

Posters ICBO 2010

- **Does Socio-economic Status Influence Vision Screening Failure Follow-Up Rates?**
 - Jim Venable, OD, FCOVD, Marc B. Taub, OD, FCOVD, FAAO, Jake Schmitt, BS
- **Socio-economic Status Does Not Correlate With the COVD-QOL**
 - Robyn Russell, OD, Marc B. Taub, OD, FAAO, FCOVD, Janna Iyer, BS
- **Normative Developmental Values of Randot Stereoacuity in Children and Young Adults.**
 - Marc B. Taub, OD, FAAO, FCOVD
- **Southern College of Optometry Pediatric and Vision Therapy Residencies**
 - Marc B. Taub, OD, FAAO, FCOVD, Cheryl Ervin, OD
- **Direction Discrimination Training Removes Timing Deficits in the Dorsal Pathway that Impair Cognitive Function,**
 - Teri Lawton, PhD
- **Screening For Auditory-Visual-Proprioceptive Processing Deficits in Patients With ABI/TBI**
 - Deborah Zelinsky, OD, FCOVD, Vassilis Kokotas, Optometrist
- **Prisms: The Optical Transformation and Practical Consequences**
 - James Hilbert, O.D., Gregory Kitchener, O.D.
- **Down syndrome and Vision Therapy: A Case Report**
 - Karen Kehbein, OD
- **Cerebral Palsy: The Optometrist's Role**
 - Ashley Schuelke, OD
- **Objective Support of Optometric Intervention in a Case of Traumatic Brain Injury**
 - Merrill D. Bowan, OD
- **Methods and Rationales for Measuring Plus Gradient Response AC/A in Symptomatic Individuals**
 - David A. Damari, OD, FCOVD, FAAO, Ashley Schuelke, OD, Karen Kehbein, OD
- **InfantSEE®: An Early Intervention to Vision Development in Infants**
 - Mark Schwartz, M.P.H, Glen Steele, OD, FCOVD, Pam Lowe, Walter Morton, Jim Spangler, OD.
- **Improved Process & Outcomes in a Private Vision Therapy Practice through Research Methods**
 - Dana Dean, OD & Herbert William Cobb, PhD, MA, CSSBB
- **The Use of Yoked Prism to Create a More Efficient Visual Process.**
 - Charles Shidlofsky, OD, Felicia Jackson, BS
- **The Management of Vision Therapy: A Call to Action on Improving the Reporting of Quality of Life Outcomes of Our Patients**
 - Sue Larter, BOptom, MSc, FACBO, FCOVD
- **Unilateral Optic Nerve Hypoplasia and Vision Loss in Childhood**
 - Christine Allison, OD, FAAO, FCOVD and Rachael Beatty, OD
- **Nature versus Nurture Revisited: A Literature Review on Genetic Factors in Myopia.**
 - Jasmine Yumori, OD, Frank Spors EurOptom, MSc, Vaibhav Tiwari, PhD, Daniel Kurtz, PhD, OD
- **A Gun Shot to the Head: Oculo-visual & Perceptual Anomalies**
 - Dominick M. Maino, OD, MEd, FAAO, FCOVD-A, Darrell Schlange, OD, DOS, Robert Donati, PhD, Bakouris C, Nikoniuk M.
- **Focusing the Visual Ambient System: Visuo-Somatic Realignment**
 - Michael Christian BSc (Hons), BSc (Optom), Bryan Smith B. Optom, FACBO, FCOVD
- **Case Report Applying Quantum Optics, Visuo-Somatic Realignment (QO-VSR) to Patients Requiring Neuro-Optometric Rehabilitation**

- Michael Christian BSc (Hons), BSc (Optom), Bryan Smith B. Optom, FACBO, FCOVD
- **Quantum Optics, Visuo-Spatial Realignment (QO-VSR)**
 - Michael Christian BSc (Hons), BSc (Optom), Bryan Smith B. Optom, FACBO, FCOVD
- **Streff Syndrome: A Case Report and Literature Review**
 - Ragna Godtland, BS, Carol Scott, OD, FCOVD
- **VEP for the Primary Care Optometrist**
 - Scott Steinman, OD, PhD, FAAO, Brigitte Keener, BS, Karen Kehbein, OD
- **Testing Strategies For Visual Efficiency in Detecting Fine Visual System Deficits**
 - Vivian Wong OD
- **The Use of the Nintendo Wii Balance Board with the Head Injury Population**
 - Joseph B. Sullivan, OD, FCOVD, Julie A. Toon, OD
- **A Multi-Sensory Integration Activity across Visual, Vestibular, Auditory, Temporal and Proprioceptive Senses: “The Slotnick Scramble”**
 - Samantha Slotnick, OD, FAAO, FCOVD
- **Fixation Disparities in Diagnosing and Monitoring Ocular Motor Comitancies and Incomitancies**
 - Selwyn Super, D. Optom, MEd, PhD, Dip-AAO
- **Stereopsis in Diagnosing and Monitoring Brain Disease**
 - Selwyn Super, D. Optom, MEd, PhD, Dip-AAO
- **Optometric Correlates of Developmental Delay in a population of patients with learning difficulties.**
 - Caroline M.F. Hurst BSc FCOptom FBABO, Dr Neil Spencer

Does Socioeconomic Status Influence Vision Screening Failure Follow-Up Rates?

Jim Venable, OD, FCOVD, Marc B. Taub, OD, FCOVD, FAAO, Jake Schmitt, BS

Eighty percent of what a child learns is acquired through the visual system. According to the American Optometric Association, about sixteen percent of all children suffer from inadequate visual skills while upwards of ninety-four percent of children with reading problems have reduced visual skills. Vision screenings are used throughout the country to detect amblyopia, strabismus and various refractive errors, but the conversion rate to full examination from a screening failure can be frustrating to all involved. This poster will examine one of the potential barriers to this process, socioeconomic status.

The Southern College of Optometry School Vision Screening sees approximately 7500 students throughout the Memphis metropolitan area each year. The screened children attend public, private and head start school programs. In concert with the Shelby County School System, a three-year study was begun to examine the follow-up rates at three public elementary schools of different socioeconomic levels (SL). Following a vision screening failure, a notice was sent to the child's home informing the parent or guardian. Three and six months later, the home was called to determine whether the child received the recommended eye examination by an eye care professional.

The following rates of follow-up examinations at the three month and 6 months intervals for each school were found.

- 1) High SL-3 months-6/10 (60%) 6 months-7/8 (87.5%)
- 2) Middle SL- 3 months 9/18 (50%) 6 months-12/15 (80%)
- 3) Low SL-3months 14/36 (39%) 6 months-22/31 (71%)

This data, while not definitive due to a small amount of failures at certain schools, does show a pattern: the children that attended the lowest socioeconomic school have the lowest rate of follow-up. This is an indication that a greater effort must be taken on the part of the Shelby County School system (including school nurses, teachers and administrators), the Southern College of Optometry and others participating in the screening process to educate parents about the importance of vision in learning, especially those in lower socioeconomic regions.

Socio-economic status does not correlate with the COVID-QOL

Robyn Russell, OD, Marc B. Taub, OD, FAAO, FCOVD, Janna Iyer, BS

Background: *It has been documented that children of lower socio-economic status are less likely to see an eye-care specialist or to use screening services.* Unfortunately, as socio-economic class decreases, the risk factor for strabismus, amblyopia, and refractive error increases. This population is underserved by community and health care professionals, including eye care providers.

Significant causes of poor academic performance are commonly undetected visual problems. The prevalence of undetected vision problems among school children has been reported as high as 25 percent and is possibly even higher in lower socioeconomic areas. The College Of Vision Development Quality Of Life (COVID-QOL) questionnaire elicits measurements of visual symptoms, and has good test-retest reliability. The test has been shown to have an inverse relationship with academic measures. The COVID-QOL is a valuable, easily administered screening tool that can help identify children who are likely to do poorly in school due to an undiagnosed learning related vision problem. *This study investigates the relationship between parent and child COVID-QOL results and socioeconomic status.*

Methods: Our method for classification for socio-economic level was based on the percentage of free/reduced lunch for each school provided by the Shelby County school system. The socio-economic classifications were as follows: less than 25%-high, 25-75%-middle, greater than 75%-low. Copies of the COVID-QDL questionnaire were provided to each of the schools to be sent home for the parent and child to fill out. Participants were asked to complete the form without assistance or consulting with the other party. Surveys were collected a minimum of two weeks later.

Results: No significant difference was observed when comparing socioeconomic classification based on child ($p=0.16$), adult ($p=0.93$) and total score ($p=0.31$) using ANOVA. No significance between child and adult COVID-QOL scores for each of the three socioeconomic classifications: high- $p=0.98$, middle- $p=.32$, low- $p=.26$ was found using unpaired t-test. In closer observation, the mean of the children's scores were higher than the adults and this difference was greatest for the lowest socioeconomic level (low-3.97, middle-1.45, high-0.03). Of note was the increase in the percentage of scores considered suspect (≥ 20) as the socioeconomic level decreased. (high- 17.2%, middle-19.2%, low-25%) as well as the percentage of children scoring as suspects when completed by the child themselves. (high-48.8%, middle-60.5%, low-72.7%)

Conclusion: The results of this study indicate that the COVID-QOL survey can be used to assess visual function in children of all socioeconomic levels. The fact that no difference in COVID-QOL score was observed whether the survey was completed by the child or adult differs from other investigations making further research warranted. Whether there is a difference based on age as has been previously put forth, should be the focus of such future study. In evaluating the current literature concerning the COVID-QOL we found that the test is easy to use, an accurate measure of visual function and can successfully be used in children regardless of age, race and gender.

Normative Developmental Values of Randot Stereoacuity in Children and Young Adults

Marc B. Taub, OD, FAAO, FCOVD

BACKGROUND: Stereopsis testing is considered standard of care in most optometric offices and offers the clinician a way to assess binocular function quickly and efficiently. Randot stereoacuity is the most widely used test to measure stereopsis, yet there is limited normative data available in pediatric populations. Investigation typically focuses on younger children and may use any number of testing devices. The Southern College of Optometry School Vision Screening program sees approximately 10,000 students throughout the Memphis metropolitan area each year. The purpose of this study was to establish Randot stereoacuity norms to assist clinicians in recognizing normal vs. abnormal stereoacuity levels.

METHOD: The Randot stereoacuity test (Global and Contour) was administered to 6928 children whose ages ranged from 4 to 13 years. A battery of tests including visual acuity, retinoscopy, and cover test were performed at the screening to establish whether the child passes or failed the screening based on set guidelines. Because this was an investigation to determine normative data on the Randot test, children who failed the vision screening were excluded. Stereoacuity failure was considered to be worse than 70 seconds of arc. Inclusion criteria included having a near visual acuity within one line of each other OD, OS. (n=2758) The stereoacuity for each child was recorded.

RESULTS: The range of stereoacuities for all the age groups (n=2758) at 40 cm was 70 to 20 seconds of arc. The mean stereoacuity for all of the children was 34.10 seconds of arc. The mean stereoacuity for the children decreased from 42.43 +/- 13.64 seconds of arc at four years to 27.61 +/- 6.61 seconds of arc at 13 years. The percentage of participants scoring at or above what is considered to adult levels of stereopsis (40 sec of arc) was 77.2%.

CONCLUSION: This paper provides normative data for Randot stereoacuity throughout childhood. While previous studies using different test devices place the age at which stereopsis in children reaches adult levels between 3 and 9 years, this study found this age to be at the lower end of that range, between 4 and 5 years old. Also of interest is the improvement in stereopsis as the child continues to age, indicating that what might be acceptable levels in younger children may be only subpar in young adults. As clinicians, we are always striving detect visual problems but limit our false positives, keeping in mind the normative data for Randot stereoacuity allows us to do just that.

Methods and Rationales for Measuring Plus Gradient Response AC/A in Symptomatic Individuals

David A. Damari, O.D., FCOVD, FAAO

Background and Aims: Accommodative and binocular vision disorders are increasingly being recognized by the general public and other health care professionals as detrimental to academic and occupational accomplishment and therefore deleterious to an individual's quality of life. In fact, the new governmental disability laws view these disorders as disabling. Therefore, it is increasingly important to correctly identify patients whose symptoms are correlated with clinically measurable conditions. An efficient and effective means of measuring the response accommodative convergence to accommodation ratio (AC/A) in a clinically meaningful way is proposed and several case examples are given.

Methods: von Graefe phorias are measured at near through either the habitual or the manifest refraction, and then again through a +1.00 D addition. Nott or monocular estimate method (MEM) retinoscopy is also performed under both those conditions. The change in phoria is divided by the change in accommodative response to derive the plus gradient response AC/A.

Results: The accommodative/vergence mechanisms behind conditions that were previously difficult to explain, such as pseudo-convergence insufficiency, are more readily apparent with this method. Three cases demonstrate how this method results in better clinical corollaries between symptoms and findings.

Conclusions: This combination of phoria measurement and quickly performed retinoscopy in two different conditions can result in more powerful analysis of the accommodative/vergence relationship in individuals with significant symptoms.

Southern College of Optometry Pediatric and Vision Therapy Residencies
Marc B. Taub, OD, FAAO, FCOVD, Cheryl Ervin, OD

Founded in Memphis, Tennessee in 1932, Southern College of Optometry (SCO) ranks as one of the nation's leading institutions of optometric education. Students and faculty enjoy the opportunity to learn and practice optometry in The Eye Center, one of the largest and most clinically advanced vision and eye care centers in the country. Our students benefit from hands-on learning as they accompany faculty on community outreach initiatives at school vision screenings and regional health care settings. SCO students even travel abroad to take eye care to those in need around the globe. Following graduation, we encourage our students to attain further knowledge by participating in a residency. Our residency program has grown exponentially since it began in 1976. There are currently 20 programs and 37 slots across the country. We are proud of the variety of program ranging from Primary Care to Ocular Disease to Vision Therapy.

The largest growth area in the SCO residency program comes in the areas of pediatrics and vision therapy. There are eight residency slots in 7 programs. Two college based programs, Pediatrics and Vision Therapy/Low Vision area available. 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 has two past COVD presidents, the editor of a major optometric journal, the current President-Elect of COVD, the current Chair of Infantsee, 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.

Behind the vision of Dr. WC Maples, the first Private Practice Vision Therapy residency was created in 2007 at the office of Dr. Stanley Applebaum in Bethesda, MD. Since that time, four more programs have been created at the following offices: Dr. Pat Pirotte-Wichita, KS; Dr. Bradley Habermehl-Flint, MI; Dr. Barry Tannen-Hamilton Square, NJ; Dr. Leonard Press-Fairlawn, NJ. These private practices residency programs offer the opportunity for increased clinical knowledge and the chance to learn the business side of running a practice that includes vision therapy. Each residency supervisor is a Fellow of the College of Vision Development and considered a leader in the field of vision therapy. The goal of these programs is simple: produce well versed clinicians that will incorporate vision therapy into their practices.

As the importance of residencies continues to grow in the optometric profession due to board certification and specialization, there will be a need for an increased number of residency programs and positions. SCO has stepped up to the plate by expanding both and has done so in a variety of specialties. In the areas of pediatrics and vision therapy, SCO offers quality alternatives and offers the optometric community a glimpse at the future of residencies.

InfantSEE®: An early intervention to vision development in Infants

Mark Schwartz, M.P.H, Glen Steele, OD, FCOVD, Pam Lowe, OD, Walter Morton, OD, Jim Spangler, OD

InfantSEE, ® a jointly funded program between the Vision Care Institute of Johnson & Johnson and the American Optometric Association with funding provided by the Center for Disease Control, provided a public health program designed to provide comprehensive vision assessments to infants in socio-economic and geographic diverse populations in eight locations across the country. Through various social marketing efforts in selected locations, infants (6-12 months) received a no-cost comprehensive vision assessment to identify vision concerns for the infant and reassure mothers that their infants' vision is developing properly. Furthermore, this early intervention initiative poses an ideal opportunity to integrate vision care into routine care for infants.

During the first 8 months of 2009, the InfantSEE® week tour provided no cost comprehensive examinations to 868 infants in the specified age range. Of those infants (6-12 months) who received an InfantSEE® exam, there were 137 causes for concerns. Additionally, of the 868 infants examined, there was considerable difference between perceived issue and actual issue. The results of this targeted population show a rate of concern expressed in 1 of 6 exams conducted in this project. Two populations were at a statistically significant rate of cause for concern: pre-mature infants and infants of minorities. Both of these populations demonstrate a high rate of causes for concern in this population: premature, 1: 5 and minority 1: 4. Furthermore, socio-economic level may play an important role in vision concerns. Average and median income for this population was reported at \$47,600 and \$36,000 respectively. Of those infants below the median income of 36,000 there was a rate of concern of 1:4 above the median income, 1: 6.

Significant examination to access to care as well as other factors including but not limited to socio-economic level, family history of vision diseases as well as access to care may be contributing factors in the increase of causes for concerns in various populations as it specifically relates to vision development. Further examination of these populations is needed.

Objective Support of Optometric Intervention in a Case of Traumatic Brain Injury

Merrill D. Bowan, O.D.

Post-Concussive Syndrome (PCS) has a number of seriously distressing symptoms, and Post-Traumatic Vision Syndrome (PTVS), is a specific sub-set of symptoms that encompasses PCS issues. We now know that eye problems and other reported difficulties that result from a brain injury often occur because of a syndrome of interferences in the central nervous system. For several decades, optometric clinicians and researchers have been aware of the power of low powered prisms (here being called microprism) and low plus lenses (microplus) in resolving many aspects of the sequelae of head and neck trauma. The precise reasons why they have worked have not been well understood.

One painfully light sensitive PCS patient (43-YOF) presented with severe balance issues over the past 4 months following a head injury. She had slipped on ice in her driveway, striking the posterior skull. She was wearing very dark sunglasses and her posture and movement were guarded and wary. There was no loss of consciousness and she was diagnosed with a severe concussion. Her symptoms developed almost immediately after the insult. Vestibular problems, photophobia, confusion, and continuous headache were her major issues. Imaging, neurological, and neuropsychological evaluations were not exceptional. She had been doing vestibular training for about 9 weeks at the time of our examination.

The patient was wearing soft contact lenses successfully and was corrected to 20/20. OD, OS, OU. The 25-W. light from the Keystone Telebinocular was highly distressful without her dark gradient sunglasses. Moderate exophoria was revealed on cover/uncover testing, and nearpoint pushup was very distressing, with defensive pulling away at about 8". Overrefraction of the SCL's was essentially plano.

A pair of 1^Δ Base In OU lenses was empirically introduced before her eyes in real space and the patient unexpectedly experienced instant relief of all hypersensitivities. Her posture changed to an unguarded one and she was able to easily stand in bright sunlight in our waiting room.

Balance Master® challenges performed by the vestibular center showed that the Composite score (a blending of four different test condition scores) had reached only 20% (see Fig. 1) five days prior to our exam (75% is the minimum needed for discharge). The battery was repeated 48 hours after the examination with her new microprism Rx and the patient now scored 76% functionality on the Composite score. (See Fig. 2) Her headaches subsided immediately and she no longer had to take acetaminophen QID. Her speech pattern and thought processing improved almost totally, according to her husband, her daughter noted that she was more "perky."

Our clinical experiences have revealed that very low powered lenses and prisms (microprism and micro-plus) are powerful tools in addressing a high percentage of PCS/PTVS sufferers. The results are fascinating because the changes are almost immediate. Additional clinical and systematic research is needed to provide support for this practice, but for the present, the risk to benefit ratio is extremely positive and cost-effective.

Until that research occurs, the use of microprism and microplus lenses as a clinical probe and potential intervention needs to be encouraged for screening candidates when addressing the life-disturbing issues of PCS and PTVS sufferers.

CEREBRAL PALSY: THE OPTOMETRIST'S ROLE

Ashley Schuelke, OD

BACKGROUND: Multiple investigative studies have demonstrated that the cerebral palsied population is more likely to have deficient visual skills than the general population. Visual anomalies common to these patients include: strabismus, amblyopia, visual field defects, saccadic and pursuit dysfunction, accommodative insufficiency and reduced visual perceptual abilities. Regardless of intelligence, the visual deficits alone can lead to reduced reading success. As optometrists, we play a critical role in the day to day functional abilities of these patients.

Refractive conditions vary in this population and the clinician must take into account that the appropriate distance lens is likely inappropriate at near. If bifocals are contraindicated due to insufficient motor abilities, the patient's individual needs and activities of daily living must be considered in the final lens prescription. Vision therapy to improve oculomotor and perceptual skills can greatly benefit cerebral palsied patients. The activities should be remediated and adjusted to a level that is feasible yet still challenging for that particular patient. Doctors can be successful using their typical oculomotor/perceptual treatment programs as a guideline with the addition of individual patient refinements.

CONCLUSIONS: A literature review will be offered regarding the challenges faced by patients with cerebral palsy and what role optometrists play in their ability to process visual information. My challenge to the optometric physician is to release the fear of treating patients with disabilities. With kindness, compassion and a little creativity we can dramatically change the life of a patient.

Down syndrome and Vision Therapy: A Case Report

Karen Kehbein, OD

Background: Patients with Down's Syndrome can present with a variety of ocular conditions, encompassing the entire eye. Higher degrees of refractive error, keratoconus, nystagmus, and lens opacities were noted in these patients. Amblyopia and strabismus have been found to occur more often in patients with Down's Syndrome than in other patients. Additionally, these patients tend to under-accommodate when viewing near targets, but when prescribed near addition bifocal lenses, their accommodation and attention to near tasks improved.

Case Presentation: A 2 year old female with Down's Syndrome presented for an eye examination after her parents noticed her eyes turn inward. She was diagnosed with intermittent alternating esotropia, and she received her first pair of glasses for hyperopia correction. Additionally, she was enrolled in a vision therapy program to help improve her depth perception and eye movement control. Techniques utilized in her therapy included bean bag toss, Quoits, and 6-form board. After a few therapy sessions, her parents noticed that her eyes turned less and she was able to grab toys more accurately. At her comprehensive eye examination at age 4, she had good control of her esotropia while wearing her glasses. A new glasses prescription was given to correct for a higher amount of hyperopia. She will return in one year for another comprehensive eye examination, and further vision therapy to gain control of her intermittent alternating esotropia will be considered at that time.

Conclusion: Down's Syndrome can include many ocular manifestations, and behavioral optometrists have a unique role in the treatment of many of these manifestations. Vision therapy should be considered in patients with Down's Syndrome to help them gain better control of their eye movements, improve their depth perception, and increase their accommodation when viewing near targets.

Prisms: The Optical Transformation and Practical Consequences

James Hilbert, OD, Gregory Kitchener, OD

An object space viewed through a prism results in an optically transformed image space. The optical transformation is generally described as a simple translation of the visual space. In relation to the object space, the image space is displaced in the same direction as the apex of the prism and the shift is proportional to dioptric value of the prism. The geometric optics of this prism transformation is usually illustrated and calculated using simple point sources of light.

When prisms are fabricated in spectacle lenses the scene seen is an entire field rather than the idealized points of light used in the first-order approximation of geometric optics. Under these conditions, observers report qualities that are frequently described as being at odds with the basic geometric optics. Varied descriptions based on a mixture of optical effects and perceptual phenomena have led to disparate descriptions of the canonical effects of the prism lens.

In fact, the optics of the prism are more complex than the first-order approximation and a better understanding of the optical transformation may facilitate more consistent descriptions. A better description of the canonical effects of the prism can provide a better foundation for evaluating patient reports and behavior when testing with and prescribing prisms.

This paper will describe aspects of the prismatic transformation of an object field as a start toward a better conical description of lenses. Aspects to be considered will include:

- Field translation or field rotation
- Size and distance changes in the field
- Effective prism power

Clinical implications for testing, prescribing and fabricating will be offered.

Screening for auditory-visual-proprioceptive processing deficits in patients with ABI/TBI

Deborah Zelinsky, OD, FCOVD, Vassilis Kokotas, Optometrist

Determination of the stability of sensory integration is of great importance during diagnosis and rehabilitation. Perception and internal representation is based on integration of both conscious and subconscious multi-sensory processes. The often overlooked realm of unconscious information-gathering is the foundation upon which patients make judgments and motor planning decisions. For instance, reflexive shifts in body and head position modify proprioceptive input from the neck and shoulders, inducing counterbalancing eye movements. While more than 80% of the retinal fibres are devoted to sight specific functions, 20% of the retinal input is actively involved in non-sensory subcortical processes, such as connections to auditory and posture systems. Further linkages between the auditory and visual systems were proven by Harry McGurk's 1976 discovery that perception is altered when visual and auditory inputs are mismatched.

Multi-sensory information processing problems are often presented in patients with ABI or TBI. The proposed screening for visual-auditory-proprioceptive deficits can be easily applied to these cases and become a useful tool for helping optometrists prescribe lenses, prisms, tints or partial occlusion to maximize sensory integration. Enhanced performance can be determined by the use of simple equipment. The underlying neurological concepts confirm, reinforce and expand Skeffington's model on the overlap and integration of processing that allows vision to emerge, offering new perspectives in optometric vision care. Optometry is in the unique position to non-invasively influence both cortical and subcortical processing.

Nature versus Nurture Revisited: A literature review on genetic factors in myopia

Jasmine Yumori, OD, Frank Spors EurOptom, MSc, Vaibhav Tiwari, PhD, Daniel Kurtz, PhD, OD

While myopia is one of the most common eye conditions in the world, its etiology is not fully understood. The current literature suggests the involvement of both environmental and genetic factors, however most clinical trials focus primarily on modifying environmental factors in myopia. There is evidence that such treatment modalities may be successful in decreasing the progression of myopia, but some of these studies show a lower-than-expected efficacy. A possible explanation may be the interaction with genetics. Twin studies and studies involving other possible hereditary aspects of myopia highlight the importance of genetics. Recent advances in technology have allowed researchers to further investigate genetic loci associated with myopia and thus solidify the importance of evaluating both genetic and environmental factor in myopia. By understanding the interaction between genetic and environment factors in myopia, we may be able to most accurately select available treatment options to best care for our patients in the future.

A Gun Shot to the Head: Oculo-visual & Perceptual Anomalies

Dominick M. Maino, OD, MEd, FAAO, FCOVD-A, Darrell Schlange, OD, DOS, Robert Donati, PhD, Bakouris C, Nikoniuk M.

BACKGROUND: Traumatic brain injury (TBI) results from mild, moderate or severe trauma to the head. The use of firearms, motor vehicles and falls causing the most deaths from TBI with firearms being the leading cause of death among persons aged 20 to 74 years. The CDC estimates that 5.3 million Americans (2% of the US population) have suffered a TBI. More than 1.4 million people a year sustain a TBI with 50,000 of these individuals dying and 235,000 being hospitalized.

CASE REPORT: A 25 y/o H M (AO) with a history of a gunshot to the right side of the head presented with left side spasticity and hemianopsia. He also reported horizontal and vertical diplopia and problems tracking a moving object and reading difficulty. AO had completed a post TBI rehabilitation program (OT, PT, Speech/Lang), but still has PT 2X a week. His current medications include Phenytoin, Sertraline, Kepra and Baclofen. AO had no known allergies. His unaided DVAs were 20/25 OD/OS and 20/20 OD/OS at near with a small amount of myopia and astigmatism. A 6 XT with 8LH was seen at far with an 18XT with 8LH noted at near. Assessment of his accommodative system and pursuit/saccades showed variable responses. No random dot stereo was seen and he either reported diplopia or suppression on the Worth 4 Dot. An assessment of the external ocular health was remarkable for lag ophthalmus and dry eye. Applanation tonometry was 16 OD, 20 OS. The dilated fundus examination was unremarkable except for temporal ON pallor. We also completed a vision information processing assessment, Visagraph, and TOVA (visual attention). His final diagnosis was exotropia, hypertropia, diplopia, suppression, oculomotor dysfunction, accommodative instability, dry eye, optic nerve pallor, left hemianopsia and multiple vision information processing anomalies. A multifocal prescription was given with both ground in and Fresnel prisms which eliminated his diplopia. Artificial tears and Omega-3s with appropriate hydration were suggested for the dry eye. We have also started an in/out of office optometric vision therapy program to remediate, rehabilitate or enhance existing or emerging oculo-visual-perceptual abilities.

CONCLUSIONS: AO showed many of the oculo-visual anomalies associated with Post Trauma Vision Syndrome. We have so far decreased his dry eye symptoms and eliminated his diplopia. Because of this, his reading and quality of life has already improved. All individuals with TBI should be assessed and treated by an optometrist who may be able to provide additional rehabilitative services beyond those routinely offered by the medical community.

Unilateral Optic Nerve Hypoplasia and Vision Loss in Childhood

Christine Allison, OD, FAAO, FCOVD, Rachael Beatty, OD

Background: Optic nerve hypoplasia (ONH) is a common cause of vision loss in children. The bilateral condition is much more common. Unilateral ONH is often misdiagnosed as amblyopia. The clinical presentation varies, and the visual acuity (VA) ranges from 20/20 to blindness. ONH can be associated with developmental delays and endocrine deficiencies among other congenital abnormalities.

Case Report: A 10 yr old African American was referred with a complaint of problems with reading. He was previously diagnosed with amblyopia with a best corrected VA of 20/200 OD and 20/20 OS. Entrance testing exhibited decreased VA at distance and near OD (20/200) and decreased color vision with no strabismus or papillary defect noted. His refractive error exhibited a small amount of compound hyperopic astigmatism OU. Anterior segment and intraocular pressures were normal. The dilated fundus evaluation showed a subtle double ring sign and the appearance of temporal elevation of the OD optic nerve head. Optic nerve cupping was small OU. All other retinal findings were normal in both eyes. After evaluation of the nerve with visual evoked potential testing, fundus photography, ultrasonography, and retinal nerve fiber analysis, a diagnosis of unilateral optic nerve hypoplasia was determined.

Treatments: Polycarbonate eyewear and/or protective sports goggles with full correction was recommended to be worn full-time. A trial period of six hours of direct patching therapy was initiated. The patient was referred back to their pediatrician for possible endocrine testing. Since the child was complaining of reading difficulties, vision therapy for oculomotility and accommodation was recommended to improve the efficiency of the preferred eye. The use of large print materials and increased computer fonts was encouraged as well.

Conclusion: Patients referred with a history of amblyopia need to be fully evaluated to determine the cause of vision loss. If there is a minimal refractive error and no strabismus, the ocular health must be thoroughly evaluated. Vision therapy in patients with pathological vision loss should be considered to improve the efficiency of eye movement skills. A trial regimen of patching should also be instituted in select patients to achieve maximum visual potential.

Testing strategies for visual efficiency in detecting fine visual system deficits

Vivian Wong, OD

Introduction: The common battery of tests in a visual efficiency evaluation are gross measures of the oculomotor, accommodation, and vergence systems in the eye and is sometimes inefficient at revealing small deficiencies in the visual system. However, patients with small discrepancies in their visual system can be extremely symptomatic. By performing more sensitive tests that allow for more detailed analysis of the different elements of the visual system, problems of visual efficiency can be more efficiently detected and properly managed.

Case Description: A 16-year old female presents with symptoms of blur and eye fatigue with sustained near work. She reports that words seem to fade in and out, flicker, move around, and shimmer on the page while reading. Although the CISS score classified her as symptomatic, results from the normal battery of tests for oculomotor, accommodation, and vergence skills performed on the Visual Efficiency Evaluation showed that her visual efficiency skills were within normal limits. Additional testing specific to measuring fine movements of the vergence and accommodative systems were administered to further investigate the patient's subjective complaints. A fixation disparity measurement was taken at 0 minutes, 5 minutes, and 10 minutes. An open-field autorefractor was used to objectively determine the patient's accommodative stimulus-response functions at 2 D, 3 D, and 5 D over 2 minute intervals for each accommodative demand. After additional investigation, the patient was found to have unstable fixation disparity ranging from 1 exo at 0 minutes, 1 eso at 5 minutes, and 1.5 eso at 10 minutes. The patient was also found to have poor accommodative stamina that resulted in greater inaccuracies of accommodation over time. This patient will be returning to pursue vision therapy in the near future. A pair of plus lenses were prescribed to provide her with optimal comfort with reading in the interim.

Discussion: This case illustrates the importance of performing testing that provides more sensitive measures of visual efficiency when the primary outcomes of the visual efficiency evaluation do not provide a clear explanation for a patient's symptoms.

Streff Syndrome: A Case Report and Literature Review

Ragna Godtland, BS, Carol Scott, OD, FCOVD

Background: Streff syndrome is a condition of visual stress. It is classically characterized by a decreased acuity that is more at near than at distance and loss of depth perception. There may also be color vision abnormalities that do not follow the color confusion lines and reduced visual fields. It is most often seen in patients age 6-12, with a slight female predilection. Although, it is associated with physical, psychological or emotional stress, it can only be diagnosed by optometric testing and low plus lenses are the primary treatment.

Case Report: A 7 y/o female presented with vague visual complaints. She reported struggling in school this semester. She had fallen out of a tree 6 months prior to this examination but had made a full recovery. Her mother had recently been hospitalized for psychiatric concerns. Her parents also reported that she was being bullied at school. Unaided distance acuities were 20/100 OD, OS and OU at distance and 20/200 OD and OS but 20/50 OU at near. She showed no stereopsis with the Stereofly and Wirt circles. Using Stress-point retinoscopy, +0.50 was determined to be the most appropriate prescription. The patient's acuity improved to 20/30 OU at distance. With this prescription, the patient was able to accurately localize the wings on the fly. Keystone Visual Skills showed an esophoric posture, reduced visual acuity at far and near, no stereopsis and abnormal color vision. Keystone Visual Skills test was repeated through +0.50 OU, which considerably improved her acuity, stereopsis and color vision. An FDT screener visual field showed un-patterned scattered defects with low test reliability. The patient returned in 6 weeks after wearing her prescription for a progress evaluation. At that visit, her acuity had improved to 20/20- OD, OS, and OU. Re-testing showed while the syndrome had improved the patient had binocular dysfunction and an in office vision therapy program was recommended. She was scheduled to return back in 8 weeks for a progress evaluation.

Conclusions: Streff syndrome is a condition of visual stress associated with physical or emotional stress. Plus lenses work to alleviate visual stress. These patients must be distinguished from traditional malingerers and the root cause of the Streff syndrome should be investigated. Besides from an ocular history, the clinician must make sure to investigate social and emotional issues to better serve the patient. Only when we take care of the entire patient, are we truly treating our patients.

A Call to Action on improving the reporting of Quality of Life outcomes of our patients.

Sue Larter BOptom, MSc, FACBO, FCOVD

The recognition of Behavioural Optometry is gaining momentum.

We are grateful to Dr Mitch Scheiman and colleagues for their pivotal and ongoing work in the PEDIG studies. We also thank Dr Sue Barry for her persistence and subsequent wonderfully exuberant eloquence in sharing her story of her developing stereopsis against the known 'truths', and Dr Gail Denton for sharing her experiences in her book 'Brainlash' where she describes her Vision Therapy for mild brain injury as being the '*cornerstone of my full rehabilitation*'. .

At the same time medicine is still claiming that behavioural optometric treatments "lack scientific evidence of efficacy" and in a review paper out of England by Barrett it is stated that "Although there are areas where the available evidence is consistent with behavioural optometric approaches.....a large majority of [these] approaches do not possess a solid evidence base, and thus cannot be advocated."

Barrett, however, then gives us a great opportunity. He states how Maples' work with Quality Of Life (QOL) questionnaires provides the means for assessing the efficacy of VT...and he wonders why we have not used this tool more. In 2006 Maple's says that "A patient's quality of life is now considered a significant factor when discussing the appropriateness of health care intervention....Relief and removal of symptoms is a prime consideration in health care therapies."

My task is to enlist all of you who are providing Clinic-Based Vision Therapy into the international collection of the type of data that is accepted and used by the broader scientific community to prove what we already know.

This poster is not about results...but about our combined potential to demonstrate the Power we wield in our therapy rooms.

Focussing the Visual Ambient System- Vision Body Integration

Michael Christian, BOptom, BSc (Hons) & Bryan Smith, BOptom, FCOVD, FACBO

Introduction: By assessing and treating the ambient visual system, a lens based Optometric Vision Training Program has emerged which Michael Christian calls Microprism® - Visuo-Somatic Realignment (VSR) or Vision Body Integration.

In practical terms VSR is the implementation of lenses and prism used in a dynamically integrative manner of aligning the eyes with the body, thus improving posture, balance and movement. This has a wide application on how we treat ametropia, sports vision optometric rehabilitation patients and Children's vision, leading to better outcomes.

Methods: Three posters will be presented, firstly to explain VSR, secondly to demonstrate the VSR protocol and thirdly to present a case study in which VSR was used to treat a Parkinson's Disease patient, referred for evaluation of possible Ambient Visual Dysfunction. The patient received an optometric examination and Visuo-Somatic Realignment or Vision Body Integration. Exam findings and treatments (lens therapy) will be discussed.

Case 1: 58 year old man Architect A R, diagnosed with Parkinson's Disease.

Presenting Rx: R -0.75/-1.25x85 6/6-2 & L -1.00/-0.75x89 6/6

Presenting complaint: Muscle rigidity; difficult slow movements; difficulty walking; stooped posture and poor balance. Initial Lens therapy prescribed:

R -0.50/-1.00 x 90 1pd Base Down, 1.0pd Base In (6/6)

L -0.75/-0.75 x 85 0.5pd Base Down, 0.5pd Base Out (6/6), (6/4.5/ou) ADD +2.25 (N5)

Multifocal Transition lenses were prescribed. Initial prescription gave patient a good sense of balance and posture.

Current Rx: R -0.50 1.5pd Base Up (6/6+)

L -0.50/-0.25 x 85 1.5pd Base Up, (6/6+), (6/4.5/ou) ADD +0.75 (N5)

Multifocal Transition lenses were prescribed. The prescription is reassessed every six months. Patient maintains a good balance and posture.

Conclusions: Focusing the Ambient visual system through Visuo-Somatic Integration or Vision Body Integration is the interplay of ophthalmic lenses and prism used in a fully integrative manner of aligning the eyes with the body both consciously and subconsciously.

This methodology allows visuo-somatic pathways to support and regulate vision such that subsequent ophthalmic prescriptions are reduced to a minimum or to no optical appliance being required at all.

Quantum Optics, Visuo-Spatial Realignment (QO-VSR)

Michael Christian BSc (Hons), BSc (Optom), Bryan Smith B. Optom, FACBO, FCOVD

QO - VSR - is a quantum physiological approach to the support and self-regulation of visuo-somatic mechanisms of the human body leading to both improved vision and interrelated somatic function.

VSR is a realignment process of ocular and systemic physiology, enabling dynamic equilibrium in both homeostatic regulation and homeodynamic redirection to take place.

VSR integrates the communicative interrelationships of focal and ambient vision, of how both the eyes and the body can be quantum-interfaced so that the whole person is focussed holo-kinetically i.e. in stationary and dynamic phases, allowing greater plasticity and stability of vision-body function.

VSR brings a huge paradigm shift to refraction. The patient is actively involved in the whole process. Eye movement, body movement are sequentially integrated with respect to location of regard in continuity with the spatial context of perspective.

The refraction now becomes a continuous process between right and left eyes, supported by body posture and its movements.

This new platform of interface allows for the correct alignment between motor projection and sensory reception, contrast and illumination, improved colour perception, spatial and local awareness dynamics, oculo-vestibular and proprioceptive integration, strengthening and/or setting up new oculo-somatic pathways for new or improved regulation.

This is a light driven or quantum process based on the holo-kinetic patterning of ophthalmic lens and prism insertion and removal. This is the Quantum Platform of Visuo-Somatic Optics.

VSR enhances both ophthalmic refraction and introduces holographic somato-kinetic therapy which not only redirects optical anomalies in the treatment of improving eyesight to more emmetropic conditions but also has direct bearing on somatic reflexes and voluntary movement, allowing visuo-somatic synkinesis i.e. how the eyes can affect the body and the body affect the visual system in a quantum holographic dependent interrelationship.

In practical terms VSR is the interplay of ophthalmic lenses and prism used in a fully integrative manner of aligning the eyes with the body both consciously and subconsciously.

This methodology allows visuo-somatic pathways to support and regulate vision such that subsequent ophthalmic prescriptions are reduced to a minimum or to no optical appliance being required at all.

Case Report Applying Quantum Optics, Visuo-Somatic Realignment (QO-VSR) to Patients Requiring Neuro-Optometric Rehabilitation

Michael Christian BSc (Hons), BSc (Optom), Bryan Smith B. Optom, FACBO, FCOVD

Background: QO - VSR - is a quantum physiological approach to the support and self-regulation of visuo-somatic mechanisms of the human body leading to both improved vision and interrelated somatic function. VSR is a realignment process of ocular and systemic physiology, enabling dynamic equilibrium in both homeostatic regulation and homeodynamic redirection to take place.

In this presentation, Visuo-somatic Realignment demonstrates application and benefit to patients requiring Neuro-Optometric Rehabilitation. The case here deals with Parkinson's Disease and how the effects of VSR can be shown both quantitatively and qualitatively.

Case Report: A 58 year old man Architect with Parkinson's complaining of a multitude of systemic and ocular issues including muscle rigidity and weakness, difficult slow movements and walking, poor balance, fixed facial expression, fatigue, dizziness/head spins, extreme glare discomfort, in which he can't open eyes during first 30minutes after waking. He was diagnosed with myopic astigmatism; and ambient vision dysfunction which required redirection. The patient was seen five visits over the course of 3 ½ years in which a series of prescription changes were made aimed at reducing symptoms by allowing visuo-somatic pathways to support and regulate vision, subsequent ophthalmic prescriptions were found to be reduced as a result. Low amounts of prism were prescribed in these prescriptions in varying directions and amounts based on the VSR protocol. A reduction in symptoms and prescription was demonstrated with proper care.

Conclusion: By continuous patient practitioner participation, improvement of the visuo-somatic system can be made manifest. It requires patience and continued application of VSR to be supportive as a re-directive process of light interfacing with the body coherently.

The use of yoked prism to create a more efficient visual process.

Charles Shidlofsky, OD, Felicia Jackson, BS

Background: Ambient visual processing orients space and is part of the sensory-motor feedback so it is important to evaluate the effects of vision since our sight leads our body. There is evidence that binasal occlusion and base in prism rebalances the ambient process, which is controlled unconsciously. While many practitioners use prism in a compensatory manner, the use of yoked prism in visual rehabilitation is not widespread. This case will outline the use of yoked prism in a child and the impact that it has had on her life.

Case Report: A 7 year old female had been under the care of an ophthalmologist for a partially accommodative esotropia and congenital nystagmus. The patient's mother had noted that her left eye was turning in more frequently when doing near activities and that her eyes were moving faster as well. During the course of the examination, the patient showed 9^Δ ET on Saladin phorias, nystagmus with a null point to the right of the midline, and her left eye turned inward at 3" on NPC. This patient was prescribed a low amount of yoked prism in the base down direction with a +2.50 add. At the 1 month progress visit there was both subjective and objective improvement in visual function.

Conclusion: Most practitioners would argue that there is only circumstantial evidence to support the use of yoked prism in treating patients with visual efficiency and processing issues. In that regard, they would be correct. There is indeed a lack of published case reports and research studies touting the benefit of this treatment. This case report brings to light the effect that prism can have on a patient, both subjectively and objectively.

VEP for the Primary Care Optometrist

Scott Steinman, OD, PhD, FAAO Brigitte Keener, BS, Karen Kehbein, OD

The Visually Evoked Potential (VEP) is a critical diagnostic tool that is often overlooked in clinical practice. Visual stimuli presented to the patient elicit an electrophysiological response in striate cortex (V1) and adjacent area V2. By placing electrodes on the scalp, electrical activity in the brain can be recorded primarily from V1. Averaging the responses enhances the response from visual cortex (VEP), while diminishing responses from other regions of the brain (EEG). Due to cortical magnification and electrode location, the majority of the input for the VEP data comes from the macular area of the visual field. The VEP can be especially helpful in the assessment of malingerers, binocular dysfunction, amblyopia and mentally impaired patients by providing an objective measure of visual acuity and optic nerve transmission.

One of the most powerful clinical applications of the VEP is the ability to predict best potential visual acuity in patients with amblyopia, enhancing the clinician's prognostic decision-making. This case presentation will highlight this technology as well as other various uses.

A 6 year-old male was seen in the Pediatrics Clinic for a routine eye examination. He had a family history of amblyopia. During distance acuity testing, was only able to read 20/40 OD and 20/100 OS. Refraction showed anisometropic hyperopia OS>OD. The BCVA was 20/40 OD and 20/60 OS. The patient was given a prescription for glasses for full time use and instructed to begin patching the right eye for 2 hours per day. The patient was seen back six weeks later at which his visual acuities were 20/32 OD and 20/80 OS. The patient was tested at this time with a VEP which showed the best potential acuity was 20/31.86 (18.83 cpd) OD, 20/34.94 (17.17 cpd) OS.

The VEP is a valuable test for visual system disorders, amblyopia and other binocular vision disorders. VEPs can also help to determine the optimal lens or prism prescription for the optimization of acuity and binocular vision. While many clinicians may not choose to have VEP technology in their offices, we will demonstrate that VEP recording should be a consideration in many behavioral optometry cases to enhance diagnosis, treatment and prognosis.

The Use of the Nintendo Wii Balance Board with the Head Injury Population

Joseph B. Sullivan, OD, FCOVD, Julie A. Toon, OD

Background: The use of the computer in the visual therapy program has been well accepted. The major problem with the use of computers in the therapy room is that the patient is seated and does not have to motorically interact with the space environment of the room.

The head injury population often has difficulty with balance and efficient movement in space. Visual disturbances that contribute to this difficulty include convergence issues, oculomotor problems, and visual field defects. Other problems seen in this population are muscle paresis, decreased reaction time, reduced stamina, and a decreased attention span. All of these areas can contribute to a patient's awareness of vestibular/anti-gravity and his/her centering locus.

The Body Test portion of the Wii Fit allows for initial measurement of a patient's balance using different stability tests, such as the Center of Balance, Basic Balance Test, the Walking Test, and the Stability Test. The outcome of these gives a percentage of the patient's right/left steadiness of balance. These tests are repeatable, giving feedback on improvements in balance.

The Balance portion of the Wii Fit program has graduated levels of difficulty. The Table Tilt, the Ski Jump, and Ski Slalom are used as the beginning levels in our office to get the patient to understand the interaction with the artificial environment of the game. This allows the doctor to look at timing and balance issues. As the patient spends more time on the balance board, more advanced levels and more balance procedures are unlocked. More integrated procedures include Tightrope, Balance Bubble, and Penguin Slide.

Conclusion: The Nintendo Wii has brought about a new level of interaction with computer gaming programs. The Wii Fit incorporating the Wii Balance Board allows the patient to safely interact with the balance part of the programs allowing for better integration of the visual and vestibular system.

With some head injury patients, getting them up on a walking rail or on a balance board is not a desirable situation. The balance portion of the Wii Fit permits the optometrist to observe the patient's balance in a more secure environment that keeps the patient closer to the ground than a Harmon walking rail and in a more stable position than a traditional balance board.

The use of the Wii Fit Balance Board allows the patient to get the necessary feedback to rebuild their visual/balance systems. It lets the doctor observe the adaptations that a patient makes to achieve a selected task.

The balance portion of the Wii Fit program will be demonstrated as well as the tracking instrument we use to monitor the patient's improvement can be monitored. Patient's adaptations to changes in balance will also be shown.

Optometric Correlates of Developmental Delay in a population of patients with learning difficulties.

Caroline M.F. Hurst, BSc FCOptom FBABO, Dr Neil Spencer

This study will be in progress at the time of ICBO 2010 and I should be able to report on the method and the statistics, but it will not be written up at that time.

This study will be a retrospective analysis of patients with learning difficulties that attended the practice for a full Behavioural Optometric visual assessment. All the examinations were carried out to the same standard by the same examiner, and the sample size is 150 patients.

A full description of the nature of the variables in the dataset will be conducted, giving appropriate summary statistics and examining the distributions of the different variables. This will be followed by the exploration of the relationships between the two sets of data by canonical correlation. The data sets are:-

(i) tests relating to developmental delay; ie the demonstrable presence of five primitive reflexes that have been shown to affect vision development - the Tonic Labrynthine Reflex (TLR), the Asymmetrical Tonic Neck Reflex (ATNR), the Symmetrical tonic Neck Reflex (STNR), the Spinal Galant, and the Moro Reflex, together with gross motor skills of commando crawling, all fours crawling, hopping and skipping.

(ii) optometric tests; ie age, gender, presenting symptom, refraction, cover test, motility, near point of convergence, fusional reserves, phoria measurements, stereopsis, AC/A ratios, reading assessment, MEM retinoscopy, near point of accommodation, accommodative facility, DEM, Maples test.

Canonical correlation analysis is a statistical method for assessing the relationships between two sets of variables. It seeks to find combinations of variables from one set which are highly correlated with combinations of variables from the other set. In this way, the strongest relationships between the sets of variables are observed.

I expect that there will be several optometric tests that correlate with developmental delay rather than with any one particular primitive reflex. I see this as the first in a series of papers and the results from this initial paper will determine the next papers.

Improved Process & Outcomes in a Private Vision Therapy Practice through Research Methods **Dana Dean, OD & Herbert William Cobb, PhD, MA, CSSBB**

Background: Private vision therapy practices rarely quantify outcomes through data analysis and scientific inquiry. This document describes a vision therapy pilot study conducted at a private practice to understand what could be done to better demonstrate and strengthen visual therapy efficacy. Vision therapy is under attack and our industry needs to become more scientifically legitimate. In response to this challenge the vision therapy industry needs to standardize core vision therapy treatments, data collection, and metrics across practices. This could benefit individual practices as well as establish an environment for multisite studies.

Convergence insufficiency is a visual condition where the visual apparatus is not able to optimize binocular vision capacity. Convergence insufficiency is manifested as diplopia, asthenopia, head-aches, and exophoria at near distances. Accommodation dysfunction occurs when the change of focus from one accommodative demand to another is sluggish. Some symptoms include difficulty sustaining near point focus and delayed board to book copying. Both conditions are particularly relevant for children, relate to academic underachievement and present challenges in learning.

Methods: The design is a pre-post treatment retrospective study in a field setting. The retrospective study examines the effects of vision therapy of binocular deficient patients over the past five years 2003 to 2008 at a private vision therapy practice. The participants are from ages 4 to 14 with a principle diagnosis of convergence and accommodation insufficiency. Standard treatment consists of weekly, 45 minute sessions conducted over approximately a nine month period totaling 28 hours of vision therapy. Data were screened and selected on the basis of diagnosis and completeness of measures.

Results: Statistically significant improvement was revealed in convergence break ($t = -5.38$, $p < 0.0001$), convergence recovery ($t = -4.64$, $p < 0.0001$), and accommodation PRA ($t = 3.794$, $p = 0.0018$), accommodation NRA ($t = -5.568$, $p < 0.0001$), measures.

Conclusions: The analysis revealed significant improvement in convergence and accommodation. This pilot study provided a better understanding of data issues, process efficiency improvements, development of ongoing outcome measures for future study and reporting.

Fixation Disparities in Diagnosing and Monitoring Ocular Motor Comitancies and Incomitancies

Selwyn Super, D. Optom, MEd, PhD, Dip-AAO

Fixation disparity (fd) is a misalignment of the visual axes in the presence of single binocular vision

A simple, quick and effective method of measuring fd provides useful information with regard to ocular motor comitancies and incomitancies, and their related brain functions.

Tests designed by Hess and Lancaster and by Brock, appear ideal for detecting and measuring fixation disparity, although they were originally intended for different purposes (such as measuring oculomotor incomitancy, and/or the relationship of the two eyes related to head and body posture).

These tests essentially provide for the binocular viewing of large peripheral fusion locks, in free space, and with the monocular viewing of different visual axis markers seen simultaneously by each eye.

Stereopsis in Diagnosing and Monitoring Brain Disease

Selwyn Super, D. Optom, MEd, PhD, Dip-AAO

Pituitary tumors at autopsy are found to be about 1 in 5 in the general population (Costello, 1936; Kattah, J., 2006; Mulinda, JR., 2007). While these tumors may be asymptomatic and are not diagnosed during patients' lives, most patients with pituitary adenomas present with symptoms and signs of hormone hypersecretion, visual field defects, headaches, and hypopituitarism either alone, or in combination, (Levy, S & Lightman, SL (1994)).

A novel, quick and inexpensive way to detect visual defects caused by brain pathology, and affecting nerve conduction through the optic chiasma and/or the corpus callosum, is to carry out timed tests of stereoacuity in front of and behind the plane of regard.

A Multi-Sensory Integration Activity across Visual, Vestibular, Auditory, Temporal and Proprioceptive Senses: “The Slotnick Scramble”

Samantha Slotnick, OD, FAAO, FCOVD

In the vision therapy room, activities are designed to engage the patient in order to provide opportunities for growth and learning. The optimal level of challenge scales the activity so that the patient experiences an 80 to 85% success rate. Learning takes place as the patient strives for improvement towards a goal which is perceived to be attainable. When working with individuals who are more emotionally fragile, the success rate should be closer to 90-95%: Progress may be slower, but interest and the critical feeling of success can be maintained.

This poster describes a powerful, dynamic vision therapy activity which can be scaled up or down in order to maintain engagement for optimal learning. It is appropriate for a wide range of ages, upwards of about age 5, with no ceiling. It is a multi-sensory integration activity, engaging visual, vestibular, auditory, temporal and proprioceptive senses. It engages gross motor planning, laterality and directionality, and visual information processing skills including visualization, visual planning, visual memory, and central-peripheral organization in space as well as in *time*. The activity requires minimal equipment: It is performed with a rebounder (trampoline) and two letter/number charts in landscape orientation.

The rebounder is a useful tool for helping the individual to understand timing, particularly when auditory processing is deficient. When a patient is unable to keep time with a metronome, any rebounder activity performed in tandem with visual attention can provide support. The patient's awareness to timing is brought under greater focus with the use of a letter chart (providing visual input), reading the letter chart aloud (providing their own auditory input), and rebounding (stimulating proprioceptive along with vestibular input). The synchronized inputs from the visual, auditory, proprioceptive and vestibular systems are all processed simultaneously at the level of the thalamus, reinforcing rhythm and timing. Temporal planning is reinforced as the patient learns to say each letter at the exact same moment of each bounce. Visual planning, motor planning, and an elevated demand on oculomotor skills are introduced as the patient makes rapid half-turn rotations to view the chart on the facing wall, stimulating the vestibulo-ocular reflex.

Direction Discrimination Training Removes Timing Deficits in the Dorsal Pathway that Impair Cognitive Function

Teri Lawton, PhD

Timing deficits resulting from sluggish magnocellular pathways are thought to underlie reading difficulties in dyslexics, those who have reading problems with no obvious neurological, sensory or ocular-motor deficits. Controlled validation studies in public schools showed that, for dyslexic children, reading fluency improved when children were trained, before directed reading, on direction discrimination 10 minutes twice a week for 15 weeks, but not when children were trained on word discrimination. In direction discrimination training, when only one level of background complexity was used, dyslexics' contrast sensitivity improved 5-fold and reading rates improved 2-fold on average. When 8 levels of background complexity were used, not only did contrast sensitivity improve 14 fold, but reading rates also improved 4-fold. Moreover, when direction discrimination training was administered individually using 14-16 complexity levels, more sessions, and was followed by training on reading fluency for 5 minutes using coached guided reading, reading rates improved 11-fold instead of only 4-fold. Furthermore, the more training on direction discrimination was administered, the more reading rates improved ($p < 0.001$). Significantly, the data from subsequent years show that these changes do not regress over time. These remarkable results from such a short amount of training can be explained in terms of removing the timing deficits in the dorsal pathway by tuning the sluggish magnocellular neurons over different backgrounds, so they are more sensitive, respond more quickly, and improve timing with linked parvocellular neurons. It is reasonable to conjecture that sluggish magnocellular neurons cause a deficit in attentional focus, preventing the linked parvocellular neurons from isolating and sequentially processing the relevant information needed for reading. Direction discrimination training, optimal for activating the dorsal pathways at lower processing levels, improved reading fluency significantly, 4-11 fold. Data suggesting that direction discrimination training broadens the attention gateway, improving sequential processing, will also be discussed.