no DVD, RATIO if DVD is present. Avoid myectomy. Case #2 was a 7 .o. child with a history of a previous "IO weakening procedure", recurrent OAIO, and no DVD. Panel consensus was to look carefully for intact posterior fibers of the IO missed by the elsewhere surgeon and to perform myectomy with only Guyton advocating adding denervation. Case # 3 was a 15 y.o. with previous RATIO, DVD (a phoria, but moderately large), alternating hypertropias in side gazes, and exotropia in up gaze – in short – a classic AES. Here, the panel was divided. Kushner said that posteriorization of the IO would eliminate the AES, but that in 50% DVD would be significantly worsened. Guyton repeated the idea that torsion was causing the AES, and everyone else on the panel disagreed. Stager Sr and Stager Jr said that they would previously have done a nasal myectomy [a tricky procedure which I perform only after reviewing the Stager videotape the night before the procedure; thanks, Dave, for the videotape], but that more recently they have moved the IO insertion from lateral to the insertion of the IR where it had been placed at the previous surgery to a more nasal position, anterior to the nasal 1/3 of the IR insertion. This eliminates the AES, eliminates the torsion (Guyton is smiling), and still keeps the DVD from returning (Guyton is frowning). [I have done this in at least 3 cases with the same good results reported by Stager Sr and Stager Jr.][Note: You can prevent AES when you are not primarily concerned with using RATIO to treat DVD by using the Kushner technique of bunching the IO just lateral to the IR insertion. (For validation, see: Mims III JL, Wood RC. Antielevation syndrome after bilateral anterior transposition of the inferior oblique muscles: incidence and prevention. **JAAPOS** 1999; 3:333-336). Case # 4 was a Crouzon's with absent superior oblique tendons. Panel consensus was anterior and nasal transposition of the IO. (Refs: Stager DR Sr., Beauchamp GR, Stager DR Jr. Anterior and nasal transposition of the inferior oblique muscle: a preliminary case report on a new procedure. **Binoc Vis Strabismus Q** 2001; 16:43-44., Stager DR Jr, Beauchamp GR, Wright WW, Felius J, Stager D R Sr. Anterior and nasal transposition of the inferior oblique muscles. **JAAPOS** 2003; 7:167-73, Hussein MA, Stager DR Sr., Beauchamp GR, Stager DR Jr., Felius J. Anterior and nasal transposition of the inferior oblique muscles in patients with missing superior oblique tendons. **JAAPOS 2007;** 11:29-33.)

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In this same workshop, Kushner mentioned a series of 6 patients he is about to publish in **Archives of Ophthalmology** who appeared to have fat adhesive syndrome after previous EOM surgery, but who had inadvertent anterior transposition of the mid-portion of the IO, 4 after buckles. Their strabismus patterns were normalized after separation of the mid-portion of the IO from the globe.

Dotan GY, Baker, JD, and Roarty JD presented a series of 206 patients who had received unilateral IO "weakening", and only 7% of 376 patients needed a "weakening" procedure of the other IO. In view of the above discussion, more details of their "weakening" procedures used for these patients would be helpful, especially breaking down the incidence of eventual contralateral OAIO into what types of surgery, myectomy vs. recession with exact details on the location of the new IO insertion. Hopefully, these authors will give us this breakdown in the published paper.

The old adage "you get what you need in IO weakening procedures" was confirmed by G. Robert LaRoche MD FRCSC, Kamal Sindi MD, and Leah Walsh CO© in a series of 42 cases of superior oblique palsy with OAIO and pre-op deviations of 5 to 30 HT. In a collaboration between physicians in Louisville, Kentucky, and New Delhi, India, Rahul Bhola MD, Kamlesh Kumar MS, Hari Narayan Prasad MS, and Sumit Monga MS demonstrated that a suspension recession of the IO will correct both the V pattern and the IOOA in 'V" pattern strabismus with OAIO. Their technique uses the stump of the IO at the insertion and avoids episcleral needle passage.

Superior Oblique

All was quiet on the SO front; no war. Joseph L. Demer MD PhD, working with Li Jiang MD, has come a long way in answering the question that he posed when he demonstrated previously that OAIO in superior oblique palsy (abbreviation: SOP) is not due primarily to the action of the ipsilateral IO. (Kono R, Demer JL. Magnetic resonance imaging of the functional anatomy of the inferior oblique muscle in superior oblique palsy. **Ophthalmology** 2003; 110:1219-29.) Demer also points out that biomechanical modeling consistently indicates that SO weakness alone cannot explain the large hypertropia observed in SOP. Demer and Jiang found with high resolution MRI in patients with SOP by clinical exam and atrophy of the ipsilateral SO on MRI, the contralateral IR had hypertrophy and increased contractility (cross sectional area in supraduction vs infraduction) in comparison to the ipsilateral IR. They concluded that in these cases contralateral IR recession is physiologic to weaken a hypertrophic IR. [But not on an adjustable suture, *please*, unless you want to see progressive overcorrection.] Demer feels that the the SOP has triggered a pathologic (and non-compensatory) pathologic hypertrophy of the contralateral IR. How can the contralateral IR recession work to provide a permanent correction in this scenario? Perhaps for contralateral IR recessions in SOP, the main mechanism of effect is a reduction in the Torque Vector at the surface of the globe. This, incidentally, is probably also the mechanism of permanent effect of ipsilateral IO recessions and terminal myectomies (in which the stump of the IO attaches to the globe just lateral to the IR). [More thinking on the progressive overcorrection seen so often after adjustable suture recession of the contralateral IR in SOP: When you perform the adjustment, you are placing the IR down its length-tension curve, a temporary state that will be eliminated once contracture has occurred in 2 or 3 weeks. The permanent effect of your IR recession is due to something that must occur only several weeks into the healing process, the re-formation of the IR pulley (assuming you did a lot of dissection when you recessed it). (See Kushner's thinking in his editorial, Kushner BJ. How do recessions and resections of extraocular muscles work? **JAAPOS** 2006: 10;292-292.)

Alejandra Roizen MD, Federico g Velez MD, and Arthur L Rosenbaum MD corrected 5.2º of pre-op 7.2º incyclotorsion with diplopia in 5 patients by performing tenotomy of the anterior SO fibers at the insertion. Diagnoses included three 3rd N palsies, one Graves, and one IO palsy. [Years ago, I did this on my father-in-law's lawyer, slowly in a gradual and graded fashion as I simultaneously observed the fundus torsion with an indirect ophthalmoscope. He had been attacked by an axe murderer as an adolescent, – true story – and his primary problem was torsion with diplopia. In spite of this handicap, he had made it through law school. Post-op, he

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recovered stereopsis and was almost as eloquent about his recovery as Stereo Sue. (Sacks O. Regaining binocular stereoscopic vision in adulthood. A case report. A neurologists notebook. Stereo Sue. Why two eyes are better than one. **Binocul Vis Strabismus Q** 200; 21:160-169.)]

In a study by Erin G Leverentz MD and Michael C Struck MD of Madison WI, among 14 patients with ET and bilateral SOP, 7 received MROU with infraplacement and recessions of the IO and 7 others received the same without infraplacement of the medial rectus muscles. Those whose medial rects muscles were infraplaced fared better, with 5 PD in down gaze vs 13 PD in downgaze (p=0.018). [Who are these patients? Children with OAIO and SOP? Certainly adults with bilateral acquired SOP and diplopia are better treated with bilateral Harada-Ito's combined with large IR recessions with Stavis-Guyton-Kushner reconstruction of the intermuscular septa and Lockwood's ligament.] (See "I told you this before! Didn't you listen?" below.)

Sarah R Hatt, David A Leske, and Jonathan Holmes compared the CROM to binocular single fields on the Goldmann, and concluded that by using real world targets in free space, the CROM method appears to be a better way to quantitate the patient's diplopia. [Twenty years ago I spent many Saturday afternoons that I should have been spending with my children having patients with vertical deviations come in for a free, lengthy experimental test which I called "phoria fields", using a Maddox rod and a large white spot stimulus on a Goldman perimeter. This proved to be a disaster in the design of surgery. Also, I had a patient with torsional diplopia that I failed to appreciate and characterize accurately because the spot stimulus on a Goldman is circular! I no longer use a Goldman perimeter for binocular fields; a simple clear plastic hemisphere with degree markings on it is much more accurate.]

Analogous to the CROM and its compasses, Dongsheng Yang PhD and Richard Hertle MD used an electronic compass to measure face turns, chin elevations, and head tilts, and validated their system by comparing it to their previously described laser 3-D position system. [Hertle simply can't examine a patient without using at least $50,000 of equipment. It's O.K. He's worth it.]

Other Vertical Strabismus

Contrary to traditional notions that contact lenses cannot be used to ameliorate vertical diplopia by incorporating prism into the contact lens, W Keith Engel MD, Lisa Rovick CO COMT, and Edward Wing CCLT, accomplished precisely this in 4 patients using a custom manufactured 2 to 4 PD base-down contact lens in one eye. Base-down prism of up to 1 PD is routinely used to ballast a toric contact lens, and their approach was simply an extrapolation of this common practice. [Like the bumblebee before the aerodynamic equations were improved, they didn't know they weren't supposed to fly.]

Noa Ela-Dalmon MD, Alejandra Roizen MD, Federico Velez MD, Anne L Coleman MD PhD, and Arthur L Rosenbaum MD tackled strabismus secondary to glaucoma drainage devices and report that complete removal of the fibrous capsule surrounding the implant and adjacent structures may be required, as well as size reduction of the implant plate, which does not, they say, interfere with intraocular pressure control.

Andrew R Jones MRCOphth, Patrick Watts FRCOphth, Robert F Walters FRCOphth, and Michael Drage FRCA of Wales presented 5 patients with ocular motility defects after surgical treatment of trigeminal neuralgia. Three treated with microvascular decompression recovered spontaneously in 5 to 8 months. Of 2 treated with percutaneous controlled radiofrequency trigeminal rhizotomy, one recovered, and one presenting with 3rd, 4th, and 6th N palsies recovered the 4th and 6th, but not entirely the 3rd.

Wendy E. Adams, Helen Haggerty, Mahmoud Nassar, Jane Dickenson, and Michael P Clarke of Newcastle upon Tyne identified 5 patients with thyroid eye disease (abbreviation: TED) and tabulated improvement of binocular single vision with 73% perceiving "little or no diplopia." Good show, chaps. This same group found better results in patients with bilateral symmetrical TED than with asymmetrical or unilateral.

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Strabismus Surgery Complications

In a large series study flawed by a lack of a no-treatment control group, Natalie Marie Koederitz MD, Daniel E Neely MD, David A Plager MD, Blair Boehmer, Derek Sprunger MD, Naval Sondhi MD, and Gavin Roberts MD found 20/650 (3%) possible post-op infections after a week-long course of topical antibiotic/steroid after strabismus surgery, not significantly different from 27/953 (2.8%) after a single application of 5% povodone-iodine at the end of the surgery. **Limbal incisions had a significantly higher post-op apparent infection rate (10%!) than cul-de-sac (= fornix).** [Unreported was the number of times the parents tore open the wound during that week-long course of topical antibiotic/steroid trying to get the drops or ointment into the eyes of their screaming, struggling child with tender eyes in the immediate postop' period.]

Based on 145/997 (16.6%) AAPOS member survey responses, Krista A Heidar MD and David T Wheeler MD tabulated 18 cases of endophthalmitis for an incidence of 4.88/10,000 procedures. [Thank goodness I've never seen it in over 4000 personal cases, even with 27 years of occasional resident "assistants."] Presentation was between 2 and 10 days following surgery. Vitrectomy and intravitreal antibiotics were used in 13, vitreous biopsy and intravitreal antibiotics were used in 3, and [homeopathic] sub-Tenon's antibiotics in 2. Culture results revealed streptococcus in 7, staphylococcus in 5, hemophilus in 1. [The Joint Commission for Accreditation of Hospitals has mandated preop' Ancef® or Kefzol® intravenously 30 minutes prior to incision in all surgeries the last 3 years.]Visual outcomes were better than 20/40 in 7, 20/80 in 1, light perception or worse in 7, and unknown or unable to test in 3. [This survey represented 389,163 cases and 2118 years of practice, for an average of 184 cases per year in responding surgeons. These were not "occasional" surgeons.]

Being unusually hard on themselves, David K Coats and Maria Castanes reported minor variations such as small conjunctival tears, split muscles, etc., as "complications" occurring in 14/109 adult patients with one scleral perforation which did not produce endophthalmitis or retinal detachment.

New department for this annual Strabology Report:

I told you this before! Didn't you listen???

In the Difficult Problems Strabismus seminar masterfully moderated by David A Plager MD, Plager himself presented the last case, a bilateral SOP nicely treated with a bilateral Harada-Ito combined with an only moderately large IR recession of 5 mm. In spite of the moderate size of these IR recessions, Plager obtained substantial bilateral lower lid retraction. He remembered Parks' teaching in regard to thorough dissection of the IR, supposedly to prevent this problem. Plager then re-operated, dissecting the previously recessed inferior rectus even more thoroughly, and this did nothing to alleviate the bilateral lower lid retraction. **David Plager, didn't you listen? I told you this before!** Retraction of the lower lid, even with 10 mm recessions can be totally eliminated by reattaching the corners of the intermuscular septa to the ends of the insertion after the recession is finished, putting them right back where God had them originally, combined with a mattress suture to bring Lockwood's ligament forward a few mm, reattaching it to the globe. [I use pre-placed sutures in the septa at the ends of the insertion at the beginning of my dissection. I presented 3 cases of isolated SR palsy with head tilts in a poster several years ago treated with 10 mm recessions of IR with large photos demonstrating cures with no lid retraction.] Monte Stavis MD presented the restoration of the intermuscular septa at an AAPOS meeting several years ago (but yet unpublished), and Guyton and Kushner have published similar techniques for Lockwood's ligament, Guyton's being potentially adjustable. He calls it the "adjustable lid" after IR recessions. From the floor, Stavis reiterated this procedure as Plager carefully listened. Sadly, John Simon MD also mentioned his procedure in which the lower lid retractors are severed, a mutilation totally unnecessary if the Stavis-Guyton-Kushner technique is used in the original surgery, but perhaps the only remedy now for Plager's case.

Are we worth it?

Reprising her last year's Golden-Globe-winning performance in helping the world to understand the economic worth of strabismus surgery, Cynthia L Beauchamp MD assisted by Joost Felius PhD, George Beauchamp MD, Melissa Brown MD MBA, and Gary C Brown MD MBA [Husband and

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wife MBA's? Who manages whom?] stroked our collective ego by presenting a model that indicated that the economic value for the successful treatment of amblyopia would be $27.9 billion, for surgical strabismus would be $15.2 billion, and for non-surgical strabismus would be $11 billion. [Still not enough to pay for unnecessary wars.]

DISCLAIMER: While the reporter has endeavored to be as accurate as possible in reporting the presentations at this meeting, the reader is strongly advised to confirm any information in this report, before acting up it or applying it to patients!

The next annual meeting the AAPOS will be in Washington, D.C., April 2-6, 2008.

Genie Leonard Apt James L. Mims III Annika Rosensvard
Kyle Nikki Agarwal-Batra KA Noelle Matta Nikki again Kyle again Noelle again
Arnoldi ?help? (Sorry) Cindy Pritchard Andrea Docherty(?) John P. Lee