

COLLEGE OF OPTOMETRISTS IN VISION DEVELOPMENT 2008

PAPERS AND POSTERS

The following papers and posters were presented during the 2008 COVD 38th Annual Meeting in Rancho Mirage, California.

COVD Papers

EXOTROPES UNDER THE AGE OF 13 MANAGED BY AN OPHTHALMOLOGY AND OPTOMETRY CLINIC

Marie Bodack, O.D. and Marilyn Vricella, O.D.

Problems: Exotropia is a common condition encountered in a clinical practice. Studies have found that most forms of childhood exotropia are intermittent and that intermittent exotropia improves over time for many children. **Method:** Retrospective chart reviews of patients under the age of 13, seen over a one year period at a children's hospital and optometry school were conducted. All patients had a diagnosis of exotropia. The reason for examination, magnitude and type of deviation at distance and near, the presence of amblyopia, systemic and ocular conditions and treatments are reported. **Results:** In the ophthalmology clinic, 668 charts from 787 were available for review. In the optometry clinic 251 charts were available for review. The average patient ages were 5 and 8 respectively. There was no gender predilection (332 male, 336 females and 132 males, 119 females). In both cases, the majority of patients (68%) reported an eye turn, or follow up for an eye turn as the chief complaint. The following data relate to the ophthalmology clinic. Patient symptoms were not commonly asked. The most common symptom was diplopia (n=22) followed by headaches and head turn or tilt (both 13 patients). The most common systemic conditions were premature birth (n=40), brain injury (n=35), seizures (n=30), developmental delays (n=29), cerebral palsy (n=26) and AD/HD (n=24). The most common ocular conditions were nystagmus (n=26), optic atrophy (n=20), and history of cataracts (n=16). Decreased vision due to refractive or strabismic amblyopia was present

in 105 patients, bilateral refractive amblyopia in 11 and organic amblyopia in 59. The average deviation at distance was 19 prism diopters (range phoric to 53), and at near was 16 prism diopters (range phoric to 80). The majority of cases were basic exotropia (n=249) followed by divergence excess (n=182), and convergence insufficiency (n=101). The remaining patients had incomplete data. The deviation was intermittent at distance and/or near in 427 patients, constant in 268, unilateral in 178, and alternating in 83. 114 patients had a total of 167 prior surgeries, or an average of 1.5 per patient (range 1-6). 87 patients had surgery, with another 38 scheduled. Observation was the most common treatment (n=373). Alternate patching was prescribed for 138 patients, atropine for 26, optometric vision therapy for 24, and over minus for 21. Results were available for 73 surgical cases. Seven patients (10%) developed new hyper deviations. Three patients (4%) had additional surgeries planned, 2 noted diplopia and 1 developed a new head turn. The following data relate to the optometry clinic. Patients were divided into preschool clinic (<6 year old) or pediatric clinic. 47 patients were seen in preschool clinic. In this group, the most common systemic conditions were drug/alcohol abuse by mother and developmental delay (n=4 for both). 38% were given glasses. The deviation was not consistently recorded. Treatment options included glasses (n=18), patching (n=5), observation (n=7), surgery (n=5), home VT (n=6), office VT (n=14 but only 9 participated). Two patients had prior surgery for ET. **Limitations:** Because this was a retrospective chart review, not all data were complete. Additionally, patients were seen by different providers. Test batteries, treatment philosophies and surgical/therapy techniques vary by practitioner. **Conclusions:** Exotropia is a binocular finding that may exist in isolation or in association with premature birth, seizures, developmental delays and cerebral palsy. Patients with these conditions should receive complete optometric evaluations to determine if exotropia is indeed more common in these children. Additionally, patient symptoms pre and post

treatment need to be better elicited. Further studies, using standardized batteries, regarding treatment options and success rates are needed to determine the most appropriate clinical management.

DEM TEST SCORES FOR A JAPANESE-SPEAKING SAMPLE AND COMPARISON TO PUBLISHED ENGLISH AND SPANISH-SPEAKING NORMATIVE VALUES - A PILOT STUDY

Tomohito Okumura, MSOptom, M.Ed., Eiji Wakamiya, M.D., Ph.D., Hannu Laukkanen, O.D., M.Ed. and Hiroshi Tamai, M.D., Ph.D.

Problem: The developmental eye movement (DEM) test is a widely used clinical visual-verbal oculomotor test that was originally standardized and normed for an English speaking population. Normative data for Spanish speaking children have recently been published. The author reported that DEM scores are similar in Spanish and English speaking populations, and concluded that DEM results could be used in any population, regardless of the language. However, normative DEM results have not been reported for native speakers of non-alphabetical languages, such as Chinese and Japanese. The present pilot study is aimed at investigating DEM performance for a Japanese speaking sample, and comparing those results with published values from previous studies for English and Spanish speaking populations. **Method:** 245 elementary school students served as the subjects for this study. The children ranged in age from 7 to 11 years, with a corresponding placement of 1st to 6th grade in the Japanese education system. All testing was administered on school premises in a relatively quiet room with good illumination. Instructions to each subject paralleled the administration protocol in the DEM manual. DEM vertical time, adjusted horizontal time, ratio, and errors were analyzed and compared to those in Spanish- and English speaking populations previously reported. **Results:** Even though Japanese children appeared slightly faster on vertical time compared to English and Spanish children, adjusted horizontal time, horizontal/vertical ratio, and errors of Japanese children were similar to English and Spanish children. **Implications:** DEM test scores appear to be relatively independent of language, even though slight differences were found between Japanese, Spanish, and English speaking subjects.

AGE DEPENDENT RELATIONSHIP BETWEEN DURATION OF FIXATION AND READING SKILLS IN STUDENTS WITH ACADEMIC DIFFICULTIES

Aaron S. Franzel, O.D., Derek Swader, B.S., Jennifer Keissr, O.D., Blair O'Brien, O.D., Stephen Viola, Ph.D., Ralph Garzia, O.D. and Carl Bassi, Ph.D.

Problem: With evidence that early visual processing can predict many reading and spelling deficits, our efforts have centered on the value of using duration of fixation when reading sight-words as a possible indicator of early visual processing when decoding text. The population used for this study was drawn from the pupil project, collaboration between the UM-St. Louis College of Optometry and College of Education. Results from previous analyses of this population have revealed that when a passage contains mostly sight words, the correlations between word reading and spelling were highly significant. Surprisingly, no significant correlations were found between rapid naming tasks and reading attributes. Because of the established, age related statistical relationship between rapid automatized naming and reading skills, our current research compared early elementary (<8.5 years) from upper elementary (>8.5 years) groups. We could also investigate the potential for duration of fixation predicting word reading and spelling ability at early elementary ages. **Methods:** 168 students (ages 6-16) were used in the analyses. All subjects included in this analysis were at reading levels within 2 years of grade expectancy. For all patients, ocular motor attributes were measured with the DEM and Visagraph. For each subject, Visagraph reading passages were administered at grade level (gl) and at their current sight word level (crl). Two-way correlations (Pearson) were calculated between rapid naming and Visagraph data and reading sub-tests of the WIAT-II. Subsequent hierarchical regression analysis was also performed. **Results:** Duration of fixation for gl and crl passages were highly correlated ($r=0.73$) at both age groups, but there was significant independence between the two measurements. There was a strong negative correlation between crl duration of fixation and single word reading tasks ($r=-0.618$) and spelling ($r=-0.585$) at the >8.5 year old group, but no correlation at the <8.5 year group. Crl duration of fixation failed to correlate with pseudo-word decoding at either age group. There was only a weak negative relationship between duration of

fixation and rapid naming tasks, independent of age. Duration of fixation contributed significant variance to word reading, after iq, phonologic processing and rapid naming were accounted for. **Implications:** The results indicate that duration of fixation with reading passages containing more sight words (crl) correlates well and contributes unique variance to reading skills beyond second grade. Rapid naming test results do not correlate well with single word reading or spelling skills in this population. Although demonstrated to be effective in predicting presence of a reading deficit, rapid naming may not be capable of predicting its severity. Orthographic/early visual processing skills, with phonologic and rapid naming skills, appear to be important contributors to reading ability.

VISUAL DISCOMFORT AND STATIC ACCOMMODATION IN COLLEGE STUDENTS

Chris Chase, Ph.D., Chinatsu Toshi, Ph.D.,
Eric Borsting, O.D., M.S. and
William H Ridder, III, O.D., Ph.D.

Problem: A previous study showed that 17% of students at selective, small-liberal arts colleges report moderate to severe visual discomfort that interfere with reading, including symptoms of soreness, headaches, blur, and text distortions. The purpose of this study was to compare clinical and objective measures of accommodation and their ability to predict symptoms of visual discomfort. **Method:** Twenty-three students representing a broad range of visual discomfort severity participated in this study. All had normal visual acuity, no strabismus, and were screened for other conditions that might cause visual discomfort (e.g., migraine headache). Objective measures of accommodation were made by continuous, two-minute recordings of static accommodation responses at 0, 2, 3, 4, and 5 diopters (d) with a 5 hz sampling rate using an AIT wam-5500 auto-refractor. Recordings were monocular (right eye) to control for vergence effects. Clinical measures of accommodation included accommodative facility (+/- 2.00 flipper test and binocular amplitude-scaled), negative and positive relative accommodation, amplitude of accommodation, and monocular estimation method. Symptom complaints were measured by the Conlon visual discomfort scale. **Results:** Auto-refractor data were trimmed for outliers, and the average accommodation lag was calculated at each viewing distance. At viewing distances of 25 cm (4D) or less,

monocular static accommodative lag correlated with visual discomfort symptoms (4D $r=0.40$, $p=.06$; 5D $r=0.51$, $p=.01$), binocular amplitude-scaled facility (4D $r=-0.47$, $p=.02$; 5D $r=-0.39$, $p=.06$), and monocular facility, left eye (4D $r=-0.45$, $p=.03$). The correlation between accommodation lag at 5D and symptoms of soreness and headache was particularly strong ($r=0.64$; $p=.0008$). **Implications:** For college-age students, visual discomfort is correlated with accommodation weakness or fatigue at viewing distances of 25 cm or less. Binocular amplitude-scaled facility and monocular facility, left eye were significantly correlated with auto-refractive measures of accommodation. Further study is needed to replicate these results and examine treatment options. **This research was supported by a grant from the College of Optometrists in Vision Development.**

COVID Posters

#1. RESIDENCY IN PEDIATRIC OPTOMETRY AND VISION THERAPY AT THE SOUTHERN CALIFORNIA COLLEGE OF OPTOMETRY.

Carmen Barnhardt, O.D.

The Pediatric Optometry and Vision Therapy (POVT) Residency is based at the Eye Care Center, a fully-equipped patient care facility owned and operated by the Southern California College of Optometry (SCCO). The residency is a full-time, formal, supervised program combining patient care, didactic education, teaching experience, and clinical research. The mission of the POVT residency is to develop the residents' clinical expertise in pediatric primary care and the assessment and management of binocular vision and visual processing anomalies, using full-scope optometric procedures and treatment options.

APPLICATION REQUIREMENTS: The applicant must have or will earn an O.D. degree, furnish complete optometric transcripts, and have passed the Basic and Clinical Science parts of the NBEO and furnish official copies of the results. An essay stating the applicant's reasons for applying to the residency program should be submitted along with 3 letters of reference. Applicants must apply through the Optometric Residency Matching Services, Inc. (ORMS) and follow application guidelines by February 1. A personal interview is required.

#2. PRIMARY CARE PEDIATRIC RESIDENCY AT THE SOUTHERN COLLEGE OF OPTOMETRY

Marc B. Taub, O.D.

This ACOE accredited residency program provides advanced training in the care of pediatric patients as well as using optometric vision therapy as a treatment modality for various vision disorders. Residents will gain extensive experience in the diagnosis and management of anomalies of binocular vision and assessment of visual function. Specialty areas of infant vision, strabismus, amblyopia, visual perception, optometric vision therapy, pediatric eye disease, head trauma, special needs, and electrodiagnostic techniques will be explored. Residents work with other optometric specialties including contact lens, low vision and ocular disease, as well physicians, educators, psychologists, and other professionals in a diverse assortment of clinical and educational settings. This program is extremely flexible and can be adjusted to meet the resident's needs and desires.

While working at the Southern College of Optometry, the resident will have the opportunity to work with a diverse and fantastic faculty. The pediatric faculty boasts of not one, but two past COVD presidents, the editor of a major optometric journal, a current COVD board member, six Fellows of the College of Optometrists in Vision Development, nine Fellows of the American Academy of Optometry and have authored over 150 articles as a collective.

Mtaub@sco.edu

#3. ACCOMMODATIVE TRAINING TO REDUCE NITM IN ASYMPTOMATIC MYOPIC YOUNG-ADULTS

Kenneth Ciuffreda, O.D., Ph.D., and
Balamurali Vasudevan, Diana Ludlam

Purpose: The purpose of this study was to assess changes in the near-point induced transient myopia (NITM) parameters of initial magnitude and its decay duration, as well as accuracy of the near accommodative steady-state response and clinically-based accommodative facility, following 6 weeks of home-based accommodative training in asymptomatic myopes. **Methods:** Ten young-adult myopes were tested. The experimental paradigm consisted of a baseline session and two follow-up sessions at the end of the 3rd and 6th weeks of training. At the

first session, baseline refractive state and the selected accommodative functions were assessed. Measurements were repeated at the two follow-up sessions. Home-based vision training included accommodative flippers ($\pm 2D$) at near, Hart chart at distance (6m) and near (40cm), and prism flipper (6pd) training at near (40cm), all of which were performed for 20 minutes a day 5 days a week for 6 weeks. **Results:** The dynamic accommodative response functions improved significantly with training, whereas the steady-state response functions were only slightly improved. Decay duration decreased significantly with training from 101secs to 74secs. Lens flipper rate increased significantly from 11 to 16cpm in the OD, 11 to 19cpm in the OS, and 8 to 11 cpm in the OU. Hart Chart rate increased significantly from 22 to 33cpm in the OD. Initial NITM decreased slightly from 0.53D to 0.47D, whereas the steady-state accommodative response increased slightly from 2.64D to 2.72D, following training. **Conclusions:** Training of the accommodative system resulted in improved dynamics in both the laboratory and clinical measures. Faster dynamics would result in decreased time-integrated retinal defocus, a potentially potent myopigenic factor, with possible reduction in long-term permanent myopia.

#4. CLINICAL TESTS OF ACCOMMODATION: CAN WE RELY ON HOFSTETTER'S NORMS TO GUIDE DIAGNOSIS AND TREATMENT?

Marc B. Taub, O.D., and
Josephine Shallo-Hoffmann, Ph.D.

Purpose: It has been previously documented that the push up and pull away methods overestimate accommodative amplitude while the minus lens to blur method (MLB) under estimates it. It has also been shown that the push up (PU) and pull away (PA) methods produce significantly similar results. We sought to compare the techniques used to measure amplitude of accommodation and their relationship to the findings reported by Hofstetter in a variety of age groups. **Methods:** Ninety ocular healthy subjects (mean 11.7 years, range: 6-36 and 50F/40M) were recruited from the patient and student populations at two schools of optometry. Three groups of 30 participants were separated based on age. The age ranges in each group are as follows: 1) adult 20-36 2) older children (OC) 10-13 3) younger children (YC) 6-9. The study participants had a best corrected

visual acuity of 20/20. The subjects completed three accommodative tests: pull-away, push-up, and minus lens method. Each procedure was performed four times. The first run of each test was eliminated from analysis to control for practice effects. Order of test presentation was controlled. Statistical analysis was performed using ANOVA with post hoc t-tests. **Results:** ANOVA was significant ($p > .0001$) for the entire study group, adults, OC and YC groups. The minus lens to blur technique varied significantly from both the push-up and pull-away methods ($p < 0.01$) for all groups. The push-up and pull-away methods did not differ significantly from each other for any of the groups but differed from expected values based upon Hoffstetter's equation for average amplitude for both the adult (PU: $p = 0.018$ PA: $p > 0.0001$) and OC (PU: $p = 0.0037$ PA: $p = 0.036$) groups. The mean amplitude of accommodation as measured by the push up and pull away techniques overestimated accommodation in each group by the following amounts: 1) adult PU 1.47D PA 2.1D 2) OC PU 4.0D PA 1.61D 3) YC PU 1.57D PA 1.03D. The mean amplitude of accommodation as measured by the minus lens to blur method found in the present study underestimated accommodation in each group by the following amount: 1) adult 1.9D 2) OC 5.4D 3) YC 4.5D. **Conclusions:** This study confirms that the MLB technique underestimates accommodative amplitude by a minimum of approximately 2D. In children, the amount of underestimation more than doubled. The PU and PA techniques overestimated the accommodative amplitude in all groups studied. The PU and PA techniques did not differ significantly from each other. This study shows that an adjustment to the MLB technique of +2D in adults and +5D in children should be considered. Also, an adjustment to the PU and PA technique of -2D in all patients should be considered.

#5. THE VISIONPRINT SYSTEM: A NEW DIAGNOSIS TOOL IN THE BATTLE AGAINST OCULAR MOTOR DYSFUNCTION

Marc B. Taub, O.D., WC Maples, O.D. and Jessica Cochran-Goldman, B.S.

One of the most common conditions that optometrists encounter on a daily basis is ocular motor dysfunction (OMD). There are several methods used to diagnose this condition including observation tests such as the NSUCO, and SCCO, psychometric

eye movement tests like the King Devick, and Developmental Eye Movement test (DEM), as well as computer based reading eye movement tests such as the Visagraph or Readalyzer. The treatment for this condition often includes optometric vision therapy. New technology known as the Visionprint system (VPS), which objectively measures the patient's head to eye movement ratio (H/E), is used by Essilor to determine the individual physiological needs of presbyopes. Readings attained with the VPS aid in the design of the Varilux Ipeo progressive addition lens. Potentially, the VPS could be used to aid VT ODs in the diagnosis of OMD and help direct the optometric vision therapy plan to better suit the patient's needs. This study examines whether the VPS is a reliable measure of h/e movement in a population of optometric students. Twenty students were selected from the student population at southern college of optometry. The subjects were required to have at least 20/25 vision at distance and near, and at least 30 seconds of arc stereopsis and could not have a current diagnosis of strabismus or amblyopia. The presence of a binocular, accommodative or ocular motor dysfunction was not a disqualification factor in this study. Each subject was tested with the vps on two visits separated by a minimum of two weeks. Each subject wore their habitual prescription for the duration of this study. A head/eye ratio (H/E) and stability coefficient (sc) were recorded at both visits. An H/E of .01 indicated that the subject is considered an "eye mover" while a ratio of 1.0 signified a "head mover." If the sc was above .16, the reading was considered unreliable and repeated. The mean H/E was 0.045 ± 0.028 for the first presentation and 0.079 ± 0.108 for the second presentation. No significant difference was found between the two presentations when analyzed by a t test. ($p = 0.19$)

This lack of significance indicates that the VPS is reliable in the determination of H/E. The VPS represents a new tool for the diagnosis of ocular motor dysfunction. This type of information can aid the VT OD in designing a therapy plan to address and alleviate each patient's specific issue. The VPS represents a reliable, objective method to evaluate eye movements. Future studies will be aimed at correlating the findings attained with the VPS versus traditional methods to diagnose OMD.

#6. A CASE OF SEVERE OCULOMOTOR DYSFUNCTION IN A SPECIAL NEEDS PATIENT

Leanna Dudley and Terri Vasche, O.D.

Chief complaint: A 10 year old white male presented to the clinic with a history of developmental delay secondary to anoxia at birth and a possible alcohol related neurodevelopmental disorder. He was adopted at age 7 from Kazakhstan and his medical history is significant for recent diagnosis of attention deficit disorder. He is in a public school special education program and receives no other services. He had recently started taking Strattera to help with his attention difficulties. **Symptoms:** His mother is concerned because he had poor visual awareness and overall visual difficulties such as trouble seeing the computer. She also observed poor gross and fine motor coordination. He rarely made eye contact and is a very tactile oriented child. **Findings:** Ocular health was unremarkable. Visual acuity at near and stereopsis were slightly reduced. There were significant losses in fixation and difficulty with target localization. Pursuits and saccades had delayed initiation with excessive head and torso involvement. Vergence was adequate but both positive and negative accommodations were deficient. A visual processing workup revealed severe perceptual deficits in all areas including bilateral awareness and integration. **Treatment:** A 20 session optometric vision therapy program was initiated. Emphasis was placed on increased visual awareness, oculomotor, perceptual and accommodative skills. The sequence of visual therapy activities included visual motor, bilateral integration, saccadic and pursuit activities and accommodative facility. **Outcomes:** At the conclusion of the training program WS exhibited marked improvement. Near acuity and stereopsis reached a normal level. Fixations, saccades and pursuits were performed with greater accuracy. His mother observed drastic changes in his behavior, including maintaining eye contact and increased visual awareness. Awareness of laterality and directionality reached an age appropriate level, and he made marked gains in visual memory. This case, as well as the optometric literature, supports the success of optometric vision therapy in the special needs population.

#7. A REVIEW AND DEMONSTRATION OF SCAN PATTERNS AND THEIR ROLE IN ASTIGMATIC STATUS

Robyn Russell, O.D., Ashley Schuelke, B.A. and Mary Grace Summers, O.D.

The etiology and treatment of astigmatism has been explored by eye care providers for more than 50 years. Two major theories have emerged: one crediting astigmatic error to the structural framework of the eye and the other affirming that visual behavior and function results in a particular astigmatic status. Throughout optometric education there is limited exposure to the functional model of astigmatism first proposed by Getman and further developed by Forrest, Childress, Harmon, Birnbaum and Harris throughout the 20th century. Forrest proposed that astigmatic status was a result of the dynamics of an observable triad consisting of head scan, eye scan and head posture. He determined that a patient's preferred eye scan meridian determined their astigmatic magnitude and axis. Patterns were discovered in the triad relationship that accounted for anisometropia and oblique cylinder. He theorized that visual training with eye scan activities could alter or reduce astigmatism. In a retrospective case analysis of astigmatic correction patterns from 7 months to 5 years of age in a white female patient, changes in astigmatism were noted that paralleled her preferred visual scanning patterns. At the initial visit at 7 months of age, the visual acuity was estimated to be 20/100 OU at near with teller acuity preferential viewing and 2.00-3.00 diopters of ATR cylinder was found via retinoscopy. No prescription was given at that time, but fixate and follow activities were initiated in all directions. Upon follow-up 1 month later, a spherical prescription of +1.00 was prescribed due to an increase in the patient's behavioral responsiveness with plus lenses. As the patient began performing a greater amount of vertically oriented activities (i.e. Rope climbing, rock climbing) between ages 1.0 and 2.5 years, ATR cylinder (-0.75d) was found on retinoscopy and prescribed. At 3 years old, she began a formalized school program in which an increased amount of deskwork activities were performed. A decrease in the ATR cylinder was found at this point and therefore, only a spherical prescription (+0.75 DS) was prescribed OU. The patient's refractive error remained stable through 5 years of age with acuities of 20/20 OD, OS, OU at distance and near. As the

patient's activities changed from vertically oriented activities to the horizontal demands of desk work, the amount of astigmatism decreased. This case demonstrates how astigmatism relates to the triad of scan paths.

Throughout optometric education, these theories and training methods for reducing developmental or postural astigmatism have disappeared from the curriculum. This poster is intended to remind the optometric community about this philosophy as a possible etiology of astigmatism and a viable treatment option.

#8. MANAGEMENT OF EXTREME HYPEROPIA IN YOUNG CHILDREN

Christine L. Allison, O.D., and
Geoffrey W. Goodfellow, O.D.

Introduction: While it is common to find small to moderate amounts of hyperopic refractive error in young children, it is quite unusual to find extremely high magnitudes in children, unrelated to a pathologic state such as aphakia. The management of hyperopia, in any form, has many different variables to be taken into account. Our biggest goal as optometrists must be to prevent strabismus and/or amblyopia from developing due to hyperopia. Despite the emmetropization process which is at work in the very young children, some are still left with significant amounts of hyperopic refractive error. **Procedure:** Two unrelated patients entered the Illinois eye institute for comprehensive eye exams. Neither child had any history of developmental delays or difficulties during birth. They were both healthy children, taking no medications, and there was no significant family history. RM, a 1 year 11 month old Hispanic female, presented with a parental complaint of photophobia, rubbing the right eye, and occasional squinting OD. She was uncooperative for visual acuity assessment of either eye. There was no strabismus present upon examination, and extra ocular motilities were normal. The cycloplegic retinoscopy results showed +16.50 DS OD, and Plano OS. The cornea, lens, and fundus were all normal. BA, a 4 year old Hispanic female, was brought for an examination with a complaint of blur at distance. This child had been wearing glasses for 1 year from another clinic. Upon examination BS was discovered to have decreased visual acuities in both eyes, an intermittent alternating exotropia with hypotropia, and a cycloplegic retinoscopy result of +18.00-1.50 x 180 OD, and +18.50-1.00 x 180

OS. The cornea and lens appeared normal, and she exhibited small optic nerves upon dilated exam. **Results:** RM was recommended to wear a contact lens OD, and polycarbonate glasses at all times. BA was initially recommended glasses, and she was also recommended to wear contact lenses OU. Amblyopia therapy, such as patching and optometric vision therapy will be incorporated once the patients are adjusted to the contact lens wear. **Implications:** It is important to look for and recognize as early as possible children with extreme magnitudes of hyperopia in order to prevent amblyopia and strabismus from occurring. The use of contact lenses with these patients can be an important part of the management options for these patients.

#9. VISUAL TEST PREDICTION OF POOR READERS ON THE TEST OF ADULT BASIC EDUCATION (TABE)

Paul Hulse, O.D., Benjamin Moore, O.D. and
Willard Bleything, O.D., M.S.

Introduction: It has been established in the optometric community that there is almost no evidence of any correlation between learning disabilities and binocular vision dysfunctions, but few have explored if there is any correlation between poor performance on standardized reading tests and visual skills obtained during an optometric examination. The main purpose of this study was to determine if there is any association between poor performance on a specific set of visual skills and a substandard performance on the test of adult basic education (TABE) reading section. **Methods:** This study examines 50 high-school students from 16 to 18 years of age, all of whom were enrolled in an alternative school for high school dropouts. These individuals underwent a vision screening to determine their visual capabilities. The battery of visual testing that the students underwent included Beery visual motor integration (VMI), King Devick, near point of convergence break and recovery, base out break and recovery at near, base in break and recovery at near, positive relative accommodation, negative relative accommodation, accommodative facilities, visual acuity at far and near, and the Visagraph reading level. In addition to these visual tests the students also took the test of adult basic education (TABE) reading language and mathematic subsections. Criteria for the study are based on studies by Morgan, Hayes, and Zellers et al. **Results:** It was found that there were

only a select few tests that had a higher percentage of predictability of poor reading performance compared to the individuals whom were found to be proficient readers. The Beery VMI, King Devick, and Visagraph were the best predictors of poor reading performance, but were not statistically significant. This study reinforces the idea that learning abilities and visual abilities involve different integrative pathways in the brain. For future projects it might be worthwhile to further explore the correlation between performance on an optometric perceptual testing battery and various standardized reading scores.

#10. TEST-RETEST RELIABILITY OF THE INTUITIVE COLORIMETER

WC Maples, O.D., Marc B. Taub, O.D. and Tom Chwe, B.S.

Purpose: The intuitive colorimeter (IC) is an instrument that is reported to assist in the prescribing of tint filters that claim to be particularly useful in the treatment of reading problems. Although there have been a number of studies that have reported good results with the use of this instrument, independent test retest reliability of a sample of subjects had not been undertaken. This study evaluated the test retest reliability of the IC. **Methods:** An instrument was loaned to Southern College of Optometry from the Bernell Corporation to support this research. Twenty one subjects were given the COVD-quality of life survey and were administered the ic under standard suggested protocol as defined by the company. Testing was performed on two different occasions, separated by approximately two weeks. **Results:** Descriptive statistics are presented. The agreement between test and retest varied and could be grouped by frequency into three different Munsell hue groups; 1) $\leq 5\%$ difference, 2) between 5 and 15% difference, 3) $> 15\%$ difference. One subject was excluded from statistical evaluation as they did not select a color on both occasions. 2/20 (10%) chose the exact same color at both presentations, while 5/20 (25%) showed $< 5\%$ difference between test and retest. Half (10/20) produced a difference of between 5 and 15% while 5/20 (25%) showed $>15\%$ difference. The saturation however showed more consistent results. There did not appear to be good agreement between the test retest reliability and symptoms as measured by the COVD-Quality of Life instrument. **Conclusions:** The test retest reliability is not robust and does not seem to correlate well with symptom.

#11. A RARE CASE OF WAARDENBURG SYNDROME TYPE 4.

Jill J. Eggers and Daniel A. Taylor, O.D., M.S.

Background: Waardenburg syndrome (WS) is an auditory-pigmentary syndrome caused by a variable deficiency of melanocytes in the skin, hair, iris, retina, and cochlea. It is a heterogenous disorder of neural crest cell development that presents with four possible types. WS types 1 through 3 are autosomal dominant disorders. Type 4 WS, also known as Shah-Waardenburg syndrome with Hirschsprung disease, is typically autosomal recessive, although heterogenous in presentation, with mutations in the endothelin-3 (EDN3) genes or in the endothelin-3 receptor (EDNRB) genes. General features of Waardenburg syndrome that may be present in varying degrees depending on the type include deafness, dystopia canthorum, iris heterochromia, iris hypochromia, albinotic or pigment mottling of the fundus, vitiligo, prominent nasal root, white forelock, and patches of hypo or hyperpigmented skin. The following case is presented as it is a rare example of type 4 Waardenburg syndrome with ocular manifestations.

Case summary: CH, an 18 year-old African American male presented after failing the vision test at the Department of Motor Vehicles. His medical history was remarkable for Waardenburg syndrome type 4 with bilateral neurosensory hearing loss. CH had also had intestinal surgery as a child. Entering visual acuity was 20/30 OD, 20/40 OS, and 20/30-OU at 6 meters without correction. Cover test showed slight exophoria at distance and near. CH exhibited full range of motion OU with no pain or diplopia on extraocular motility testing. Pupils were equal, round, and reactive to light with a negative relative afferent pupillary defect. Confrontation fields were full OU. Low-minus refraction yielded distance visual acuities of 20/20 OD, OS, and OU. General facial appearance showed a wide nasal root, vivid blue iris, and a white patch of hair amid his predominantly black hair. Biomicroscopy revealed albinotic fundi bilaterally. Upon binocular indirect ophthalmoscopy, patches of dark pigment on the OD retina was noted, which were determined to be patches of normal pigment among an otherwise albinotic fundus. Photos were taken of the retina and iris. **Conclusion:** Waardenburg syndrome type 4 is a rare disease with multiple ocular manifestations including iris heterochromia, iris hypochromia, and albinotic fundus. Often the hypopigmentation in the

iris matches the hypopigmentation in the fundus. One study showed 19% of patients with the syndrome have convergent strabismus, contrasted with only 4-5% in the general population. Waardenburg syndrome is also an important differential in the diagnosis of Horner's syndrome as both may present with iris heterochromia. There is some evidence there may be an increased risk of glaucoma associated with Waardenburg syndrome as ocular and dermal melanocytes are derived from neural crest cells and the iris stroma and trabecular meshwork develop from that same cell line. Therefore it is plausible that a defect in pigmentation may lead to abnormalities in the development of these tissues. By this theory the hyperpigmented areas of the uveal tract as well as the hypopigmented areas may be abnormal.

#12. A REPORT ON THE EYE AND VISION PROBLEMS OF PATIENTS UNDER THE AGE OF 1 YEAR IN AN ACADEMIC-BASED URBAN CLINIC

Ida Chung-Lock, O.D., Jennifer Duan, O.D. and Rochelle Mozlin, O.D., M.P.H.

Problem: Since 2005, doctors at the University Optometric Center (UOC), the patient care facility of the SUNY state college of optometry, have participated in the Infantsee® program, supporting early detection of potential eye and vision problems that can otherwise go undetected. This paper documents the conditions found in patients under the age of one year presenting for examination. **Methods:** A retrospective record review was conducted on all patients under the age of one year examined at the UOC during the period from June 2005 through May 2007. Patients were included based on age and initial examination regardless if they were referred in through the Infantsee® program or not. We collected the following data: presenting complaint, presence of positive developmental or medical histories, presence of positive family ocular history, diagnostic findings and recommended treatment. **Results:** Of the hundred and fourteen patients reviewed, 34 patients presented for routine eye examination. Of these, 9 patients (26%) needed treatment or follow-up care: 7 for significant refractive errors and 3 for ocular pathology. Eighty patients presented with a concern: 35 for possible strabismus, 21 for ocular pathology (including aniridia, history of trauma, congenital glaucoma, aphakia, ptosis), 14 for visual concern (including second opinion for non-accidental head trauma, tracking problems,

nystagmus, rubbing of the eyes, head tilt), and 10 for positive family ocular history (including strabismus/amblyopia, refractive error, ocular pathology, systemic condition with ocular manifestation, and color vision deficiency). Of these 80 patients, 43 were confirmed to have an eye or vision problem: 21 patients had strabismus, 24 had ocular pathology (aniridia, trauma, glaucoma, aphakia, cataract, ptosis, duct obstruction, ROP, Albinism, Duane's syndrome, blepharitis, conjunctivitis, optic nerve abnormality), and 36 had vision problems (gaze limitation, tracking, nystagmus, refractive error). A total of 5 patients received corrective lenses. **Implications:** Seventy percent of patients presented with perceived ocular complaints. Of these patients, 83% (67 out of 80) were found to have ocular conditions that needed treatment or follow-up care. Additionally, almost one-third of the patients presenting for routine examination had a diagnosis that required immediate intervention or frequent monitoring. The implications of these results are that infant patients are presenting to optometrists in an urban setting requiring management of visual disorders, and as public health professionals, we should continue to educate and to promote the importance of eye examinations by one year of age, particularly to find and treat those without presenting symptoms.

#13. BREASTFEEDING VERSUS BOTTLE-FEEDING — DOES SUPPLEMENTED FORMULA LEVEL THE PLAYING FIELD: A LITERATURE REVIEW

T. Thomas Chwe, B.S.

Breastfeeding or bottle-feeding? This is an age-old question that many mothers continue to grapple with every day. It is estimated that 82% of children in the United States are breastfed either exclusively or in conjunction with bottle-feeding. Today, there is substantial interest in the role of long-chain polyunsaturated fatty acids (LCPS) in the visual and cognitive development of infants and children. Two LCPs, docosahexaenoic acid (DHA) and arachidonic acid (ARA), are important structural components of membrane lipids of the brain and retina. Some infant formulas currently sold in North America provide no DHA or ARA, and other formulas vary in the amounts of DHA and ARA provided. Recent studies provide consistent evidence that high doses of DHA plus AA, coupled with prolonged supplementation for up to 12 months, allow for optimal visual development of infants. The positive effects of LCP supplementation

on the development of visual acuities are demonstrated with the more sensitive electrophysiological tests (such as VEP) rather than behavioral methods (such as teller acuity cards). There have been numerous studies published about the effects of visual maturation of term infants who are fed LCP-supplemented formulas. Large differences exist in the outcomes of these studies. Those that provided lower concentrations of total fatty acids, used teller acuity cards as an outcome measure, and had smaller samples sizes were less likely

to show a functional benefit. Extensive research into nutrition related to visual development of infants has opened new doors for the optometric profession. This literature review emphasizes the need for optometrists to be involved in the nutrition of their youngest patients, as it relates to optimum visual health and development. Individuals who are not able to provide breast milk to their infants should be educated about the importance of incorporating LCP-supplemented formulas into the diets of their young.

Congratulations to the following individuals who completed the certification process during the 2008 COVD 38th Annual Meeting!

Fellows	Mentors
Cody Bengoa, OD, FCOVD	Dr. Elizabeth Christensen
Elizabeth Crandon, OD, FCOVD	Dr. Pat Pirotte
Jenifer Dattolo, OD, FCOVD	Dr. Sharon Berger
Kristi Jensen, OD, FCOVD	Dr. Paul Bernstein
Robert I. Johnson, III, OD, FCOVD.	Drs. Ron Bateman & Roger Dowis
Karen Love, OD, FCOVD.	Dr. Camilla Dukes
Rochelle Mozlin, OD, FCOVD, FCOVD-A.	(Dr. Mozlin received her FCOVD-A this year.)
Joanne Myung, OD, FCOVD	Dr. Alan Brodney
Lori Nishida-Eugenio, OD, FCOVD	Dr. Gary Etting
Tomohito Okumura, FCOVD	Dr. Beth Ballinger
Marc Taub, OD, FCOVD	Dr. Richard Sorkin

To obtain Board Certification in Vision Development and Therapy, optometrists must complete a Guided Study Program involving submission of written responses to a series of questions relating to clinical diagnosis, treatment and patient management and three detailed case reports for evaluation by the COVD International Examination and Certification Board (IECB). Academic Fellow (FCOVD-A) Candidates are evaluated

on the basis of their published research in the areas of functional and behavioral vision care. All candidates must also successfully complete a written examination and oral interview administered by the IECB. Candidates who have successfully met all the requirements for certification are awarded Fellowship in the College of Optometrists in Vision Development (FCOVD).

COVTs	Employed by	Mentors
Karen Cramer, COVT	Dr. Nancy Torgerson.	Dr. Torgerson
Dawn Grandmont, COVT.	Dr. Dawn Dunford	Linda Sanet, Tom Headline, Vickie Bedes, & Irene Wahlmeier
Meghan Hayes, COVT	Dr. Lynn Hellerstein	Stacie Ryman
Keri Hees, COVT.	Dr. Jason Clopton	Kathy Renolds
Judy Marron, COVT	Dr. Julie Ryan	Dr. Ryan & Linda Sanet
Adia Mcduffey, COVT	Dr. Philip Bugaiski.	Jane Wood
Sarah Merigold, COVT.	Dr. Philip Bugaiski.	Stacie Ryman
Robert Nurisio, COVT.	Dr. Mary McMains	Linda Sanet
Alyson Olmstead, COVT.	Dr. Dan Fortenbacher.	Jackie Bralick
Marybeth Ranelli, COVT	Dr. Allen Cohen.	Dr. Cohen & Jo-Ann Basso
Lynette Yazzie, COVT.	Dr. Robert Esposito.	Tennille Moore

To become a Certified Optometric Vision Therapist (COVT), an individual must be employed by an optometrist who is a Fellow of COVD, complete a guided study education program, and pass a written exam and an oral interview administered by the IECB. The certification process provides an

opportunity for optometric vision therapists to expand and document their knowledge and skills in vision therapy and enhance their ability to assist the optometrist in providing patient services in this area of optometric care.