Thursday, October 25

Posters are available 9:00 AM – 5:00 PM
All posters must be up for display on the assigned board by 9:00am
Posters are displayed for the entire poster session from 9:00am to 5:00pm
Posters taken down between 5:00 to 5:30pm
Authors of ODD numbered posters present from 9:00am to 12:00pm
Authors of EVEN numbered posters present from 2:00 to 5:00pm

Boards	**Topics**
Posters 1-6	General Pediatrics
Posters 7-13	Pediatric Disorders
Posters 14-17	Stereopsis
Posters 18-24	Binocular Vision Topics
Posters 25-28	Binocular Vision Case Reports
Posters 29-31	Post Surgical
Posters 32-37	Technology
Posters 38-43	Choroid
Posters 44-52	Retina
Posters 53-54	Medication Toxicity
Posters 56-66	Traumatic Brain Injury
Posters 67-70	Neuro-ophthalmic
Posters 71-72	Optic Neuropathy
Posters 73-74	Medications
Posters 75-77	Cancers
Posters 78-79	Glaucoma: Epidemiology
Posters 80-85	Glaucoma: IOP
Posters 86-90	Glaucoma: Cases
Posters 91-98	Glaucoma: Technology
Posters 100-108	Systemic Disease: Retinal Complications
Posters 109-116	Systemic Disease: Neurologic Complications
Posters 117-118	Systemic Disease: Pharmacologic Pathology
Poster 119	Electrophysiology

1. **PRESCHOOL VISUAL ACUITY SCREENING WITH LEA SYMBOLS AT 10FT AND 5FT: BETWEEN-TEST AGREEMENT** (125226)

Marjean T. Kulp, OD, MS, FAAO, The Ohio State University College of Optometry, Jiayan Huang, MS, Gui-Shuang Ying, PhD, Elise B. Ciner, OD, FAAO, University of Pennsylvania at Salus University, Lynn A. Cyert, PhD, OD, FAAO, Northeastern State University, Bruce D. Moore, OD, FAAO, New England College of Optometry, Deborah A. Orel-Bixler, OD, PhD, FAAO, University of California Berkeley, Vision In Preschoolers Study Group, Maureen Maguire, PhD, Graham Quinn, MD, MSCE, Univeristy of Pennsylvania School of Medicine

RESULTS: The pretest was successfully completed by 99% of children. The percentage of agreement was 76% overall (weighted kappa 0.57; 95% CI: 0.55-0.60) and increased

with age (70% for age 3, 77% for age 4, and 81% for age 5), with VA from 5ft Lea testing generally better than that from 10ft Lea, particularly in 3-year-olds ($p<0.001$). The percentage of agreement was higher among eyes without any vision disorders than among eyes with vision disorders (85% vs. 57% agreement).
PURPOSE: At 90% specificity, visual acuity (VA) screening using crowded, single Lea Symbols at 5ft (5ft Lea) was shown to have significantly higher sensitivity for detection of ≥1 targeted conditions as compared to crowded, single lines of Lea symbols at 10ft (10ft Lea) in the Vision In Preschoolers (VIP) Study. The agreement between VA measurements obtained using 10ft vs. 5ft Lea in 3- to 5-year-old preschoolers is assessed in the present analysis.
METHODS: Children (N=1447) participating in the VIP Study had binocular pretesting to show ability to name or match the LEA symbols. Monocular VA was tested using 10ft Lea by trained nurse screeners and 5ft Lea by trained lay screeners, in random order. Optotype sizes were based on age and included levels equivalent to 20/200, 20/64 and 20/50 for 3-year-olds, and 20/200, 20/50 and 20/40 for 4- and 5-year-old children. The agreement between Lea tests was assessed using percentage of agreement and weighted kappa, among all preschoolers, by age groups, and by presence of VIP-targeted vision disorders.
CONCLUSIONS: Agreement in VA measured with 10ft vs. 5ft Lea testing is lowest for 3-year-olds and for eyes with vision disorders. In the group overall, the disagreement between VA findings (and better sensitivity for the 5ft Lea at 90% specificity) appears to be in part attributable to the 5ft Lea yielding fewer falsely low scores suggesting the 5ft Lea may be easier for young children and/or screeners to perform.
ADDITIONAL COMMENTS: NEI/NIH, DHHS grants: U10EY12644; U10EY12547; U10EY12545; U10EY12550; U10EY12534; U10EY12647; U10EY12648 and R21EY018908

2. IMPACT OF CONTOUR INTERACTION AND CROWDING ON SLOAN LETTER ACUITY (125104)

Gayathri Srinivasan, Elise N. Harb, OD, MSc, FAAO, Dale L. Mayer, PhD, Li Deng, PhD, FAAO, New England College of Optometry

RESULTS: Overall, acuities for all seven conditions differed significantly ($p<0.001$), with CIB being significantly lower than the other six conditions ($p<0.05$). For the three isolated conditions, acuities were significantly different ($p<0.0005$), and again CIB showed lower acuity ($p<0.01$). Within the line conditions, overall acuities were also statistically different ($p<0.03$), while none of the pairwise comparisons differed.
PURPOSE: Previous research by our group (Ah-Kine et al., AAO 2010) with non-amblyopes showed that an isolated letter with contour interaction bars (CIB) yielded surprisingly lower VA compared to a line of letters surrounded by a rectangular contour interaction box (RB). To better understand this, the current study compared the effect of contour interaction and crowding on isolated and line letter acuities in non-amblyopes.
METHODS: 47 young adults with BCVA ≥20/25 and no history of amblyopia or ocular disease participated. Sloan letters were presented on a computerized digital system at 13ft. BCVA was measured in the better seeing eye or the right eye for those with equal acuity. Seven conditions were tested, 3 with isolated optotypes: 1) CIB (50%), 2) contour

interaction box (50%), and 3) uncrowded (control). Single line conditions were: 1) 50% spacing of optotypes and RB, 2) 71% spacing of optotypes and RB, 3) 100% spacing of optotypes and 50% of RB and the 3 line condition was a "standard" EDTRS format (control). The order of stimulus presentation was randomized. Mean logMAR acuities were analyzed for all 7 conditions and separately for the 3 isolated and 4 line conditions.
CONCLUSIONS: Isolated optotypes with CIB yield significantly lower acuity compared to both isolated and line presentations. Lower acuity with CIB was also found in our previous research. Changing the optotype spacing did not result in expected differences in acuity. Further study is warranted to investigate whether a CIB condition is more sensitive to amblyopia than line letter acuity and whether it could improve screening protocols.

3. **EFFECTIVENESS OF SURESIGHT VISION SCREENER IN DETECTING HYPEROPIA WHEN TESTING IN CHILD VERSUS ADULT MODE** (125166)

Amanda K. Huston, BA, OD, MS, Marjean T. Kulp, OD, MS, FAAO, The Ohio State University College of Optometry, Gui-Shuang Ying, PhD, Jiayan Huang, MS, University of Pennsylvania at Salus University

RESULTS: 195 children (mean age 9.4 +/- 2.3 years) completed the study, 42 of whom were tested in child mode. The criterion for significant hyperopia was met by 37 children, 14 of whom were tested in child mode. AUC for detection of hyperopia was 0.83 (95% CI: 0.70-0.95) in child mode and 0.92 (0.86-0.98) in adult mode (p=0.19).
PURPOSE: In the VIP study, SureSight Vision Screener (SS) was among the best screening tests for identification of one or more targeted vision problems in preschoolers. The manufacturer recommends testing children under age 7 in child mode to control accommodation; however, prior studies have suggested that child mode is largely ineffective. The purpose of this study was to compare the effectiveness of SS for detection of significant hyperopia when testing in child mode versus adult mode.
METHODS: SS was used to measure non-cycloplegic refractive error in children aged 5 to 13. Child mode was used for children under age 7, and adult mode was used on those aged 7 and above. All children underwent comprehensive eye examination, including cycloplegic autorefraction. Significant hyperopia was defined as ≥2.75D in any meridian on cycloplegic autorefraction. Detection of hyperopia by SS was based upon the most positive meridian in the child's worse eye. The ability of SS to identify significant hyperopia was summarized by the area under the receiver operating characteristic curve (AUC) using all possible cutpoints of the most positive meridian for defining failure. AUC was compared for children tested using child mode versus adult mode.
CONCLUSIONS: When using SS for detection of significant hyperopia, AUC was very good for 5- to 6-year-old children tested in child mode and excellent for 7- to 13-year-old children tested in adult mode.
ADDITIONAL COMMENTS: Support: NIH/NEI T35EY007151, Beta Sigma Kappa Central World Council Research Grant

4. **REFRACTIVE ERROR AND AMBLYOGENIC RISK FACTORS IN AFRICAN AMERICAN PRE-SCHOOL CHILDREN** (125561)

Valerie M. Kattouf, OD, Birva Kadakia, OD, Megan Allen, OD, RaeAnn Nordwall, Illinois College of Optometry

RESULTS: Of the 2944 children examined 2% were 12 months and under, 18% were 1-3 years, 65% were 3-5 years, and 5% were 5-6 years. The prevalence of hyperopia was 45%, myopia was less than 1%, and astigmatism was 12%. Approximately 7% demonstrated risk factors for refractive amblyopia. Only 1.4% of the patients seen had strabismus. Less than 1% of the children were identified with ocular pathology.
PURPOSE: To determine the prevalence of refractive error, amblyogenic risk factors, strabismus and ocular pathology in high-risk African American children from 6 months to 6 years of age in an urban setting.
METHODS: In a multisite study, comprehensive eye examinations of 2944 African American children ages 6 months-6 years were performed. All of the children were recruited from Head Start Programs. Visual acuity determination, cover testing, stereopsis evaluation, cycloplegic retinoscopy and ocular health evaluations were performed. Hyperopia and myopia were defined as 1.00D or more in each principal meridian. Astigmatism was defined as at least 1.00D difference in refractive error between the two principal meridians. Amblyogenic risk factors were defined as bilateral spherical refractive error >+4.00D or <6.00D; astigmatic refractive error >2.50D; anisometropic refractive error >1.50D in regard to hyperopia and astigmatism; and >2.00D of myopic anisometropia and constant unilateral strabismus.
CONCLUSIONS: In the African American preschool population hyperopia and astigmatism were the most prevalent refractive errors. These refractive errors were the basis for the refractive amblyogenic risk factors. High risk African American preschool children demonstrated a greater risk (7%) for the development of refractive amblyopia than in the general population(2-3%); specifically in the form of isometropic risk factors. Isometropic amblyopia accounts for 1-2% of all refractive amblyopia in the general population. 5% of the children in the study were positive for the risk. Constant strabismus was not identified as a significant amblyogenic risk factor in this population.

5. VALIDATION OF THE PEDIATRIC REFRACTIVE ERROR PROFILE 2 (125546)

Courtney Andersen, BS, Jeffrey J. Walline, OD, PhD, FAAO, The Ohio State University College of Optometry

RESULTS: We examined 25 glasses and 19 contact lens wearers aged 8 to 14 years. The Vision score was 79.2±20.6 for PREP and 64.1±18.5 for PREP2 (t-test, $p<0.001$), Symptoms score was 75.1±16.1 for PREP and 59.7±19.6 for PREP2 (t-test, $p<0.001$), Appearance score was 75.8±20.0 for PREP and 71.5±18.9 for PREP2 (t-test, $p=0.01$), Activities score was 67.5±24.1 for PREP and 66.8±18.4 for PREP2 (t-test, $p=0.78$), Handling score was 75.0±16.0 for PREP and 67.0±16.0 for PREP2 (t-test, $p<0.001$), Peer Perception score was 70.4±17.2 for PREP and 72.3±14.3 for PREP2 (t-test, $p=0.264$), and Overall score was 74.8±14.2 for PREP and 71.5±20.0 for PREP2 (t-test, $p=0.089$). The 95% limits of agreement were ±33.3 for PREP and ±21.0 for PREP2 on Vision, ±26.7 for PREP and ±26.1 for PREP2 on Symptoms, ±25.7 for PREP and ±21.8 for

PREP2 on Appearance, ±40.5 for PREP and ±25.1 for PREP2 on Activities, ±28.9 for PREP and ±24.0 for PREP2 on Handling, and ±24.0 for PREP and ±18.5 for PREP2 on Overall.
PURPOSE: The Pediatric Refractive Error Profile (PREP) is a survey to measure vision-specific quality of life of children affected by refractive error. The PREP2 is an updated version of PREP to improve repeatability. The purpose is to compare agreement and repeatability between PREP and PREP2.
METHODS: Subjects with vision correction completed the PREP and PREP2. Each item was answered with strongly agree, agree, neutral, disagree, or strongly disagree. The quality of life in each scale ranged from 0 (poor) to 100 (excellent). Two weeks later, subjects completed both surveys and returned them by mail.
CONCLUSIONS: The PREP and PREP2 cannot be used interchangeably because the PREP2 gives significantly lower scores on the Vision, Symptoms, Appearance, and Handling scales. The LoA were five or more units better for PREP2 than PREP on the Vision, Activities, and Overall scales, so PREP2 should be used for future longitudinal studies.
ADDITIONAL COMMENTS: Supported by T35-EY007151

6. PREVALENCE OF REFRACTIVE ERROR IN 6-7 YEAR OLDS AS COMPARED TO 11-12 YEARS OLD AT THE CHICAGO SCHOOL-BASED VISION CLINIC (125180)

Sandra S. Block, OD, MEd, FAAO, Melissa A. Suckow, OD, FAAO, Illinois College of Optometry

RESULTS: There were 600 6–7 yr olds and 1120 11-12 yr olds. Univariate analysis showed mean (sd) dry spherical equivalent for younger age was -.13D (±2.1) and -.80D (±1.91) for the older age group. Cycloplegic spherical equivalent for the younger age was +1.37D (2.53) and older age - 0.26D (2.07). 96.4% of the children were African American (AA) or Hispanic (H). Of these two races, an analysis of age, race, and age with race showed a significant effect of age as well as race with age. However, there was no effect from race alone. The same outcomes were seen with sphere. Analysis of cylinder showed an effect of age, race and race with age.
PURPOSE: This cross sectional study compared refractive errors in children 6-7 yrs of age to those 11-12 yrs seen at IEI at Princeton Vision Clinic (IEI) in 2011. The study also looked at the differences in Hispanic and African America children at the 2 age ranges to see if the refractive error changes reflect changes seen in previous studies.
METHODS: The study consisted of a retrospective review of 5,032 children. Of those, 1720 children were found to be 6-7 years of age or 11-12 years. Dry and wet autorefraction was conducted on the Canon Autrorefractor. Cycloplegia was attained with 1% cyclopentolate, 2.5% phenylephrine, and 1% tropicamide. Race was reported by the parent or observed by the attending staff.
CONCLUSIONS: This study confirmed that the children in the midwest shows the same myopic shift from younger age groups to the older age group that has been reported in other studies. In addition, while race for AA or H children alone does not appear to impact the change in spherical equivalent with age, age and the combination or age and race do. When looking at cylinder alone, race does have an effect. The limitations of the

study include the lack of longitudinal data and a convenience sample. Data will continue to be collected with the hopes of reporting more data in the future.

7. **EARLY SIGNS OF INFLAMMATION IN A PEDIATRIC PATIENT** (125682)

Jenny Myung, OD, Carlo Pelino, OD, Pennsylvania College of Optometry at Salus University

BACKGROUND: Intermediate uveitis is an inflammation primarily of the anterior vitreous but an also involve the ciliary body and the peripheral retina. Pars planitis is a subcategory of intermediate uveitis, and is a diagnosis of exclusion associated with snoballs or snow banks in an otherwise healthy young individual. This case demonstrates the progression of an intermediate uveitis from its early stages. Interestingly, first signs were seen in the retina before being diagnosed as pars planitis.
CASE REPORT(S): A 7 year old African American female presented seeing white floaters in her left eye for the past month. Anterior segment was clear with no cells and flare. Dilated fundus exam was clear in the right eye, but faint white circular sheathing around the blood vessels was noted in the far periphery of the left eye. Five days later, the periphlebitis progressed to the right eye and vitreous cells had developed more so in the left eye. There was no presence of snowballs or snow banks. Medical history was negative for inflammatory disease. The patient was then referred to a pediatric retinal specialist to find an etiology of the intermediate uveitis. All inflammatory blood work up was negative. Four weeks later, there was now some spillover of cells in the anterior chamber. The patient was treated with prednisone drops BID in both eyes for four weeks and then tapered. Anterior uveitis was resolved and only traces of the vitritis and periphelbitis was persistent, though now minimal. No etiology was found, thus the ophthalmologist diagnosed the patient as idiopathic pars planitis, despite the absence of snowballs or snow banks.
CONCLUSIONS: Early signs of intermediate uveitis can easily be missed in young children. Inflammation progresses quickly, as shown in this case. Had early signs of periphlebitis not been caught, the patient's vision could have been compromised. This stresses the importance of a careful dilated fundus exam on pediatric patients along with appropriate testing to rule out any systemic involvement.

8. **A RARE CHROMOSOME DELETION PRESENTS WITH CONGENITAL GLAUCOMA** (125597)

Kimberly Walker, OD, FCOVD, Western University of Health Sciences, College of Optometry

BACKGROUND: Deletions of chromosome 6q25 are very rare. Patients with these deletions present with variable characteristics depending on the location, size and break points of the deletion. In the literature it has been associated with developmental delays, brain abnormalities, hearing impairments, as well as other variable anomalies. There have been ocular abnormalities reported including retinal pigment irregularities and strabismus. Depending on their impairments, these patients can have a normal life expectancy. To our knowledge there have been no reports of congenital glaucoma with

this chromosome deletion.
CASE REPORT(S): A 19 month old hispanic male was referred to our clinic by his infant development teacher, who noticed that he was not visually engaged during therapy. He was born with a rare chromosome deletion of 6q25. He is severely developmentally delayed in all areas. He also has absence seizures for which he is prescribed Keppra and Phenobarbital. He had a previous eye examination with a pediatric ophthalmologist at 3 weeks of age. In reviewing those records, he presented with a chief complaint of watery eyes OU. He was diagnosed with having blond fundus with all other findings being within normal limits. The plan was to follow up in 6 weeks. The parents elected not to return for their next appointment, due to dissatisfaction with the previous visit. His examination at our clinic reveled megalocornea OU, restricted visual fields, OS worse than OD, obvious preference for use of his right eye, Haab Striae OS>OD, and cup to disc ratios of 0.80/0.80 OD, 0.95/0.95 OS. IOP measured by Tonopen was 18 mmHg OD and 13 mmHg OS. The patient was referred for glaucoma treatment.
CONCLUSIONS: To the best of my knowledge this is the first case reported of congenital glaucoma in the presence of this rare deletion. The initial symptoms of epiphora, which can be a sign of congenital glaucoma, were not addressed in this patient's first eye examination. While this case was an atypical presentation of congenital glaucoma, with normal IOP, there are indications that the IOP was previously elevated.

9. **ARE THERE DIFFERENCES BETWEEN CHILDREN AND ADOLESCENTS WITH AUTISM SPECTRUM DISORDER AND TYPICALLY DEVELOPING CONTROLS IN PRIOR VISION CARE?** (125566)

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RESULTS: No difference was found between typically developing and ASD patients in the percentage whose parents reported a prior vision exam. However, the time since the last exam was significantly longer for patients with ASD (mean =1.95 years) than for typically developing patients (mean =0.76 years; p =0.031). In the ASD group, the percentage with a prior vision exam was not associated with gender (66.7% of boys and 63.6% of girls; p=0.87). Though the percentage of ASD patients with a prior vision exam increased with the patient’s ability to communicate verbally (43% for non-verbal, 57% for partially verbal, 80% for speaks fluently), the difference was not significant (p=0.20). Although not significant, children whose ASD was diagnosed later in life are more likely to have received a prior eye exam (OR=1.3, p=0.078).
PURPOSE: Little information is available regarding vision care in patients with Autism Spectrum Disorder. The Convergence in Children and Adolescents Diagnosed with Autism Spectrum Disorder (CICADA)study compared vision exam testing and the frequency of reduced convergence in children and adolescents with ASD and typically developing controls. In this report, we look at prior vision care of the two groups.
METHODS: 54 patients 9 to 17 years old who were typically developing (n=25) or had ASD (n=29) were recruited. Parents provided ocular history including whether or not the patient had received a vision exam prior to the study, and if so, the age of the last exam. For ASD patients, parents reported the age of diagnosed and the patient’s current

communication level. Chi-square, t-tests and logistic regression were used to compare the ASD and typically developing groups.
CONCLUSIONS: Parental reports of patients in this study suggest that though patients with ASD are as likely as typically developing patients to have obtained a vision examination, there may be a longer time interval between vision examinations.
ADDITIONAL COMMENTS: NSU Chancellor's Faculty Research Scholarship Grant

10. **PERMANENT VISION LOSS IN A PEDIATRIC PATIENT SECONDARY TO REPEATED VOLUNTARY GLOBE LUXATION** (125547)
Linda R. Marks, OD, FAAO, University of Missouri-St. Louis School of Optometry

BACKGROUND: Luxation of the globe(s) occurring spontaneously or voluntarily can cause long term visual impairment due to traumatic optic neuropathy. Repeated self-luxation by a child may lead to devastating visual consequences.
CASE REPORT(S): An 11-year-old myopic/astigmatic male had rapidly diminishing visual acuity over a 9 week period. Initial best-corrected distance visual acuity was 20/30- OD/OS/OU. Optic discs and maculae appeared normal. Due to the reduced visual acuity, the patient was instructed to return in 1 month for follow-up, but did not return for 9 weeks. At that visit, best-corrected visual acuity had dropped to 20/70 OD and 20/100 OS. No improvement was obtained with pinhole or refraction. A positive APD was noted OS in addition to restricted confrontation fields OU. There was mild pallor of the optic nerve OD and severe pallor OS. The patient's mother mentioned that he had been "popping his eyes out". The patient admitted to luxating his own globes but could not articulate the frequency or reason for doing so. He was instructed to stop the behavior immediately and warned that it may be a potential cause of his vision loss. A 24-2 HVF revealed a superior arcuate defect OD with mean deviation -9.34 DB and extensive defects OS with mean deviation -21.79 DB. Records from an eye examination two years earlier were obtained and had a notation regarding the voluntary luxation, but no recommendations had been recorded. The patient was referred to a pediatric ophthalmologist to rule-out other potential causes of optic neuropathy. Flash VEP showed reduced amplitudes and prolonged latency, worse OS. MRI was negative outside of neuropathy of the intraorbital optic nerves. The patient reportedly stopped luxating his globes but visual acuity and fields remain reduced 4 years later.
CONCLUSIONS: This case demonstrates the unfortunate occurrence of a childhood obsessive habit leading to permanent vision loss. Practitioners should be aware of this rare, albeit serious cause of vision loss and communicate the potential visual outcome to their patients.

11. **INNER RETINAL CHARACTERISTICS IN TREATED AMBLYOPIC EYES** (125352)
Lindsey A. Wetherby, Elise N. Harb, OD, MSc, FAAO, Stacey S. Choi, PhD, Nathan Doble, PhD, Erik Weissberg, OD, FAAO, New England College of Optometry

RESULTS: There were no significant differences in RNFLT between amblyopic and control eyes in any quadrant or globally (p values>0.10). Likewise, no significant differences in RNFLT in any quadrant or globally was found between amblyopic and

fellow eyes (p values>0.10). IRT at the 4° temporal location was not significantly different between amblyopic and control eyes (p=0.24), nor between amblyopic and fellow eyes (p=0.73). However, the difference in IRT at the 4° nasal location approached statistical significance (p=0.06), with amblyopic eyes being slightly thinner than control eyes (mean diff.=11.12 microns), but not between amblyopic and fellow eyes (p=0.12).
PURPOSE: Differences in retinal nerve fiber layer thickness (RNFLT) in amblyopic eyes have previously been investigated using optical coherence tomography (OCT), without much consensus. The aim of this study was to investigate RNFLT and inner retinal thickness (IRT) in the eyes of subjects with treated amblyopia.
METHODS: 7 treated amblyopic subjects, with a range of residual amblyopia, and 4 age-matched (22-27y) emmetropic control subjects underwent binocular function assessment and imaging with a Fourier Domain OCT system (RTVue, RT-100). RNFLT in four quadrants and globally surrounding the optic nerve and IRT (ILM to IPL) at the 4° nasal and temporal locations from the fovea were measured. Thickness data was analyzed for amblyopic and fellow eyes and from both eyes of the control subjects.
CONCLUSIONS: In this preliminary study, there were no significant differences in RNFLT in eyes with treated amblyopia compared to their fellow eyes or control eyes. IRT was not significantly different in amblyopic eyes, although the 4° nasal location approached a significant difference, with amblyopic eyes being slightly thinner than control eyes. More investigation is warranted in both treated and un-treated amblyopes to detect if differences in the inner retinal layers of eyes with a history of amblyopia exist and whether they are related to the depth of visual deficits found in amblyopia.

12. **PAPILLEDEMA AND NYSTAGMUS:, A CASE REPORT** (125242)
Luis C Trujillo, OD, Lynn H. Trieu, OD, MS, Pennsylvania College of Optometry at Salus University

BACKGROUND: Careful attention should be paid while evaluating a nystagmus to rule out pathology. Likewise, apparent optic nerve head swelling should also be fully investigated. This case report illustrates the importance of these concepts.
CASE REPORT(S): A 9-year-old Hispanic male presented to our optometry clinic with a chief complaint of blur when looking at the distance in both eyes. His mother brought him in for a second opinion after being evaluated a few months earlier at a prominent ophthalmology clinic at a local medical school. A comprehensive exam was performed. EOM testing revealed a possible end point nystagmus and a dilated fundus exam showed questionable optic nerve head swelling in both eyes. He was referred to our Neuro-optometry department for further testing. A B-scan ultrasound with a 30-degree test was ordered and confirmed the papilledema. An MRI was ordered and revealed the presence of a rare pilocytic astrocytoma in the the right cerebellar hemisphere which extended through the foramen magnum. Due to the size of the cerebellar mass, it was referred for an immediate resection. At the follow-up visit the patient still exhibited the nystagmus; however, all signs of papilledema were resolved.
CONCLUSIONS: The presence of nystagmus in conjunction with papilledema in this particular case pointed to a cerebellar disease which was confirmed with imaging. This example supports the conclusion that careful attention to detail with regards to both EOM testing and nystagmus classification is of utmost importance. Additionally, papilledema

should be ruled out with any optic nerve disc which appears elevated and/or appears to have indistinct margins.

13. **THE USE OF TOPICAL TIMOLOL MALEATE TO TREAT PERIOCULAR INFANTILE HEMANGIOMA** (125121)

Lily Y. Zhu-Tam, OD, FAAO, Albert Einstein College of Medicine, Dennis Chui, OD, Bronx-Lebanon Hospital Center

BACKGROUND: Hemangiomas are commonly seen in infants. They can occur anywhere, resulting in functional and aesthetic consequences. Periocular hemangioma can have potential vision threatening sequelae. Traditional treatments have major side effects. We present a case of a periocular infantile hemangioma treated with topical timolol maleate; thus supporting evidence for a new potential standard of care
CASE REPORT(S): 3 mth old, Hispanic, female was referred for consultation of a lid lesion. Her parents reported rapid growth since its first appearance at 1 mth old. Medical history is remarkable for a congenital heart murmur. Family history of hemangioma in her half sister resolved at age 6. VA was fix and follow OU with resistance to occlusion of OD. No strabismus was apparent on Hirschberg testing. Anterior segment exam revealed a large red, round 10mm wide firm lesion on the left upper lid. Palpebral aperture size was 8mm OD and 4mm OS. Cycloplegic refraction revealed +2.50D OD and +4.50-2.00x180 OS. DFE was unremarkable. Findings were consistent with a capillary hemangioma and anisometropic meridional amblyopia due to mechanical ptosis OS. Amblyopia therapy was implemented. 30 min of patching with near eye hand coordination activities daily in supine position. After consultation with pediatric ophthalmology and clearance from pediatric cardiology, we started the patient on 2 gtts of topical timolol maleate 0.5% to left upper eyelid BID with punctual occlusion. Subsequent follow up visits showed markedly less redness and vessel engorgement with an increased palpable softening of the lesion. Also, the size decreased to 8mm wide, aperture size increased to 7mm OS and astigmatism decreased to +1.50-1.00x180 OS. Patient is still undergoing monthly follow up
CONCLUSIONS: Based on our findings, topical timolol has shown to be a safe and effective alternative treatment for infantile hemangioma. With a greater safety profile and success rate, we recommend timolol maleate to be used by eye care providers as a first line treatment to prevent visual threatening sequelae.

14. **DEVELOPMENT AND TESTING OF A PHANTOGRAM STEREOTEST FOR LOW VISION AND PAEDIATRIC PATIENTS** (125959)

Ivan C. Wood, PhD, FAAO, Stockport, UK

RESULTS: The stereo target of each anaglyphs were correctly identified by all the pediatrc and Low Vision patients who also detected all of the Lang 1 stereo targets 200 arc secs=800arcsecond viewed @ 30cms. Those pediatric patients who were classified stereo blind by the Lang test also failed the Static phantogram test. However 3/10 Low Vision static stereoblind patients detected stereo depth and stereomotion of the horse targets.
PURPOSE: A New Gross Phantogram Stereotest has been developed for low vision and

pediatric patients.
METHODS: Model Toy horses targets were studio photographed using a Nikon D70 12MEG Pixel Camera and Nikkor DX 70 Lens. A stereo pair red blue anaglyphs were generated from the resultant a left and right 12 MEG photographs using Photoshop and Stereo-maker software. The four horse targets were presented in a series of four pictures thru Red and blue stereoglasses to 10 paediatric and 10 Low Vision patients at a testing distance of 40cms. In each picture only one of the 9cms horse targets with a disparity of 500 arc seconds stood out in stereo relief. A forced choice method of testing was used to identify the correct stereo (horse) target. Stereo motion was introduced by rotating/tilting the stereo card back and forward at 1Hz
CONCLUSIONS: In this pilot study both pediatric (below 8 years of sge) and older Low Vision patients (Over 65 yrs) successfully detected Phantogram Gross stereotest targets. Stereoblind and stereo-motion patients were also identified by this test.
ADDITIONAL COMMENTS: The photographic and computing/software techniques used to produce attractive age related Phantograms will be discussed.

15. **INTEROCULAR ACUITY DIFFERENCES ALTER THE SPATIAL FREQUENCY TUNING OF STEREOPSIS** (125279)

Ashley Craven, Kevin Gustafson, Truyet Tran, Sandy Chat, Dennis M. Levi, MS, PhD, FAAO, Roger W Li, OD, PhD, Roger W. Li, OD, PhD, University of California Berkeley

RESULTS: The stereoacuity versus spatial frequency function is basically the inverse of a typical contrast sensitivity function, with the optimum spatial frequency at 5- 10 cyc/deg. Increasing the interocular acuity difference degrades stereo thresholds selectively at high spatial frequencies, gradually shifting the optimum frequency to lower spatial frequencies. Interestingly, stereopsis for low frequency targets was only mildly affected even with an acuity difference of as much as eight letter-lines (0.8 LogMAR).
PURPOSE: It is well known that interocular acuity differences result in reduced stereo acuity. However, previous studies have used tests that are broadband in their spatial frequency content. The purpose of the present study was to investigate the effects of interocular differences in acuity on the spatial frequency tuning of stereoscopic depth perception.
METHODS: The visual stimulus consisted of two horizontally separated square blocks, one presented to each eye. Each block contained a Gabor target patch surrounded by four Gabor reference patches. Binocular disparity was introduced by shifting the two Gabor targets in opposite directions (controlled by 2 interleaved staircases), and a haploscope was used to enable binocular fusion. Stimulus spatial frequency ranged from 1-20 cyc/deg. The visual task was to determine the stereoscopic depth of the Gabor target (crossed disparity: in front of / uncrossed disparity: behind) relative to the four references. Five adult observers with corrected-to-normal vision were tested. Bangerter foils were used to reduce visual acuity in the dominant eye. Stereothresholds were measured for a range of acuity difference: from 1 to 8 letter-lines on a standard LogMAR letter chart.
CONCLUSIONS: The current study shows that interocular acuity differences result in spatial frequency specific losses of stereopsis. These findings have important clinical implications for understanding both the sparing of coarse stereopsis and the deficits in

fine stereopsis in anisometropic amblyopia.
ADDITIONAL COMMENTS: Grant identification: NIH Grant R01EY01728

16. **3D MOVIES AND EYE-RELATED DISCOMFORT** (125310)
Joseph Kane, Eiman Atia, Rose Kombo, Sandra Vidacic, Jenna Willard, Stacy Zubkousky, New England College of Optometry

RESULTS: 64% of respondents were unaware of the potential eye-related discomfort before viewing 3D movies for the first time. 79% reported experiencing at least one of the surveyed symptoms at some point during or after a 3D movie. Participants reported experiencing headaches (39%), eyestrain/pulling (39%), nausea (25%), dizziness (31%), and double vision (14%) at least sometimes as a result of 3D movie viewing by selecting "yes" or "sometimes" on the survey. Furthermore, 49% reported looking away from the screen to avoid discomfort at some point during the film. The majority of survey participants (77%) reported that they preferred 2D movies, regardless of symptoms.
PURPOSE: To collect data regarding the prevalence of eye-related symptoms during 3D movies, increase awareness of the possibility of experiencing discomfort, and develop creative solutions to the 3D discomfort public health concern.
METHODS: A 22-question survey was distributed online via email and Facebook. Participants (n=157) were asked to subjectively report ocular conditions, 3D discomfort, etc.
CONCLUSIONS: Eye-related symptoms during 3D movies are common, and there are currently no warnings given prior to a 3D movie about the possibility of experiencing discomfort during or after the film. The authors' suggested intervention is to present a split screen image during the previews that would have a 2D simulation of the 3D effects next to an image that requires 3D glasses. This serves as an opportunity to incorporate vision screenings into movie theaters, identify eye conditions in children (one of the main target audiences for 3D movies), potentially prevent amblyopia, and serves as a warning to movie viewers.

17. **STEREOACUITY LEARNING IN CHILDREN AND ADULTS** (125728)
Joanne Malek, BA, State University of New York (SUNY) College of Optometry

RESULTS: All 20 subjects completed the experiment and 17 provided data suitable for analysis (10 children and 7 adults who spent no more than 30% of the time in any session at the maximum staircase disparity of 15 arcmin). There were no large systematic differences between the rates of learning in children and adults. However, children had lower stereoacuity thresholds than adults in sessions 1 and 2 ($p < 0.05$, two-tailed t-test).
PURPOSE: Individuals improve at stereoacutiy tasks (more sensitive to smaller disparities) with practice. This is interesting because it tells about how stereovision works in normally sighted individuals, while informing about clinical practices such as rehabilitation following strabismus surgery. AOA treatment guidelines specify that testing and treatment be done as early as possible, as visual development is most rapid up to ages 6-8. Yet direct measures of perceptual learning rates in children vs. adults are needed. We used a training paradigm to measure improvements in stereoacuity (disparity thresholds) over time in two groups: children and adults.

METHODS: We collected data from ten adults and ten children in a two alternative forced choice 4-day training paradigm, where disparity was controlled by a psychophysical staircase procedure. The stereoacuity task involved perceiving which of two rectangular-shaped objects was closer.
CONCLUSIONS: We failed to replicate the previous finding that perceptual learning improves performance in a stereoacuity paradigm (Fendick and Westheimer, 1982). Inter-session variability was large. We also did not observe a statistically significant difference between the rates of learning in children and adults, although individuals showed highly significant improvements (or worsening) across sessions. Although our data is informative, we will need to collect more data to be able to make assertions about the significance of our results.
ADDITIONAL COMMENTS: Grant support: NIH T35 EY-07088

18. **ACCOMMODATIVE FACILITY MEASURED BY +/-2.00 FLIPPER AND DIOPTRICALLY EQUIVALENT TARGET DISTANCES IN ADULTS WITH AND WITHOUT ACCOMMODATIVE INFACILITY** (125039)
Angela M. Chen, OD, MS, FAAO, Eric Borsting, OD, MS, FAAO, Del Lam, Amanda Antonino, Southern California College of Optometry

RESULTS: The mean subjective accommodative responses were 13 cycles/min (cpm) for the flipper method and 20cpm for the far/near method in normals and 8cpm and 11cpm respectively in the poor facility group. The objective measurements for the flipper method showed a mean response of 3.90D through the -2.00 lens and 0.04D through the +2.00 lens in normals, and 3.69D and 0.27D respectively in the poor facility group. For the far/near method, the mean response to the target at 22 cm was 3.47D and to the 2 m target was 0.44D in normals, and 2.71D and 0.45D respectively in the poor facility group. The mean total shift in accommodation was 3.86D with the flipper method and 3.02D with the far/near method in normals ($p=0.042$), and 3.69D and 2.71D respectively in the poor facility group ($p=0.049$). No statistically significant difference in accommodative responses for both methods was found between the groups.
PURPOSE: In this study, we objectively compared accommodative responses by using the +/-2.00 flipper method and altering target distances in adults with and without accommodative infacility.
METHODS: Twenty adults, with a mean age of 26.5 years, were divided into normal (>11 cycles/min) and poor (<11 cycles/min) accommodative facility groups based on the +/- 2.00 flipper test. Continuous measurements of accommodation were taken with a WAM-5500 autorefractor while subjects performed the following 2 tests monocularly: 1) the +/-2.00 flipper method for 1 minute and 2) shift focus between targets at 22cm and 2m for 1 minute (far/near method).
CONCLUSIONS: These results confirm our previous study showing that the +/- 2.00 flipper tests results in a greater accommodative response than the equivalent free space method. The lack of difference between the responses of the normal and poor facility groups in the magnitude of accommodative responses indicate that the latency of accommodative responses should be investigated in future studies.

19. **EVALUATION OF PERSPECTIVES AND TRENDS CONCERNING CONVERGENCE INSUFFICIENCY** (125342)

Jeffrey K. Ho, Kelly Abbott, Adrian Crichton, BSc, Emily Hable, Kun Nancy Wu, New England College of Optometry

RESULTS: 252 surveys were completed, and ~90% of respondents consider CI to be a problem and consider VT to be a viable treatment method. However, only 30% routinely screen for CI while the remaining do not screen or only screen selective patients. Respondents who treat CI were more likely to screen for it and were more likely to have completed a VT residency. Among different modes of practice, respondents practicing in VA hospitals screened and treated almost two-fold fewer patients than those in academic and private practice. Respondents with more years of experience treated about 40% more CI's than ODs in practice for fewer years.

PURPOSE: Convergence insufficiency (CI) has a reported prevalence of 2.25-8.30% among children and adults in the United States. Despite the potential benefits of identifying patients with CI, a number of optometrists do not screen for it during routine eye exams. Although studies such as the Convergence Insufficiency Treatment Trial (CITT) have identified vision therapy (VT) as an effective treatment for CI, there is discourse within the optometric community as to the true benefits of VT. The purpose of this study is to gain insight of optometrists (ODs) who are alumni from the NECO regarding screening and treatment of CI.

METHODS: An anonymous 15-question survey was sent to NECO alumni who graduated from 1970-2011. Primarily, the questions explore the frequency CI was screened and treated as well as the ODs view of VT as a viable treatment.

CONCLUSIONS: The majority of ODs surveyed view CI to be a problem but many do not screen or treat CI frequently. We recommend an awareness campaign that highlights the importance of screening and treating CI. More research is necessary to determine methods for screening, testing, and treatment of CI that will expand the number of optometrists engaging in treatment of this prevalent condition.

ADDITIONAL COMMENTS: We would like to thank Dr. Nicole Quinn (New England College of Optometry) for her guidance as well as Dr. Gary Chu (New England College of Optometry) for his mentoring on this project.

20. **TEST-RETEST RELIABILITY OF THE CONVERGENCE INSUFFICIENCY SYMPTOM SURVEY IN INDIVIDUALS WITH ACCOMMODATIVE INSUFFICIENCY** (125398)

Nahrain M. Shasteen, OD, Marjean T. Kulp, OD, MS, FAAO, G. Lynn Mitchell, MAS, FAAO, The Ohio State University College of Optometry

RESULTS: The CISS was administered two times to 15 subjects ages 9 to 30 (mean age 17.38 ±8.03] years; mean time between administrations 7 days, range 2 to 15 days). Bland-Altman analysis showed a mean difference of 1.47 points and 95% limits of agreement of -5.19 and 8.13. Analysis did not reveal any statistically significant difference between the mean difference and zero ($p=0.12$) or between the mean score and the mean difference between scores ($p=0.81$). The ICC was shown to be 0.95 with a 95% confidence interval of 0.87, 0.98.

PURPOSE: The Convergence Insufficiency Symptom Survey (CISS) has been shown to be repeatable in children and adults with convergence insufficiency (CI). Previous publications have reported test-retest ICC values of 0.77 for children and 0.68 for adults and a mean difference in test scores of 0.98 in children and 0.68 in adults with CI. The CISS has the potential to be used to monitor treatment of other accommodative and binocular vision disorders, such as accommodative insufficiency (AI). The purpose of this pilot study was to determine if the CISS was reliable in subjects with AI.
METHODS: Subjects ages 9 to 30 years with AI were recruited. The CISS was administered two times (one week apart). Bland-Altman analysis was performed to evaluate reliability. Intraclass correlation coefficient (ICC) was also calculated as a measure of repeatability.
CONCLUSIONS: Test-retest reliability was similar to that reported in children with CI with a slightly larger (less repeatable) mean difference in scores but higher (better) ICC. The CISS is repeatable in subjects with AI.
ADDITIONAL COMMENTS: Supported by COVD 2010 Research Grant

21. **IS CISS A VALID INSTRUMENT FOR EVALUATING OCULOMOTOR DYSFUNCTION AND ACCOMMODATIVE INSUFFICIENCY?** (125063)
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RESULTS: The mean CISS scores were 15.42 ± 10.04 (NBV), 16.45 ± 9.64 (AI), 27.00 ±13.39 (OMD), and 21.32 ?10.38 (AI and OMD combination). A significant difference was detected among the four groups (P=0.07). Post hoc tests showed significant difference between the NBV and OMD groups (P=0.048) but not among other groups.
PURPOSE: The Convergence Insufficiency Symptom Survey (CISS) has been validated to aid in the diagnosis of convergence insufficiency in both children and young adults. Accommodative insufficiency (AI) and oculomotor dysfunction (OMD) share some common symptoms with CI. The purpose of this study was to assess the validity of CISS in the diagnosis of AI and OMD in children aged 9-18 years.
METHODS: A total of 161 patients aged 9 to 18 years were examined in an urban school-based eye clinic, which resulted in 85 children who were qualified for this study. Nineteen of them had normal binocular vision (NBV), 22 had AI, 16 had OMD, and 28 had both AI and OMD. An analysis of variance was performed to compare the CISS scores among the four groups.
CONCLUSIONS: Children with OMD had a significantly higher CISS score than children with NBV. Children with AI did not report worse symptoms than children with NBV using the CISS. There was a trend that children with both AI and OMD had higher CISS scores than children with NBV, however without statistical difference. The results of this study demonstrate that the CISS is a valid instrument that can be used to diagnose and evaluate children with OMD.

22. **NEARWORK-INDUCED TRANSIENT MYOPIA (NITM) AMONG SCHOOL CHILDREN AND PARENTAL REFRACTIVE ERROR** (125076)

Balamurali Vasudevan, BSOptom, MS, FAAO, Midwestern University Arizona College of Optometry, Zhong Lin, MD, Yuan Liang, MD, Yi Zhang, MD, Shi Zhao, MD, Xiao Yang, MD, Ning Wang, MD, Kenneth J. Ciuffreda, OD, PhD, FAAO, State University of New York College of Optometry

RESULTS: No significant differences ($p>0.05$) in eitherNITM magnitude, overall decay time, or decay time constantwere found as related to the number of myopic parents. With univariate and multivariate logistic analyses, the odds ratio for incomplete decay of NITM did not change significantly ($p>0.05$) with either increase inthe number of myopic parents or magnitude of parental myopia.
PURPOSE: Nearwork-induced Transient Myopia (NITM) among School Children and Parental Refractive Error
METHODS: Three hundred and fifty-nine children, including 172 males and 187 females, between the ages of 7 to 17 years were tested. Initial NITM and its decay time were assessed objectively (WAM-5500, Grand-Seiko) monocularly immediately after binocularly viewing andperforming a sustained near task (5D) for 5 minutes incorporating a cognitive demand with full distance refractivecorrection in place.The NITM was classified into 3 categories: low (<0.15D), moderate (0.15D-0.30D),or high (≥0.30D), whereas its overall decay time was classified into 2 categories, namely either complete or incomplete. Additionally, the children were divided into 3 groupsbased onthe number of myopic parents (no, one, or two)and into 4 groups based on mean parental refraction (no, mild, moderate, or high myopic parents). The parental refractive error was obtained either objectively using autorefraction (Accuref-K9001, Shin Nippon) or recently documented history of refractive state.
CONCLUSIONS: There was no association between parental refractive error and their children's NITM characteristics. The results suggestthat environmental factors play animportant role in the genesis of NITM.

23. REPEATABILITY AND LEARNING EFFECTS OF THE DEVELOPMENTAL EYE MOVEMENT TEST (DEM) IN YOUNG ADULTS (125430)

Vandana Rajaram, OD, PhD, Paul Kimbro, Nathan Gilmore, Michigan College of Optometry

RESULTS: Repeatability of test scores at each time interval was calculated using the Intraclass Correlation Coefficient (ICC) in a one way random effects model. Subjects showed good repeatability for the adjusted horizontal times when retested four hours after the initial administration (ICC (95% CI) = 0.63(0.30-0.60), $p<0.03$) but poor repeatability (ICC < 0.34) at the two day and one week testing. Vertical times had fair repeatability at four hours (ICC (95% CI) = 0.51(0.08-0.74), $p<0.03$) and poor repeatability (ICC < 0.35) at the two day and one week testing. Ratio scores had very poor repeatability across all three testing times with all ICC values < 0.24. Poor repeatability was attributed to the statistically significant improvement in test-retest scores which all subjects showed with repeated testing. This improvement was seen in adjusted horizontal, vertical times and in ratio scores.

PURPOSE: To evaluate the repeatability and learning effects of the DEM test in young adults through sequential testing over a few hours, two days and one week.
METHODS: A group of college students (N=38) in the age range 19 to 31 were included in the study. All subjects had a visual acuity of 20/20 and normal binocularity. The DEM test was administered sequentially over the following time intervals after the initial administration - four hours, two days and one week.
CONCLUSIONS: Overall, the DEM test had poor repeatability in our sample of young adults especially at the two-day and one week follow up testing. The poor repeatability was attributed to the significant improvement in test scores with repeated testing. In the absence of vision therapy or other forms of training in this group, we speculate that any improvement seen in scores is largely the consequence of a learning effect. The results have important clinical implications especially when the DEM is used to assess improvement in saccadic performance secondary to vision therapy in young adults.

24. **AN INTERDISCIPLINARY TRAINING APPROACH FOR HANDWRITING DIFFICULTY CHILDREN** (125377)

Mabel Mei-Po Leung, BSc, FAAO, Carly Lam, Cecilia Li-Tsang, PhD, Sutie Lam, MS, The Hong Kong Polytechnic University School of Optometry

RESULTS: Thirteen HWD children of mean age 8.0+0.9 years were recruited into training group A and another thirteen HWD children of mean age 8.4+1.0 years were recruited into training group B. Handwriting skills measured by motor speed and precision test (Paired-t test: $t=3.20$, $p=0.01$) showed significant improvement after training in group A but not in group B. In addition, amplitude of accommodation (Paired-t test: $t=3.15$, $p=0.01$), accommodation facility (Paired-t test: $t=4.39$, $p=0.001$), directionality (Paired-t test: $t=-2.57$, $p=0.02$) and vertical time in developmental test of eye movement (DEM) (Paired-t test: $t=-2.19$, $p<0.05$) were also found significantly improved after training in group A.
PURPOSE: To investigate the effectiveness of an interdisciplinary combined training by optometrist and occupational therapist on a group of children with handwriting difficulties (HWD).
METHODS: Twenty-six HWD children were recruited and assigned equally into two training group, A and B. Group A consisted of combined training by both optometrist and occupational therapist while group B consisted of training by occupational therapist only. Training by optometrist included accommodative function, ocular motility, binocular fusion, peripheral awareness and eye hand coordination. Training by occupational therapist included visual form perception, visual spatial relationship, visual memory, visual sequential memory, visual figure ground, visual constancy, visual closure, graphomotor control and grip-control. All subjects finished 8 sessions of training. The visual functions and handwriting performance of all subjects were assessed and compared before and after completion of training.
CONCLUSIONS: HWD often coexist with visual function impairment. This sutdy showed that remediation training for HWD children would be more effective with a combination of both visual function and fine motor training. An interdisciplinary collaboration between optometrist and occupational therapist in managing HWD children

was found necessary.

25. **PRESUMED INTRACTABLE DIPPLOPIA WITH CHRONIC ESOTROPIA AND CONVERGENCE SPASM:, A RARE OCCURRENCE** (125926)

Robert P. Rutstein, OD, MS, FAAO, Martin Cogen, MD, University of Alabama at Birmingham School of Optometry

BACKGROUND: Although esotropia and convergence spasm can mimic one another, both conditions occurring simultaneoulsy is rare. We report this clinical finding in an adult with presumed intractable diplopia.
CASE REPORT(S): A 65 year-old man was examined for chronic diplopia. Ten years earlier, he had been placed on medical disability because of the diplopia. Prism lenses had not helped. History indicated a strabismus that began approximatley 45 years ago secondary to prolonged monocular patching for treatment of a corneal injury. The patient is myopic and astigmatic. Prior records indicated esotropia with normal ocular motility. Examination revealed a moderate and variable right esotropia. Bilateral pupillary miosis and bilateral abduction restriction were noted in additon to the esotropia, suggesting superimposed convergence spasm. When either eye was occluded, abduction improved in the opposite eye. Sensory testing with the Worth 4 dot test revealed suppression of the right eye. Synoptohore testing indicated potential for normal fusion. It was speculated that the convergence spasm was induced to increase the magnitude of the esotropia, allowing the patient to ignore the diplopia. Treatment consisted of a 7.5 mm recession of the right medial rectus. Follow-up revealed no diplopia, orthophoria at distance and near, full ocular motility, absence of convergence spasm, and normal stereopsis.
CONCLUSIONS: Convergence spasm can subsequently develop in esotropia to allow the patient to ignore diplopia.

26. **OPTIC NERVE HYPOPLASIA IN THE PRESENCE OF INFANTILE ESOTROPIA** (125989)

Katerin Ortiz, Stephanie Ramdass, MSc, Inter American University of Puerto Rico

BACKGROUND: Infantile esotropia is a common binocular disorder in childhood, however a concurrent optic nerve hypoplasia raises a challenging decision in terms of management and prognosis. The visual acuity of a patient with monocular optic nerve hypoplasia (ONH) can vary from 20/20 to no light perception depending on the decrease number of nerve axons with normal tissue. In a patient with infantile esotropia and ONH occurring simultaneously, it is difficult to assess if there is a contributing factor of strabismus for the amblyopia present, if the ONH is the sole cause of the visual impairment or if it's a combination of both.
CASE REPORT(S): After multiple visits to various eye doctors without any intervention, the child presents at 2 years old with a visual acuity of 20/1200 taken with teller acuity, 50 PD esotropia & nystagmus which worsens when monocular. Patient had an MRI confirmed ONH. The patient's previous doctor had refused to operate due to the patient's poor visual acuity and presence of nystagmus. The patient underwent occlusion

therapy combined with vision therapy and finally surgical correction. The patient concluded with elimination of nystagmus, excellent alignment, and a visual acuity of 20/200.
CONCLUSIONS: This case presents an interesting scenario, where it is not certain whether unilateral optic nerve hypoplasia is a debatable cause of infantile esotropia. The patient showed improvement in nystagmus and visual acuity demonstrating that in patients with monocular ONH and associated strabismus, amblyopia therapy should be implemented.

27. **A TWO CASE REPORT: THE NEED FOR EXTENDED FOLLOW UP IN ORDER TO ACHIEVE THE MOST ACCURATE AMBLYOPIA DIAGNOSIS** (125399)
Valerie M. Kattouf, OD, Illinois College of Optometry

BACKGROUND: Two 5 year old male patients presenting with amblyopia depended upon extended follow up and use of the appropriate test battery to determine the most accurate diagnoses and treatment plans
CASE REPORT(S): Patient I presented with refractive error of+9.50-2.00x180OU. Best corrected visual acuity(VA) was 20/50 at distance and 20/60 at near OD,OS,OU. The patient did not achieve random dot stereopisis(RDS) and cover testing(CT) revealed orthophoria. Isometropic amblyopia was diagnosed. At 1 month follow up the patient's VA was unchanged, additional plus was not accepted, RDS was not achieved, and CT revealed a small esophoria. At the 2 month follow up the patient accepted increased plus and a single vision Rx. The VA was 20/40OD, 20/20OS. Patient 2 presented with monocular reduction of VA. Refractive error was +8.50-2.00x180OD and +10.00-2.50x045OS. Best corrected VA was 20/30OD and 20/200OS. The patient did not achieve stereopsis and CT revealed orthophoria. A diagnosis of anisometropic amblyopia was considered. A spectacle Rx and occlusion therapy were prescribed. At one month follow up the patient's VAOD was 20/20 and OS was 20/60. Continued occlusion treatment produced a best corrected VAOS of 20/40. Follow up visits (for both patients) found a 6Δ constant esotropia, the Bruckner test revealed a whiter pupillary reflex, and visuoscopy revealed 2Δ of nasal eccentric fixation in the amblyopic eye. Stereopsis was not achieved. Worth 4 dot revealed central suppression and peripheral fusion. The initial diagnoses of refractive amblyopia was now changed to strabismic amblyopia secondary to the micorotropia
CONCLUSIONS: The proper diagnostic and treatment decisions for an amblyopic patient depend on the determination of the type of functional amblyopia. The conclusion that each patient had strabismic amblyopia allows for the correct prognosis and treatment plans to be developed. Using the proper test battery to detect the small angle strabismus is crucial in developing goals for occlusion therapy and additional treatment options in amblyopia

28. **OPTOMETRIC MANAGEMENT OF NYSTAGMUS AND ANXIETY WITH YOKED PRISM** (125662)
Kelly Meehan, OD, FAAO, Midwestern University Arizona College of Optometry

BACKGROUND: Congenital nystagmus is a condition of involuntary bilateral conjugate oscillation of the eyes developing within the first six months of life. Optometric treatment options such as spectacle,contact lenses, and yoked prism may be used to enhance cosmesis, and improve visual function.
CASE REPORT(S): Ocular history was positive for congential nystagmus and strabismus OS. Current medications included Gabapentin, Cymbalta, and Ambien. Last eye exam was 4 months prior with ophthalmology where a PAL spectacle Rx was given. Snellen acuities were taken through the patient's habitual PAL Rx with a +10.00 lens to avoid iatrogenic reduction of acuity due to latent nystagmus. Visual acuities were 20/40 OD, OS and 20/25 OU at distance. Cover test revealed a 10Δ CLET and a 10Δ CLHyperT. On gross observation a slight head turn to the right was noted. EOM's revealed jerk like nystagmus with a null point in left gaze and an increase in nystagmus frequency was noted in all right gazes. No significant changes from the habitual Rx were found on manifest refraction. Ocular health examination was unremarkable. Due to the longstanding nature of the patient's condition a referral to neurology was not completed. A single vision Rx was released for computer use with yoked prism to position the eyes at the null point. The patient was also recommended to use a document holder to the right of her computer screen while entering in the needed serial numbers. The patient presented for follow up 2 weeks later where she reported no double vision, decrease in mistakes, and a decrease in anxiety while in the workplace. She was able to quit counseling and resume her duties in the operating room.
CONCLUSIONS: Conventional treatments of congenital nystagmus include pharmalogical agents such as GABA agnoists or inhibitiors to increase foveation time. Activities of daily living are often affected in these patients and optometrists have a unique skill set that may be used to improve their quality of life. Knowledge of appropriate lenses and prism treatment options are critical for these patients.

29. BILATERAL, CONSECUTIVE STAGE 1 MACULAR HOLES FOLLOWING UNCOMPLICATED PHACOEMULSIFICATION SURGERIES (125581)

Wendy J. Haaland Stone, OD, FAAO, Illinois College of Optometry, John Baker, OD, MSEd, Pennsylvania College of Optometry at Salus University

BACKGROUND: Macular hole (MH) formation is rare following uncomplicated phacoemulsification (PE). Though the etiology is not fully understood, post-PE MHs are thought to occur due to anterior-posterior tractional forces by the vitreous on the macula due to the altered post-operative vitreous structure. This leads to accelerated and incomplete posterior vitreous detachment with vitreofoveal adhesions. Vitreous traction and degeneration of the inner retinal layers are theorized to predispose patients for an idiopathic MH, but little has been reported as predisposing a patient for a post-PE MH due to its rare occurrence. We report a unique case of a patient with a stage 1 MH in each eye following PE.
CASE REPORT(S): A 76 year old African American female with ocular hypertension (treated with travaprost) presented with a foveolar yellow spot and reduced vision (20/40) OD ten weeks post-uncomplicated PE. An optical coherence tomography (OCT)

confirmed a Gass stage 1A MH (foveolar detachment with inner foveal splits). The macula OS was normal by OCT and photos at this time. The MH OD resolved nine months later. Subsequently, the patient underwent uncomplicated PE OS. At her four week post-PE visit, a foveolar yellow spot and mildly reduced vision (20/25) were found OS. OCT confirmed a small stage 1A MH (foveolar detachment). This MH resolved in three months.
CONCLUSIONS: This is the first report of bilateral, consecutive MHs after PE. These MHs appear to have resulted directly from PE. Both eyes had good vision immediately after PE, and an OCT was normal pre-PE OS. These factors indicate this patient was predisposed to MH development. Strong vitreofoveal adhesions or degenerative macular thinning are suggested as possible causes. Topical prostaglandin analogs have been shown to cause macular changes post-PE. Therefore, the use of travaprost may have played a contributing role in the development of these MHs.

30. **BILATERAL LASER MACULOPATHY** (125659)
Shirin Yousefi, OD, Melanie J. Frogozo, OD, Danica J. Marrelli, OD, FAAO, University of Houston College of Optometry

BACKGROUND: Retinal damage from lasers is a rare and most often accidental; however, it is preventable if proper laser safety procedures are followed. The long-term effect of laser damage to the eye is dependent on the structures involved with symptoms of painless blurry vision, scotomas, or metamorphopsia. The visual prognosis for patients depends on the energy of the laser and the time exposed. Case Report: A 24-year old Asian female presented with visual disturbance in both eyes after working in an engineering lab with Class 4 lasers the day prior. During the lab, she wore the incorrect protective goggles for an hour before noticing blurry and fragmented vision at both distance and near. Distance visual acuities were 20/30-2 and 20/30+2 in the right and left eyes respectively; however, the patient noted that some letters were missing on the chart. Amsler grid testing revealed three relative scotomas in each eye. Bilateral, symmetric, elevated yellow lesions at each macula were noted. All other findings of her ophthalmological examination were normal. OCT of each macula revealed full thickness symmetrical and vertical, linear clouding at the center of each fovea; however, retinal pigment epithelial layer appeared intact. Bromfenac was initiated twice a day in both eyes and the patient was to return for follow-up care in 2 weeks. Follow-up visits revealed improved of visual acuities of 20/20 in each eye; nonetheless, the patient was still complaining of letters missing. Per ophthalmoscopy, both macular lesions appeared unchanged; however, an improvement was seen on OCT with all structures intact except for some disruption at the photoreceptor layers of each eye. Conclusion: Laser damage is rare and the sequela of damage is not known; nevertheless, residual effects from lasers can be permanent. Currently there are no treatments that can reverse damaged retinal structures; however, patients need to be monitored for CNVM formation and RD after disruption to retinal layers.

31. **PEHCR SECONDARY TO ARMD FOLLOWING SCLERAL BUCKLING** (125702)

Lindsey Jendrasko, OD, New England College of Optometry, James P. Smith, OD, FAAO, Tkyla Smith, OD, Laura K. Dowd, OD, FAAO, Togus VA Medical Center

BACKGROUND: Peripheral exudative hemorrhagic chorioretinopathy (PEHCR) is an uncommon finding associated with advanced age, age-related macular degeneration and temporal location. Less commonly, atrophic RPE degeneration has also been associated with PEHCR. The condition has also been described by a variety of other names including peripheral choroidal neovascularization, massive spontaneous retinal hemorrhage, and hemorrhagic detachment of the peripheral retinal pigment epithelium.
CASE REPORT(S): An 88 year old male presented for a scheduled dilated eye exam. He had no complaints and felt his vision was stable. Ocular history included open angle glaucoma, dry eye, moderate dry ARMD, pseudophakia and history of retinal detachment with scleral buckling OD. Visual acuity was 20/50 OD and 20/20 OS. Fundus exam revealed a small (1/2 DD) peripheral retinal hemorrhage over the scleral buckle in the superior temporal quadrant OD. B-scan confirmed no new retinal breaks or detachments posterior to the buckle. At 2 week follow up, the patient remained asymptomatic, but the hemorrhage appeared significantly larger (3 DD) and a retina consult was obtained. The patient presented to the retina consult 1 week later complaining of a shadow nasal to fixation in the right eye and decreased vision OD (20/70). Dilated exam showed a large subretinal hemorrhage extending posteriorly from the scleral buckle to the macula. The diagnosis of an eccentric neovascular lesion was made and the patient was treated with intravitreal Lucentis.
CONCLUSIONS: Although rare, PEHCR is an important consideration in older patients with known macular degeneration and peripheral retinal hemorrhage. In this case, the location of the initial lesion over a scleral buckle in an area of RPE scarring suggests prior retinal surgery may represent an additional risk factor. Without treatment, PEHCR can progress and lead to significant central vision loss. More investigation is needed in the treatment of these lesions with anti-VEGF therapy.

32. QUANTIFICATION OF AREAS OF HYPERFLUORESCENCE IN ULTRA-WIDEFIELD AUTOFLUORESCENCE IMAGES IN NORMAL AND DISEASED EYES (125578)

Sarah MacIver, Natalie Hutchings, PhD, MCOptom, University of Waterloo School of Optometry and Vision Science, Jerome Sherman, OD, FAAO, State University of New York (SUNY) College of Optometry

RESULTS: The difference between the mean gray level and METs was 57 for the high areas in the normal subject. The corresponding mean difference in the abnormal AF images was larger (Mean [Range]: 140 [123-168],respectively). The MET was higher in the abnormal images (170) than in the normal images (149). The distribution of randomness in normal AF images is more evenly distributed while the distribution of randomness is skewed towards high values along the grayscale in abnormal AF images. The differences between the threshold values in the ROI illustrate that a pathological state can be differentiated from a normal state in AF images.
PURPOSE: To investigate the clinical utility of thresholding segmentation for identifying areas of hyperfluorescence in ultra-widefield (Optos') fundus

autofluorescence (AF) images.
METHODS: 200 degree AF images were obtained from 10 participants using the Optos 200Tx. 2 images from a normal subject and 8 with retinal disease and AF abnormalities were obtained. Of the AF abnormalities: 2 were bulls eye maculopathy, 2 were maculopathy with peripheral changes, 2 were scattered macular hyper AF, and 2 were peripheral retinal degenerations. The images were converted to 8-bit (256 level) grayscale. A circular region of interest (ROI), centered on the macula and free from imaging artifacts, was selected (~45% of the total imaged area). The ROI was segmented using a maximum entropy thresholding (MET) technique. Entropy, a statistical measure of randomness, derives a threshold value by analyzing the gray level distribution and separates the objects from the background. To identify areas of differing AF, the MET was adjusted identify areas of hyper AF above the normal threshold value with the ROI.
CONCLUSIONS: MET segmentation is capable of identifying areas of hyper AF in normal and abnormal AF images. The use of MET segmentation offers an objective method of quantifying AF images and may be applied to the identification of subtle pathological changes and to monitor for progression in various retinal diseases.

33. **EXPLORING CLINICAL CORRELATES IN FUNDUS AUTO FLUORESCENCE AND SD-OCT** (125664)

Daniel Epshtein, Jerome Sherman, OD, FAAO, State University of New York College of Optometry

BACKGROUND: Fundus Auto Fluorescence (FAF) indirectly visualizes the integrity of the Retinal Pigement Epithelium (RPE) via Auto Fluorescence (AF) of lipofuscin contained within the RPE. Factors leading to RPE stress will lead to increased levels of lipofuscin and hyper AF, whereas a loss of RPE tissue will lead to a reduction in lipofuscin and therefore hypo AF. It has been noted that hyper AF is a sign of “sick” RPE tissue which will eventually give way to RPE loss and hypo AF.In addition, Spectral Domain Optical Coherence Tomography (SD-OCT) has been used to analyze retinal structure; including the RPE and photoreceptors.
CASE REPORT(S): A case series demonstrates a range of AF patterns correlated to SD-OCT images. Ten cases of Retinitis Pigmentosa (RP) demonstrate Hyper AF corresponding to a normal RPE. Though no damage to the RPE was visualized, the Photoreceptor Integrity Line (PIL) [also known as connecting cilia, inner segment-outer segment junction, ellipsoid] was attenuated. Damage to the PIL is most likely due to the progressive damage of photoreceptor cells in RP. In an AZOOR patient, hypo AF was associated with an attenuated RPE and PIL damage. In one case of Central Serous ChorioRetinopathy FAF, SD-OCT, and Fluoroscein Angiography (FA) images were obtained. Zones of hypo AF were associated with an intact RPE and a damaged PIL, whereas a ring of hyper AF was correlated with damage to both the RPE and PIL.FA revealed a window defect which was localized to the area of hypo AF, where the RPE was damaged and underlying choroidal vasculature was visible.
CONCLUSIONS: Based on the above cases, a clinical association between AF and outer retinal organization has been revealed. In twenty patients with outer retinal disease, hypo AF was associated with RPE and PIL damage and hyper AF corresponded to an attenuated PIL and normal RPE. Disorganization of the PIL has been previously reported

to correlate with loss in visual sensitivity. A correlation of FAF and SD-OCT may prove useful in predicting the clinical outcome of patients with outer retinal disease.

34. **A COMPARISON OF THE MACUSCOPE AND QUANTIFEYE MACULAR PIGMENT DENSITOMETERS** (125567)

Elizabeth Wyles, OD, FAAO, Robert Donati, PhD, Illinois College of Optometry

RESULTS: Mean MPOD for the cohort was 0.315±0.131 for the MacuScope (n=29) and 0.370±0.159 for the QuantifEye (n=29). There was no significant difference between the MPOD means. The mean standard deviation of each subject's MPOD was 0.069±0.083 for the MacuScope (n=29) and 0.040±0.041 for the QuantifEye (n=32). There was no significant difference between the two instruments when considering individual subject variability.

PURPOSE: Studies have suggested that reduced levels of macular pigment (MP) may increase risk for developing age-related macular degeneration (AMD). There are two compact commercially available heterochromic flicker photometry instruments that measure MP in the USA. A previous clinical study revealed significant variability between instruments when critically looking at each subject individually. Our aim was to determine if the same variability would be found in a young, healthy, educated population.

METHODS: Sixteen young adults were recruited from the Illinois Eye Institute patient base. Macular pigment optical density (MPOD) was measured using the MacuScope and QuantifEye. A single operator collected data in one session for each patient. Two measurements per eye were taken on each instrument and each eye was used as a separate data point. If the difference was greater than 0.04 between two measurements on a single instrument, a third measurement was taken. Invalid readings were excluded. Student's t-tests were done to compare the statistical significance of the results from both instruments. Additionally, a Bland-Altman plot was done for an added comparison.

CONCLUSIONS: If MPOD is monitored with the possibility of altering treatment, the need for reliable measurements is imperative. Based on this limited study, both instruments appear to demonstrate reliability. However, the population tested was young, healthy and educated which is not representative of the population at large. Thus, the clinician must consider individual patient variability and take this into account if using MPOD as an indicator for AMD risk and/or clinical care.

35. **THE DISSOCIATION BETWEEN THE GANGLION CELL COMPLEX/ANALYSIS AND RETINAL NERVE FIBER LAYER THICKNESS IN HEREDITARY RETINAL DISEASE** (125054)

Sherry J. Bass, OD, FAAO, Anna Wong, Jerome Sherman, OD, FAAO, State University of New York College of Optometry

BACKGROUND: The ganglion cell "complex"(GCC) is a measurement available in I-Vue and RTVue (Optovue,Inc.)that determines the thickness of the ganglion cell bodies, their dendrites and axons. The ganglion cell "analysis" (GCA) is available in the Cirrus OCT (Carl Zeiss Meditec, Inc.)that measures the thickness of the ganglion cell bodies and their dendrites, but not their axons. The GCC and GCA are both measured in the

central 6mm of the retina. Both purport to be a biomarker for the early development of glaucoma and usually agree with the measurement of the retinal nerve fiber layer (RNFL) thickness which is measured in a circle 3.4 degrees around the optic disc. In hereditary retinal degenerations, there appears to be a dissociation or disagreement between the GCC/GCA and the RNFL measurement because these diseases are characterized by a thinner than normal macula and an abnormal GCC/GCA, whereas the RNFL measured around the optic disc is usually thicker than normal in these patients. The etiology of the outer retinal layer thinning in the macula in hereditary retinal degenerations is easily explained and highly correlates with histopathological evidence. In contrast, the thinning of the inner retinal layer, i.e. the ganglion cell bodies, their dendrites and their axons, is difficult to explain and is paradoxical to the RNFL thickening seen in these patients.
CASE REPORT(S): We report the abnormal GCC/GCA findings in a series of 5 patients with various forms of retinitis pigmentosa who had thicker than normal RNFL measurements. All 5 patients had normal visual acuity. All had statistically significant GCC/GCA thinning in the macula and statistically significant thickening in all or part of the RNFL. One patient was also a glaucoma suspect and hence the diagnosis and management of this patient was more challenging.
CONCLUSIONS: The use of GCC/GCA and RNFL thickness in the diagnosis of glaucoma must be used with caution in patients with hereditary retinal degenerations.

36. **PERIPHERAL ISCHEMIA AS A RISK FACTOR IN THE MANAGEMENT OF DIABETIC MACULAR EDEMA** (125308)

Ashley Scheurer Speilburg, OD, Bruce A. Teitelbaum, OD, FAAO, Leonard V. Messner, OD, FAAO, Illinois College of Optometry

BACKGROUND: Recent advances in fluorescein angiography (FA) have provided posterior pole-to-periphery views in a single, high resolution image by utilizing scanning laser ophthalmoscope technology. This allows visualization of up to 200 degrees of retina, compared to ~75 degrees visualized using the 7 standard field composite developed for the Diabetic Retinopathy Study. With images from ultra-widefield FA, the significance of the peripheral vascular changes, now easily identified in diabetic eyes, is being debated. Could the variable response of diabetic macular edema (DME) to standard laser treatment be influenced by peripheral ischemia? It is well established that peripheral ischemia leads to the release of vascular growth factors influencing the proliferation of neovascularization and increased vasodilation and capillary hyperpermeability in diabetic eyes. Until recently, identification and quantification of peripheral retinal ischemia has been challenging. With ultra widefield FA, identification of nonperfused retina as well as the calculation of an ischemic index, comparing perfused to nonperfused retina, is possible.
CASE REPORT(S): We present 2 cases illustrating diabetic macular edema and co-existing peripheral ischemia as imaged with Optos C200 MA scanning laser ophthalmoscope (Optos PLC, Dunfermline, United Kingdom) where standard FA would not accurately document the degree of nonperfusion. An ischemic index is calculated to quantify the level of ischemia.
CONCLUSIONS: In the future, quantification of peripheral ischemia, as imaged with ultra-widefield fluorescein angiography, may impact the management of DME.

Treatment with targeted retinal photocoagulation to the nonperfused peripheral retina may have a role in the management of this condition.

37. **COMPREHENSIVE POSTERIOR SEGMENT IMAGING IN A CASE OF NEUROFIBROMATOUS WITH MULTI-SPECTRAL AND ULTRA-WIDEFIELD IMAGING** (125669)

Jerome Sherman, OD, FAAO, Sanjeev Nath, Elizabeth Yusupov, Daniel Epshtein, State University of New York College of Optometry

BACKGROUND: Unlike Lisch nodules of the iris, retinal and choroidal lesions are rare in Neurofibromatosis (NF). A review of the historical literature reveals an occasional case of choroidal lesions in NF but virtually all of these reports contain the presence of only a single lesion. New technology such as the Multi-Spectral Imaging device (Annidis Ontario, Canada) may reveal deep choroidal lesions which are virtually invisible to ophthalmoscopy and standard fundus photography.
CASE REPORT(S): A 25 year old female presented for a routine eye exam. She reported a history of NF. VA was correctable to 20/20 in each eye. Initially, Ultra-Widefield (UWF) images (Optos Marlborough, MA) were obtained and revealed several dozen dark lesions in each eye, most within the arcades. These lesions were not visible with green laser separation but were quite obvious with red laser separation suggesting that the lesions were all deep to the RPE. UWF auto fluorescence (af) revealed no abnormalities and hence the RPE appeared unaffected. Perhaps surprisingly, clinical BIO through a dilated pupil revealed virtually nothing. Multi-Spectral Imaging (MSI) using multiple LEDs of various colors revealed only a hint of these lesions with green, amber, and yellow LEDs. In contrast, 4 red LEDs and 3 infra-red LEDs revealed dozens of profound lesions OU deep to the retina. These lesions were not detected with SD OCT and UWF FA. Upon questioning about skin lesions, the patient demonstrated hundreds of cafe au lait spots of various sizes on her abdomen and back which were photographed.
CONCLUSIONS: Imaging technologies capable of penetrating below the retina and revealing choroidal detail and lesions invisible to ophthalmoscopy are now available. In NF, all skin, brain and fundus lesions should be monitored for change. Techniques such as MSI and UWF imaging appear to be ideal in such cases.

38. **BILATERAL MULTIFOCAL CENTRAL SEROUS CHORIORETINOPATHY ASSOCIATED WITH INHALED CORTICOSTEROID USE** (125888)

Dennis Chui, Barnie Y. Lim, OD, FAAO, Bronx-Lebanon Hospital Center

BACKGROUND: Central serous chorioretinopathy (CSCR) is characterized by the presence of neurosensory retinal detachments within the posterior pole due to subretinal fluid accumulation. CSCR is typically unilateral, unifocal and can cause reduced vision. Risks factors for CSCR include Type-A personality, high-stress lifestyle, high levels of endogenous cortisol and exogenous corticosteroid use
CASE REPORT(S): A 56 YO Hispanic female presented to the Bronx-Lebanon Hospital Eye Clinic with complaints of blurriness OD>OS that has worsened over the past month. Her medical history is remarkable for severe asthma, DM, HTN, chronic

kidney disease, CHF and mitral valve replacement. She was started on a corticosteroidal inhaler 2 months ago to control her recent asthma attacks. Her systemic medications include Advair Diskus, coumadin, simvastatin, hydrazaline, Lasix, Calcitrol, aspirin, lisinopril, Feosol and insulin. Her ocular history is remarkable for mild NPDR and areas of RPE changes in the posterior pole OU. VA was 20/150 OD and 20/40 OS with her habitual glasses. Pupils, EOMs and slit lamp exam was unremarkable. DFE revealed scattered dot hemes OU, large central serous detachment OD and 2 smaller serous detachments in the posterior pole OS that were confirmed by SD-OCT. Fluorescein angiography revealed multiple areas of early hyperfluorescence with late pooling within the detachments, consistent with bilateral, multifocal CSCR. The patient underwent laser photocoagulation to the sites of active leakage OD 1 week after presentation. Lab assessment of endogenous cortisol levels revealed normal serum cortisol and ACTH. Steroid inhaler use was not discontinued due to the severity of her asthma. Follow-up visits are pending

CONCLUSIONS: Corticosteroid therapy through any route of administration can be associated with atypical CSCR. Patients on chronic steroids should be educated about potential visual sequaelae and monitored regularly. This case illustrates the risk of inhaled corticosteroid use in the development of bilateral multifocal CSCR

39. **DOCUMENTED SMOKESTACK USING SDOCT IN IDIOPATHIC CENTRAL SEROUS CHORIORETINOPATHY: CASE SERIES** (125972)

Eulogio Besada, OD, FAAO, Barry J. Frauens, OD, FAAO, Diana L. Shechtman, OD, FAAO, Nova Southeastern University College of Optometry

BACKGROUND: Confirmation of leakage in patients with idiopathic central serous detachment (ICSC) has been documented in the past using fluorescein angiography (FA). A classic FA sign described in ICSC is a focal point of hyperfluorescense resembling an inverted smokestack or ink-blot. We document similar imaging of smokestack with spectral domain optical coherence tomography (SDOCT). Morphological features and changes associated with ICSC are not clearly delineated using FA.

CASE REPORT(S): A 38 year-old Hispanic male complained of seeing a dark spot in central vision OD. BCVA was 20/400 OD. Dilated fundus exam (DFE) revealed ICSC OD. SDOCT confirmed the CSD and smokestack effect. Case2. A 37 year-old Hispanic male presented with complaints of decreased vision OD. BCVA 20/70 OD. DFE revealed an ICSC OD. SDOCT confirmed the ICSC, as well the observation of the smokestack phenomena.

CONCLUSIONS: An inverted smokestack may be imaged in some patients with acute onset ICSC using SDOCT. Detection of turbulence and consequential density viscosity gradient differences, resulting from hydrostatic pressure emanating from an acute onset focal retinal pigment epithelium (RPE) defect, may explain this SDOCT observation. This SDOCT observation may further help us understand pathogenesis of the disease

40. **POLYPOIDAL CHOROIDAL VASCULOPATHY** (125631)

Becky Forman, Anuradha Veerappan, BS, Richard Wu, BA, Nancy N. Wong, OD, PhD, FAAO, Nicolas M. Beaupre, OD, VA Hudson Valley Health Care System

BACKGROUND: Polypoidal choroidal vasculopathy (PCV) represents neovascular disease characterized by the formation of intrachoroidal branching vascular networks terminating in polyp-like aneurismal dilatations. The polypoidal lesions are optimally visualized with indocyanine green angiography (ICG). Disease progression may result in formation of choroidal vascular complexes, hemorrhagic/serous pigment epithelial detachments (PED), retinal edema, neurosensory retinal detachments and/or subretinal hemorrhages. The pathogenesis of the vasculopathy remains elusive. Recent investigations propose disruption of the inner elastic layer of choroidal arterioles in addition to the originally suggested venular origin. Previously, PCV has been characterized as a neovascular entity distinct from macular degeneration (AMD). However, recent investigations suggest a common genetic link between PCV and AMD.
CASE REPORT(S): A 57 year old Hispanic male presented to the Optometry Service complaining of progressive vision loss in the left eye. Best-corrected visual acuities were 20/20 and 20/70 in the right and left eyes, respectively. Clinical examination revealed an elevated hypo-pigmented macula in the left eye. Optical coherence tomography demonstrated intrachoroidal vasculopathy. Early phase fluorescein angiography revealed hyperfluorescence with a polypoidal vascular configuration. The findings were consistent with PCV. The patient underwent multiple anti-vascular endothelial growth factor injections resulting in PCV involution and stabilization of vision.
CONCLUSIONS: This poster examines the pathogenesis, clinical manifestations and diagnostic findings of PCV. Moreover, optimal treatment and management are reviewed.

41. **FOCAL CHOROIDAL EXCAVATION** (125660)

Shannon Santapaola, Yi-San Lee, OD, Kelly H. Thomann, OD, FAAO, Nancy N. Wong, OD, PhD, FAAO, VA Hudson Valley Health Care System

BACKGROUND: Focal choroidal excavation (FCE) represents a recently described idiopathic bilateral condition which manifests as thinning of the choroid. Typically, the disease course stabilizes and vision is affected minimally. However, in some cases, focal choroidal excavation may lead to central serous chorioretinopathy and/or choroidal neovascular membrane formation, which can cause vision loss. Optical coherence tomography (OCT) represents the optimal imaging modality for the diagnosis of focal choroidal excavation.
CASE REPORT(S): A 67 year old male presented to the Optometry Service complaining of blurred vision blur OS>OD. The best-corrected visual acuities were 20/25 and 20/50 for the right and left eyes, respectively. Mild retinal pigmentary disturbances were observed which failed to account for the reduction in vision in the left eye. Spectral domain OCT demonstrated focal choroidal excavation of the left eye. The outer retinal layers and retinal pigment epithelium conformed with the lesion excavation. Retinology consultation concurred that the condition was non-progressive; therefore, observation was recommended.
CONCLUSIONS: This poster examines the proposed FCE pathogenesis. FCE characterization by OCT imaging are reviewed. The treatment and management of FCE are discussed.

42. **A CASE OF PUNCTATE INNER CHOROIDOPATHY: CLINICAL FEATURES AND OUTCOMES** (125673)

Mahsa Salehi, OD, MT (ASCP), FAAO, Peter Gehlbach, MD, PhD, Johns Hopkins University Wilmer Eye Institute

BACKGROUND: Punctate inner choroidopathy (PIC) is an idiopathic ocular inflammatory disease involving the choroid and retina. It usually presents as multifocal, well-circumscribed small choroidal lesions in the absence of vitreous or anterior chamber inflammation. Choroidal neovascularization is the most common complication and subfoveal CNV accounts for the highest number of poor visual outcome. Papilledema and segmental retinal phlebitis are occasional events. The general visual prognosis is moderately good.
CASE REPORT(S): We report a 32-year-old Caucasian female with chief complaint of blurry vision and metamorphopsia for several months. Ocular and systemic history is unremarkable. Her best-corrected visual acuity measured 20/60 OD and 20/60 OS. Slit lamp examination was noncontributory. Dilated fundus examination found small punched out lesions in the maculae with choroidal neovascular membrane and minor subretinal fluid in both eyes. Baseline serological blood workup was ordered to eliminate any possible infectious or systemic etiology, which found to be normal. Given her inactive disease, she was treated with Cellcept, which is an immunosuppressive agent. Within several months of treatment her vision and distortion was improved and progression of choroidal neovascularization was arrested.
CONCLUSIONS: The diagnosis of PIC can be difficult because many other entities have similar appearance. The active choroidal lesions can be treated with oral or regional immunosuppressive agents and also intravitreal anti-VEGF. Generally PIC carries a good visual prognosis when the diagnosis and treatment are carried out appropriately. We review demographics, presenting symptoms, disease manifestations, differential diagnosis, treatment regimens, and ocular complications associated with this rare disease.

43. **PREVALENCE AND RISK FACTORS FOR CHOROIDAL NEVI USING THE OPTOS SCANNING LASER OPHTHALMOSCOPE** (125413)

Ariela Gordon-Shaag, PhD, Simon Barnard, BSc, PhD, FAAO, Liat Gantz, BOptom, PhD, Gabrielle Chiche, Vanessa Elbaz, Ruth Wolff, Rima PInchasov, BOptom, Zoya Gosman, BOptom, Einat Shneor, BOptom, PhD, Hadassah College

RESULTS: 42 subjects (13.2%) had one or more CN. Nevus prevalence was lower in women than men (9.5% vs. 24.1%, $p<0.001$). Nevus was found to be more prevalent in subjects with blond/light brown hair than in brown/black hair (34.5% vs. 10.4%, $p<0.001$) and in green/blue eyes than in brown/black eyes (17.9 vs. 10.6%, $p<0.01$). There was no statistically significant difference in visual acuity between the two groups.
PURPOSE: Choroidal nevi (CN) are a common incidental finding in many fundus examinations and the clinical significance relates to their rare potential for malignant transformation. Reported nevus prevalence rates vary widely (0.2%-30%). However, most studies have been from autopsy series or clinic-based studies and have used fundus camera for imaging only 35-70° of the retina after pupil dilation. This study aims to determine the prevalence and risk factors, associated with CN, using the Panoramic 200

Scanning Laser Ophthalmoscope (Optos plc, Dunfermline, UK), which can capture up to 200º view of the retina, without pupil dilation.
METHODS: A large cohort of healthy students was recruited from the student body of Hadassah Academic College. Preliminary analysis was carried out on the first 318 subjects (average ages 23.3±4.3). Images from each eye were obtained using the Optos along with a visual assessment. Each image was examined independently by 3 Optomap experts to assess for CN. Subjects were asked to complete a questionnaire covering socio-economic status, ethnicity, medical and eye health history. Hair, eye and skin pigmentation was assessed using previously reported methodology. Prevalence was calculated, and control and nevi cohorts were compared using chi-square analysis.
CONCLUSIONS: We found high prevalence of CN using the Optos. Nevus was found to be more prevalent in men and in subjects with light pigmentation. The presence of CN does not adversely affect visual acuity. Further analysis is required to assess for risk factors in terms of ethnicity, lifestyle and health.

44. **X-LINKED HEMOPHILIA AND FOVEAL RETINOSCHISIS - COINC.IDENCE OR CONSANGUINE?** (125193)
Lori Ann F. Kehler, OD, FAAO, Anita Agarwal, MD, Vanderbilt Eye Institute

BACKGROUND: X-linked bilateral foveal retinoschisis is a common cause of juvenile maculopathy in males. It often presents in early childhood as a student demonstrates difficulty in school. Vision loss associated with bilateral foveal schisis is varied and can be asymmetric. Clinical diagnosis of foveal schisis is challenging, as the associated stellate schisis folds are difficult to detect on exam. Modern imaging techniques like optical coherence tomography (OCT) can allow visualization of the schisis cavities and prompt a diagnosis that may not otherwise have been made. The gene responsible for foveal retinoschisis has been identified as XLRS1 on chromosome Xp22. Factor IX deficiency (hemophilia B) is also an X-liked condition and, to our knowledge, has not previously been reported in patients with bilateral foveal retinoschisis.
CASE REPORT(S): An 11 year-old boy presented to the Vanderbilt Eye Institute for longstanding, bilateral vision loss. His medical history is significant for hemophilia B, and several of his family members also have hemophilia (i.e. brother, maternal grandfather, cousin.) He had been previously seen by several community-based eye care providers and at an academic institution in a neighboring state. He reports having several pairs of glasses in the past without improvement in vision. He is accompanied by his mother who reports that he is having difficulty seeing in school. Uncorrected Snellen visual acuity is 20/60+4 OD, 20/60 OS. Salient clinical findings include mild hyperopia OU, trace pallor of the optic disc temporally OU, and dull foveal reflex OU. Spectralis OCT revealed bilateral foveal retinoschisis.
CONCLUSIONS: The gene locus for factor IX is Xq27.1-q27.2, which is not adjacent to the locus associated with the foveal retinoschisis gene. This unique case of a boy with both conditions warrants further genetic studies and further study of the hemophilia-affected family members. Clinicians should rule out foveal retinoschisis in males with bilateral vision loss, especially before suspecting malingering or bilateral refractive amblyopia.

45. **VISION LOSS SECONDARY TO PARAMACULAR COLOBOMA** (125228)

Richard C. Trevino, OD, FAAO, Praneetha Raveendranathan, Salma Kiani, University of the Incarnate Word Rosenberg School of Optometry

BACKGROUND: A paramacular coloboma is a torpedo-shaped chorioretinal lesion located temporal to the macula with its pointed edge facing the fovea. It is believed to arise due to incomplete closure of the fetal fissure. Its pathognomonic shape and location have resulted in its conjugate name "torpedo maculopathy" This congenital defect is believed to be the result of incomplete differentiation of the arcuate bundles along the horizontal raphe, during development, leading to its unique appearance. There are no known associated congenital, systemic, or ocular abnormalities. Patients are often asymptomatic, thus this lesion is normally discovered during a routine fundus examination. Due to its nonprogressive nature, patients can be followed up on an annual basis.

CASE REPORT(S): Two cases of paramacular coloboma are presented; one (Case 1) where the visual acuity remains unaffected and another (Case 2) where the visual acuity is reduced to 20/50. In both cases the OCT results showed disorganization of the inner layers, especially the RPE layer and outer layers of the retina, but in case 2 the lesion is encroaching on the fovea and in case 1 it is not. Humprey's visual field testing showed a defect corresponding to the macular lesion in the patient with reduced visual acuity but no scotoma was found in the patient with normal visual acuity. Location of the defect was the key difference between these patients leading it to be the main suspect of cause in terms of the reduced visual acuity and visual field defect.

CONCLUSIONS: In most cases of paramacular coloboma the visual acuity remains unaffected and the visual field is normal. If the lesion is near to the fovea, visual function can be affected, as occurring in Case 2. Our poster demonstrates that paramacular coloboma can present with a range of severity of vision loss that appears to be dependent upon the proximity of the lesion to the fovea.

46. **A RARE CASE OF PIGMENTED PARAVENOUS CHORIORETINAL ATROPHY INVOLVING THE MACULA** (125363)

Kimberly Cheng, OD, Lee Quin Vien, OD, David N. Yang, OD, FAAO, VA Palo Alto Healthcare System

BACKGROUND: Pigmented paravenous chorioretinal atrophy (PPCRA) is a rare disorder usually diagnosed by fundus appearance. Typical features include chorioretinal atrophy along retinal veins with variable bone spicule pigmentation. Differential diagnoses include sector retinitis pigmentosa, helicoid peripapillary chorioretinal degeneration, and gyrate atrophy. PPCRA initially presents peripherally, usually in the inferior quadrant. It is usually either non-progressive or very slowly progressing towards the posterior pole. Macular involvement is very rare, with only 6 cases reported as of 2000. It is hypothesized that there may be a hereditary or inflammatory component to the disorder. Unless the macula is involved, patients with PPCRA are typically asymptomatic and diagnosis is made on routine examination.

CASE REPORT(S): An 83 year old Pacific Islander male presented to the clinic for a

low vision examination with longstanding reduced vision OS. He reported no known history of ocular inflammation, infection, or trauma. His family ocular history was unremarkable. His best corrected visual acuities were 20/40 OD and 20/1000 OS with eccentric viewing, measured with the Feinbloom chart. Dilated fundus examination revealed extensive chorioretinal atrophy along the retinal veins with associated pigmentary changes OU. The chorioretinal atrophy was more extensive OS, extending to the macula, explaining the reduction in vision OS. Tangent screen visual field testing demonstrated superior and inferior scotomas corresponding with the areas of chorioretinal atrophy OU. Management included extensive patient education, including the importance of comprehensive eye exam for family members, and recommendation of low vision magnifiers.
CONCLUSIONS: PPCRA is a rare disorder with a typically good prognosis. This case demonstrates asymmetric PPCRA with macular involvement in one eye resulting in significant reduction in vision.

47. **CHORIORETINITIS SCLOPETARIA: A CASE REPORT** (125424)
Candice Elam, OD, James A. Haley Veterans Administration Hospital and Polytrauma Rehabilitation Center

BACKGROUND: Chorioretinitis sclopetaria is a term first used in German literature to describe retinal and choroidal trauma secondary to a high-velocity projectile passing through or adjacent to the orbit. Other terms that have been used to describe this rare clinical presentation include acute retinal necrosis, chorioretinitis proliferans, traumatic proliferating chorioretinitis, retinitis sclopetaria and retinitis sclopetarium.
CASE REPORT(S): A 24 year-old male was seen approximately seven weeks after sustaining a penetrating head injury by grenade. Ocular injuries were significant for right orbital roof fracture without globe rupture. The patient was one month status post prophylactic laser retinopexy to prevent retinal detachment. Computed tomography of the head showed shrapnel in the right orbit. Commotio retinae was seen at the inferior macula and an area of retinal necrosis with a pigmented border was present superiorly in the right eye.
CONCLUSIONS: The area of retinal necrosis visualized in this patient resulted from the "coup" injury of the projectile while commotio retinae at the macula represents the "contrecoup" injury from transmitted shock waves. In chorioretinitis sclopetaria retraction of the choroid and retina reveals bare sclera without scleral rupture. Vitreous hemorrhage is followed by proliferation of fibrous tissue that creates a firm adherence of retina and choroid to the sclera. This prevents fluid access to the subretinal space and lowers chances of acute retinal detachment. Observation for retinal breaks may have been indicated in this patient over the laser retinopexy treatment performed.

48. **RETINAL ANGIOMATOUS PROLIFERATION** (125653)
Becky Forman, Yi-San Lee, OD, Anuradha Veerappan, BS, Nancy N. Wong, OD, PhD, FAAO, Elaine Lin, VA Hudson Valley Health Care System

BACKGROUND: Retinal angiomatous proliferation (RAP) represents a subtype of neovascular age-related macular degeneration (AMD). RAP neovascular membranes originate in the deep retina with possible progression toward retinochoroidal anastomosis. RAP may be characterized into 3 vasogenic phases. Alternatively, recent investigations propose a dual origin of neovascularization, retinal and/or choroidal. Clinical manifestations include intraretinal hemorrhages, intraretinal edema, vascularized pigment epithelial detachments (PED) and choroidal neovascularization. Spectral domain optical coherence tomography (OCT) and indocyanine green angiography (ICG) represent the optimal modalities to define the RAP lesion.
CASE REPORT(S): A 74 year male presented to the Optometry Service complaining of recent onset reduced vision in the left eye. Best-corrected visual acuities were 20/20 and 20/40 for the right and left eyes, respectively. Fundus evaluation demonstrated a para-foveal intraretinal hemorrhage and edema. Fluorescein angiography demonstrated stippled poorly defined hyperfluorescence in the left eye. OCT revealed a stage 2 RAP lesion with an associated PED. The patient underwent multiple anti-vascular endothelial growth factor injections resulting in membrane involution and improvement of vision.
CONCLUSIONS: This poster examines the clinical manifestations and proposed pathogenesis of RAP. RAP staging based upon angiographic and OCT characteristics are discussed. Moreover, optimal treatment and management modalities are examined.

49. **ACUTE ZONAL OCCULT OUTER RETINOPATHY: A CASE REPORT AND OCT STUDY** (125658)
R. Jacob Gunn, OD, Group Health Permanente

BACKGROUND: Acute Zonal Occult Outer Retinopathy was initially described by J. Donald M. Gass in 1992 who used electroretinography (ERG) to localize the disease to the outer retina. The development of optical coherence tomography (OCT) has provided the ability to study the retinal changes that occur in AZOOR and characterize them. This poster presents a case of bilateral AZOOR where OCT findings assisted in the diagnosis. Related differential diagnoses will also be discussed.
CASE REPORT(S): A 58 year old Romanian female presented to the eye clinic complaining of sudden onset of photopsias, and over the next two weeks developed a bi-temporal visual field defect. Her fundus examination was unremarkable and magnetic resonance imaging ruled out a lesion to the optic chiasm. OCT imaging performed during a neuro-ophthalmology evaluation revealed retinal thinning and loss of the photoreceptor layers corresponding to the visual field defects. With the use of OCT, fundus autofluorescence, intravenous fluorescein angiography (IVFA), and indocyanine green angiography (ICG) she was diagnosed with AZOOR. At the time of this report the patient had been followed for 2 months and her visual loss had stabilized without treatment.
CONCLUSIONS: AZOOR is a rare retinal disorder of unknown etiology characterized by focal degeneration of the photoreceptors causing zones of visual loss and photopsias. Knowledge of AZOOR can assist the clinician in avoiding unnecessary referrals. As shown in this patient, the use of OCT can help detect changes in the retina not present on clinical examination, and if performed at this patient's initial evaluation would have saved the patient unnecessary neuro-imaging. ERG testing has been the mainstay for diagnosing AZOOR. However ERG testing is not widely accessible and is generally limited to

academic centers. This patient was diagnosed with AZOOR based on clinical findings and OCT imaging without the use of an ERG study.

50. **A CASE OF UNILATERAL ACUTE RETINAL NECROSIS IN AN IMMUNOCOMPETENT PATIENT** (125697)

Kendra Eck, OD, James Esposito, OD, FAAO, Nicholas T. Chan, OD, FAAO, Deana Emiko Lum, OD, FAAO, George Bertolucci, MD, VA Central California Health Care System Fresno Medical Center

BACKGROUND: Acute retinal necrosis (ARN) is a herpetic necrotizing retinitis most commonly seen in immunocompetent individuals. ARN presents with a panuveitis and confluent areas of peripheral retinal necrosis. Severe retinal thinning and atrophy puts the patient at a high risk for the development of a rhegmatogenous retinal detachment.
CASE REPORT(S): A 79 year old Caucasian male presented to our clinic after seeing an outside ophthalmologist one month prior with the diagnosis of a broken blood vessel in the back of his eye. His chief complaint was increased blurred vision and floaters OD. BCVA was 20/100 with superior temporal constriction on confrontation visual field testing OD. Biomicroscopy revealed 2+ cells in the anterior chamber and moderate vitreous cells and haze OD. Posterior segment examination was remarkable for vasculitis of the superior temporal arcade and peripheral retinitis extending from 8 to 11 o'clock. Lab testing for syphilis, toxoplasmosis, and Lyme disease were ordered along with a lymphocyte panel and chest X-ray. A diagnosis of ARN was suspected given the patient's immunocompetent status and the clinical presentation with significant inflammation. The patient was admitted to the hospital and given IV acyclovir 15mg/kg every eight hours for ten days with excellent response. The patient was later switched to oral valganciclovir as maintenance therapy and continued to improve without further reactivation of the retinitis.
CONCLUSIONS: As with all infectious retinal disease, early recognition and management is essential to reduce the risk of potential devastating vision loss. Differentiating ARN from other types of posterior segment inflammatory conditions based on clinical presentation and immune status is needed for prompt treatment and a more favorable outcome.

51. **ROD LOSS WITH 43-KDA AND 52-KDA PROTEIN, ANTI-RETINAL AUTOANTIBODIES IN AUTOIMMUNE RETINOPATHY** (125691)

Albert D. Woods, MS, OD, FAAO, Hua Bi, OD, PhD, Nova Southeastern University College of Optometry, Michelle Caputo, OD, Bascom Palmer Eye Institute

BACKGROUND: Paraneoplastic and autoimmune retinopathies are associated with antibodies directed against several different retinal proteins, including antibodies against recoverin (23-kDa) most common in cancer associated retinopathy (CAR). However, less common anti-retinal autoantibodies must be considered in any patient considered to have a paraneoplastic retinopathy. We present the electrophysiological and clinical findings of a rare autoimmune retinopathy compared to the more common anti-recoverin retinopathy in CAR patients
CASE REPORT(S): A 55 year-old female was referred for ERG testing to help evaluate

her vision loss as a possible CAR case. The patient had noticed decreased central vision for approximately one year OU, along with nyctalopia. Her medical history was significant for a weight loss of 40 lbs over the past year. She reported abnormal breast cells and small nodules in her lungs with PET and CT imaging, but were not considered to be consistent with a malignancy. Flash ERG showed a marked attenuation of the rod responses and a mild degree of cone attenuation OU. With the pattern of rod loss, and the question of a possible underlying malignancy until ruled-out by biopsy, an anti-retinal autoantibody test panel was ordered. The panel findings showed a positive Western Blot for anti-retinal autoantibodies against 43-kDa and 52-kDa proteins. While breast biopsy and neuroimaging have been negative for any malignancy over the five months since her ERG, a transbronchial lung biopsy is now being scheduled.
CONCLUSIONS: This case indicates electroretinography provides an objective characterization of retinal degenerations that can help guide additional testing and possible treatment. The autoimmune retinopathy as seen in this patient initially affected rod photoreceptor function. While the association of anti 43-kDa and 52-kDa autoantibodies and cancer is not well established, an anti-transducin autoantibody, anti-40-kDa, also characterized by defects in rod function similar to our patient, is typically not associated with an underlying malignancy.

52. **PAPILLOPHLEBITIS: NOT YOUR AVERAGE CRVO** (125027)
Carla Gilbertson, Rebecca A. Johnson, OD, VA Medical Center

BACKGROUND: The retinal picture of papillophlebitis typically appears similar to that of a central retinal vein occlusion with dilated and tortuous retinal veins, hemorrhages, exudates, cotton wool spots, and edema. The main difference between the two disease states is that patients with papillophlebitis are young and relatively healthy. The exact etiology is unknown, but it is suspected that papillophlebitis develops from inflammation of the retinal or papillary vessels.
CASE REPORT(S): A new 28 year old white male presented to the clinic complaining of decreased peripheral vision in his left eye for one month. He denied any history of trauma, pain, or flashes of light. The patient's corrected visual acuities were OD 20/20-1 and OS 20/20-2. The pupillary evaluation, extraocular muscle (EOM) testing, and anterior segment findings were normal OU. All posterior segment findings OD were normal. The posterior pole findings OS illustrated 2+ optic nerve head (ONH) edema with dilated and tortuous veins and scattered flame and blot hemorrhages in all four quadrants extending into the mid-periphery. Fundus photographs were taken to document the retinal appearance. Humphrey visual field (HVF) testing showed peripheral constriction 360 degrees OS. The optical coherence tomography (OCT) demonstrated severe diffuse edema of the macula and nerve OS. The patient was diagnosed with papillophlebitis OS. A consult was submitted to an ophthalmologist for further review. After a series of follow-up appointments, the patient's retinal findings, HVF testing, and OCT results returned to baseline with no residual impact on vision.
CONCLUSIONS: As in this case, papillophlebitis commonly resolves without treatment three to six months after onset. It is critical to follow the patients closely as neovascularization and secondary glaucoma may develop. The most common cause of visual loss in papillophlebitis is macular edema. In other rare cases, the retinal vessel

inflammation may lead to diffuse retinal ischemia which may also contribute to visual loss. Most often, diffuse retinal ischemia does not occur.

53. BILATERAL DISC HEMORRHAGE ASSOCIATED WITH CONCURRENT WARFARIN AND AMIODARONE THERAPY (125375)

Jennifer Koh, BS, OD, San Francisco VA Medical Center

BACKGROUND: Warfarin is an anticoagulant commonly prescribed for control and prevention of thromboembolic events. Abnormal bleeding is a main side effect. Ocular complications include hyphema, subconjunctival, vitreous, retinal, and choroidal hemorrhage. Patients on warfarin may have co-morbidities requiring systemic medications, such as amiodarone for ventricular arrhythmias. Concurrent amiodarone therapy has been shown to potentiate the effects of warfarin, often requiring titration in warfarin dosage to maintain therapeutic International Normalized Ratio and decrease risk of bleeding complications.
CASE REPORT(S): A 65 year-old male with atrial fibrillation and symptomatic rapid ventricular rate on concurrent warfarin and amiodarone therapy presented with asymptomatic bilateral disc hemorrhages. International Normalized Ratio (INR) was below or at the therapeutic goal of 2.0 to 3.0, except for one episode of 3.2 two months prior to presentation. Work-up to assess for risk of early normal tension glaucoma was conducted. The disc hemorrhages resolved without further bleeding complications.
CONCLUSIONS: This case documents the unique ocular complication of bilateral disc hemorrhages in a patient on concurrent warfarin and amiodarone therapy. Warfarin is available as two enantiomers which are stereoselectively metabolized by renal cytochromes, CYP2C9 and CYP1A2. Amiodarone inhibits the activity of these enzymes, reducing biotransformation of warfarin and enhancing its anticoagulant effect causing prolonged INR. Thus, dosage of warfarin must be adjusted to maintain INR within therapeutic goal and to reduce risk of side effects. Patients with ocular findings should be observed for resolution of retinal hemorrhages.
ADDITIONAL COMMENTS: Acknowledgements: Bernard Dolan, OD, MS, FAAO Andrew Mick, OD, FAAO Michael Narahara

54. NEW CHALLENGES IN SCREENING FOR PLAQUENIL MACULOPATHY: INTERPRETING RESULTS OF SPECTRAL DOMAIN OCULAR COHERENCE TOMOGRAPHY (SD-OCT) (125140)

Andrea M. Janoff, OD, FAAO, Rim Makhlouf, OD, Diana L. Shechtman, OD, FAAO, Sherrol A. Reynolds, OD, FAAO, Michelle Nadeau, OD, Nova Southeastern University College of Optometry

BACKGROUND: Despite its efficacy in the management of systemic lupus erythematosus (SLE) and rheumatoid arthritis (RA), Plaquenil is known to cause irreversible and progressive vision loss when drug toxicity exists, even after the medication has been discontinued. New guidelines for screening have emerged recommending the use of more sensitive diagnostic tools for earlier disease detection. SD-OCT is one such test that may reveal macular abnormalities preceding visual field loss in Plaquenil maculopathy.

CASE REPORT(S): Case 1: A 26 yo black female treated with Plaquenil (200mg bid X 12 yrs) for SLE presented with best-corrected visual acuity (BCVA) of 20/20 OD, OS. Dilated fundus examination (DFE) was unremarkable OD, OS. SD-OCT revealed para-foveal thinning viewed on the retinal thickness map OD,OS in the absence of any defects on visual field testing. Case 2: A 70 yo white female treated with Plaquenil (200mg bid x 10 yrs) for RA presented with BCVA of 20/20 OD, OS. DFE was unremarkable OD, OS. SD-OCT revealed para-foveal disruption of the photoreceptor integrity line (PIL) OD, OS with corresponding defects on visual field testing.
CONCLUSIONS: Plaquenil maculopathy is a deleterious condition that requires early detection for prompt intervention to occur, thereby avoiding further irreversible damage. It is crucial for clinicians to familiarize themselves with the new screening guidelines along with proper interpretation of the diagnostic tools being utilized, such as SD-OCT. The fact that baseline data did not include SD-OCT results makes new data interpretation with subsequent proper therapeutic recommendations challenging. We must be vigilant in regards to early detection, yet cautious with regards to therapeutic adjustment.

55. **STEREOACUITY OF PRESCHOOLERS WITH AND WITHOUT VISION DISORDERS** (125341)

Elise B. Ciner, OD, FAAO, Gui-shuang Ying, PhD, Maureen Maguire, PhD, Graham Quinn, MD, MSCE, Jiayan Huang, MS, University of Pennsylvania, Marjean T. Kulp, OD, MS, FAAO, The Ohio State University College of Optometry, Lynn A. Cyert, PhD, OD, FAAO, Northeastern State University, Deborah A. Orel-Bixler, OD, PhD, FAAO, University of California Berkeley, Bruce D. Moore, OD, FAAO, New England College of Optometry

RESULTS: Only 1% of children were unable to complete stereoacuity testing. Overall and at each age, children with VIP targeted disorders had significantly lower median stereoacuity (120 vs. 60 sec arc, $p<0.001$). Each disorder was also associated with significantly lower stereoacuity ($p<0.001$). Median stereoacuity was unmeasurable for children with strabismus, 480 sec arc for amblyopia, and 240 sec arc for refractive error. Children with the most severe vision disorders had lower median stereoacuities than children with moderate or mild disorders (480 vs.120 sec arc, $p<0.001$). When compared to children without vision disorders, they were also less likely to achieve the highest level of stereopsis (9.2 vs. 64%) and more likely to demonstrate no measurable stereopsis (41.6 vs 1.5%) ($p<0.001$).
PURPOSE: To determine the association between stereoacuity and presence, type and severity of vision disorders in Head Start preschool children.
METHODS: Children aged 3-5 years (n=2898) participating in the Vision in Preschoolers Study (VIP) were evaluated with the Stereo Smile II as part of a comprehensive vision exam including visual acuity (VA), cover testing and cycloplegic retinoscopy. The Stereo Smile II is a 2 alternative forced choice test with a non-stereo smile training card and 4 test cards from 480 to 60 sec arc in 1 octave steps successively paired with a stereo blank card. Children were classified as either having or not having a VIP targeted disorder (strabismus, amblyopia or significant refractive error) and further classified based upon the type and severity. Children able to complete only the training card were scored as having no measurable stereopsis. Median stereoacuity was compared

using the Wilcoxon rank sum test.
CONCLUSIONS: Presence and increasing severity of any VIP targeted disorder was associated with significantly worse stereoacuity in preschool children.
ADDITIONAL COMMENTS: NEI/NIH, DHHS grants: U10EY12644; U10EY12547; U10EY12545; U10EY12550; U10EY12534; U10EY12647; U10EY12648 and R21EY018908

56. **A RETROSPECTIVE REVIEW OF ACQUIRED PHOTOPHOBIA IN SOLDIERS RETURNING FROM WAR WITH MILD TRAUMATIC BRAIN INJURY** (125500)
Suzanne Wickum, OD, FAAO, University of Houston College of Optometry, Catherine McDaniel, OD, MS, FAAO, The Ohio State University College of Optometry, Tiffany Martinez, OD, University of Houston College of Optometry

RESULTS: Sixty-seven subjects were included in this study. All 3 groups showed >90% of subjects with increased photophobia outdoors. Other commonly reported symptoms included: trouble with dark adaptation, increased glare, increased light sensitivity indoors, and self restriction of driving. There was no clear correlation between specific TBI mechanism and the symptoms reported. The photophobia symptoms were not secondary to visible ocular pathology nor were medications the sole cause either. Finally, the majority of subjects found short to mid wavelength selective filters provided significant photophobia relief.
PURPOSE: BACKGROUND: Traumatic brain injury (TBI) has been labeled the signature wound of the Iraq and Afghanistan conflicts. Studies have shown that accommodative and binocular vision deficits are common in TBI patients; however, the combat military TBI population also has a high frequency of photophobia. The literature is limited in addressing the cause of the increased light sensitivity and the symptomatic relief of the photophobia.
METHODS: A retrospective chart review was performed to evaluate if there was a difference in reported light sensitivity among 3 groups of combat brain injured soldiers: blast related, traditional (non-blast), and combined blast and traditional TBI. Data was collected from the subjects' comprehensive exams including: history of TBI, photophobia symptoms, self-limited activities of daily living (ADLs), medications, eye exam findings, and whether selective wavelength filters provided symptomatic relief.
CONCLUSIONS: When faced with TBI patients it is important to ask about visual symptoms, such as photophobia, which may limit the patient's ADLs. While the exact mechanism of photophobia secondary to TBI remains unknown, there are several theories being studied that may lead to additional treatments for this problem. In the meantime, the use of selective wavelength filters can provide symptomatic relief for such patients.

57. **SEVERITY LEVELS OF DRY EYE SYNDROME IN PATIENTS WITH VARIOUS TYPES OF ACQUIRED BRAIN INJURY** (125628)
Lynn A. Lowell, Southern California College of Optometry, Milton M. Hom, OD, FAAO, Azusa, CA

RESULTS: The mean OSDI score for all 41 patients was 45.46 (range of 13.64 - 87.5) with a standard deviation (SD) of +/- 18.61. This sample included 21 males and 20 females with an average age of 52.71 years old. Patients diagnosed with CVA (n=9) were the most symptomatic with an overall score of 48.85 (SD +/- 17.83), followed by patients with TBI (n=19) at 45.89 (SD +/- 20.90), then DAI (n=10) at 45.41 (SD +/- 16.97), and lastly patients with ABI from miscellaneous causes (n=3) at 32.64 (SD +/- 11.47). Additionally patients with CVA had the highest percentage of severe DES (8/9) at 88.89%, followed by DAI (8/10) at 80%, then TBI (15/19) at 78.95%, and lastly ABI from miscellaneous causes (1/3) at 33.33%.
PURPOSE: To assess if certain types of Acquired Brain Injuries (ABI) relate to the degree of Dry Eye Syndrome (DES) experienced in this patient population.
METHODS: Forty-one patients with ABI and DES were surveyed using a validated questionnaire for dry eyes, the Ocular Surface Disease Index (OSDI). The scoring range of the OSDI is from 0 (asymptomatic) to 100 (extremely symptomatic). A score of 13 and greater is considered symptomatic for DES. Furthermore, the scoring range is divided into degrees of severity: mild (13-22), moderate (23-32), and severe (33-100). The categories of ABI include: Cerebral Vascular Accident (CVA), Diffuse Axonal Injury (DAI), Traumatic Brain Injury (TBI), and Miscellaneous Causes.
CONCLUSIONS: In our pilot study, patients with various types of ABI were highly symptomatic for DES with an overall mean OSDI score in the severe range. Specifically patients who had CVAs were the most symptomatic for DES, followed by TBI, DAI, and ABI from miscellaneous causes. This information may suggest that further research is indicated to identify the causative mechanism for DES in various types of ABIs.

58. **PUPILLARY DYNAMICS TO LIGHT IN MILD TRAUMATIC BRAIN INJURY (MTBI)** (125232)

Preethi Thiagarajan, BSOptom, MS, FAAO, Kenneth J. Ciuffreda, OD, PhD, FAAO, State University of New York (SUNY) College of Optometry, Jose E. Capo-Aponte, Visual Sciences Branch US Army Aeromedical Research Laboratory

RESULTS: Peak velocity of pupillary constriction was significantly ($p = 0.01$) lower in the mTBI group (5.03mm/sec) when compared to the VN group (6mm/sec). Similarly, average velocity of pupillary dilation was significantly ($p = 0.03$) slower in the mTBI group (0.9mm/sec) when compared to the VN group (1.1mm/sec). However, the maximum and minimum pupil diameter, latency of constriction, and 75% recovery time to dilate to the original baseline pupil size was not significantly different between the two groups ($p>0.05$).
PURPOSE: To evaluate objectively dynamics of the human pupillary response in individuals with mTBI and compare it to visually-normal (VN) individuals.
METHODS: Pupillary dynamics to a flash light stimulus (180 micro watts; 525 milliseconds duration) was assessed objectively using a Neuroptics PLR-200 handheld pupillometer (sampling rate: 32 fps) in 8 individuals with mTBI (mean age: 28 years) and 8 VN (mean age: 30 years) individuals. None had any direct trauma to the eye. Subjects steadily fixated a target at 3m distance with the non-tested eye, and the pupillometer was aligned along the subject's tested eye. The light stimulus was flashed into the tested eye, and the response was recorded for 5 seconds. Measurements were repeated 3 times in

each eye alternately, and then they were averaged separately for each eye. At least a minute interval was allotted between each measurement for light adaptation recovery.
CONCLUSIONS: The mTBI group demonstrated slower dynamics of both pupillary constriction and dilation. The slowed pupillometer responses are consistent with slowed responses in the other oculomotor subsystems (e.g., vergence) of those with mTBI. The slowed responses may in part contribute to the report of photosensitivity in these individuals.

59. **TEST-RETEST RELIABILITY OF A QUANTITATIVE VISUAL SYMPTOMS QUESTIONNAIRE FOR USE WITH OEF/OIF VETERANS AT PRIMARY VA EYE CLINICS** (125708)

Timothy Morand, OD, FAAO, Cincinnati VA Medical Center

BACKGROUND: Traumatic brain injury (TBI)often results in intolerance to ambient illumination in the absence of anterior segment pathology. Although the mechanism of the photosensitivity is not well understood, colored filters provide relief. Colored filters have been known to reduce the ophthalmologic symptoms of TBI by providing glare reduction, maximizing visual function, and enhancing orientation and mobility skills.
CASE REPORT(S): A forty-one year old male presented with severe light sensitivity upon returning from active military duty overseas. His symptoms were constant; however, his photosensitivity was worse when transitioning from scotopic to photopic conditions and while driving at night. His medical history was positive for post-traumatic stress disorder, cerebral aneurysm, and mild traumatic brain injury. All findings of his comprehensive ophthalmological examination were unremarkable and he was refracted to 20/20 in both eyes. By subjective testing, it was determined that an amber tint (525 nm) provided the best relief of photosensitivity. Thus, driving glasses and soft contact lenses were prescribed in this wavelength. With both forms of colored filter correction, the patient noticed a significant decrease in photosensitivity and improvement in vision while driving at night. Important to note was that the patient was more partial towards the soft contact lenses versus spectacles for treatment. This preference was attributed to the increased optical quality that contact lenses provide for myopia in comparison spectacles. Additionally, the patient appreciated the ease of wearing non-prescription sunglasses over his contact lenses to increase his comfort.
CONCLUSIONS: Specialized colored filters prescribed in spectacles and/or soft contact lenses are effective treatment modalities for photosensitivity in mild-TBI. Tinted soft contact lenses, in comparison to tinted spectacles, may be the preferred treatment option for many of these individuals.
ADDITIONAL COMMENTS: Acknowledgement: Special thank you to Dr. Kia Eldred, Low Vision Optometrist at the MEDVAMC VISOR Program.

60. **THE SIGNIFICANCE OF AMBER TINTED LENSES IN TRAUMATIC BRAIN INJURY INDUCED PHOTOSENSITIVITY** (125465)

Sangita Patel Vadapalli, OD, FAAO, VA Medical Center, Melanie J. Frogozo, OD, University of Houston College of Optometry

BACKGROUND: Traumatic brain injury (TBI)often results in intolerance to ambient illumination in the absence of anterior segment pathology. Although the mechanism of the photosensitivity is not well understood, colored filters provide relief. Colored filters have been known to reduce the ophthalmologic symptoms of TBI by providing glare reduction, maximizing visual function, and enhancing orientation and mobility skills.
CASE REPORT(S): A forty-one year old male presented with severe light sensitivity upon returning from active military duty overseas. His symptoms were constant; however, his photosensitivity was worse when transitioning from scotopic to photopic conditions and while driving at night. His medical history was positive for post-traumatic stress disorder, cerebral aneurysm, and mild traumatic brain injury. All findings of his comprehensive ophthalmological examination were unremarkable and he was refracted to 20/20 in both eyes. By subjective testing, it was determined that an amber tint (525 nm) provided the best relief of photosensitivity. Thus, driving glasses and soft contact lenses were prescribed in this wavelength. With both forms of colored filter correction, the patient noticed a significant decrease in photosensitivity and improvement in vision while driving at night. Important to note was that the patient was more partial towards the soft contact lenses versus spectacles for treatment. This preference was attributed to the increased optical quality that contact lenses provide for myopia in comparison spectacles. Additionally, the patient appreciated the ease of wearing non-prescription sunglasses over his contact lenses to increase his comfort.
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ADDITIONAL COMMENTS: Acknowledgement: Special thank you to Dr. Kia Eldred, Low Vision Optometrist at the MEDVAMC VISOR Program.

61. **NEURO-OPTOMETRIC REHABILITATION REVEALED SIGNIFICANT VISUAL IMPROVEMENTS ONE YEAR POST BRAIN INJURY** (125696)
Lernik Mesropian, OD, Paula A. Handford, OD, FAAO, Kristine Huang, OD, MPH, FAAO, Southern California College of Optometry

BACKGROUND: This case allows for better understanding in the current treatment options for patients who are seeking optometric care after suffering from an acquired brain injury. Most importantly, it provides supporting evidence that significant improvements in the daily functioning of our patient's lives can occur, even if therapy is initiated 1 year after initial trauma to brain.
CASE REPORT(S): AB, a 31-year-old white male, suffered from an anoxic brain injury 1 year prior to his first evaluation in our clinic. Imaging had shown damage to his cerebral cortex, as well as his occipital and frontal lobes. At that point, AB was unable to tie his own shoe laces, use the microwave, or a telephone. A comprehensive evaluation revealed severe inadequate visual information processing deficits in the areas of figure ground, closure, form constancy, and visual motor integration, as well as inadequate visual efficiency abilities. Neuro-optometric vision rehabilitative therapy was recommended to AB. We are now over 2 years after the initial insult to his brain, and have evidence showing significant improvements in visual analysis, and most

importantly, improvements in his daily life (living on his own, and using a smart phone for phone calls and his calendar). He has thus far completed 38 therapy visits at our college, and continues to make significant improvements.
CONCLUSIONS: With proper neuro-optometric rehabilitation evaluation and therapy, improvements in various areas of visual processing can be made long after the onset of the acquired brain injury. Care should be taken to insure that patient is also receiving therapy in other areas (Occupation and physical therapy), to insure best management and outcomes for patient.
ADDITIONAL COMMENTS: We have numerous images and video of our patient's work before the start of therapy, during therapy and now one year after therapy. We're hoping to incorporate that in our presentation to best demonstrate the improvements our patient has made, as well as present the viewer with additional evaluation and therapy techniques.

62. **TOLERABILITY AND EFFECTIVENESS OF CONTACT LENS IN MILD TBI WITH VISUAL DISCOMFORT: A CASE SERIES** (125309)

Len V. Hua, PhD, OD, FAAO, Hannu Laukkanen, OD, MEd, FAAO, John Hayes, PhD, Mark P. Andre, FAAO, Pacific University College of Optometry

RESULTS: Five mTBI subjects were enrolled in the study. Comprehensive eye examination of all subjects prior to the study revealed normal ocular health with the exception of visual symptoms. Two subjects appreciated the beneficial effects of multifocal contact lens. The other three subjects did not experience significant benefits of multifocal contact lens. Nevertheless, all subjects successfully tolerated daylong contact lens wear.
PURPOSE: This case series examines the tolerability, effectiveness and clinical utility of multifocal contact lenses in a subset of mild traumatic brain injury (mTBI) patients with visual discomfort.
METHODS: This was a controlled, crossover study using Proclear EP Multifocal Contact lens, compared to Proclear Single Vision contact lenses, for 5 subjects between the ages of 18 and 45 years with history of mTBI. Visual symptoms were evaluated using the Convergence Insufficiency Symptom Survey and visual function was examined by standard visual tests, including visual acuity, EOM, pupil size, near point convergence (NPC), vergence, phoria, NRA/PRA, accommodative and vergence facility, stereoacuity. Subjects were randomized to either Proclear Sphere (single vision) contact lens or Proclear EP Multifocal contact lens, each for a duration of two weeks.
CONCLUSIONS: Most eye care professionals face the daunting task of how best to manage complex mTBI cases. One of the lingering effects of TBI is often manifested as visual symptoms due to oculomotor dysfunction. Multiple treatment modalities may be necessary to alleviate chronic visual discomfort secondary to mTBI.. Traditionally, spectacles, prisms and vision therapy have been recommended to manage mTBI visual symptoms, but our results suggest that multifocal contact lenses can also benefit select mTBI patients.
ADDITIONAL COMMENTS: This study was supported by Harold Haynes Endowed Research Fund.

63. **BINASAL OCLUSION ENHANCES THE VISUAL-EVOKED POTENTIAL (VEP) AMPLITUDE IN MILD TRAUMATIC BRAIN INJURY (MTBI)** (125185)

Naveen Kumar Yadav, BSc(H) Oph Tech, MS, Diana Ludlam, Kenneth J. Ciuffreda, OD, PhD, FAAO, State University of New York (SUNY) College of Optometry

RESULTS: In all 10 individuals with mTBI, the mean VEP amplitude increased significantly ($p<0.05$) with the BNO added (by 2.2uV). In contrast, in all 10 VN, the mean VEP amplitude decreased significantly ($p<0.05$) with the BNO added (by 4.2uV). Latency (P100) was normal and unaffected by the BNO added ($p>0.05$) for all conditions/groups.

PURPOSE: While binasal occulsion (BNO) has been reported clinically to reduce the symptom of increased visual motion sensitivity (VMS) in mild traumatic brain injury (mTBI), there has been no objective documentation of an electrophysiological correlate in this group.

METHODS: Young-adults with mTBI (n=10, mean age 26 years, 1-10 years post-insult) and VMS were tested. They were compared with 10 age/gender-match visually-normal (VN) (mean age 28 years) subjects. Conventional full-field (17H x 15V degrees) VEP testing (DIOPSYS NOVA-TR) and test stimuli were used (64x64check size, 85% contrast, 64 candelas/meter square, temporal frequency of 2 Hz, 1m distance, average of 2 trials, binocular viewing with spectacle correction) under 2 conditions: with and without the opaque BNO. The BNO occluded regions 5.7H and 15V degrees that were 5.5 degrees lateral to either side of the VEP test field, and hence blocked bitemporal retinal regions in each eye.

CONCLUSIONS: This is the first objective demonstration of BNO enhancing visual cortical system responsivity in mTBI, in agreement with their subjective counterpart. We speculate that those with mTBI and VMS habitually attempt to suppress cortically visual information in the near retinal periphery. With the BNO, this suppression is somewhat reduced, thus leading to the spread of reduced inhibition and hence enhanced central visual field responsivity. In VN with BNO, there is reduction of normal excitation, thus reducing central field responsivity.

65. **"EXECUTIVE FUNCTIONING" ATTENTIONAL PERFORMANCE DISORDERS IN ADULTS WITH TRAUMATIC BRAIN INJURY (TBI)** (125666)

Darrell G. Schlange, OD, FAAO, Dominick M. Maino, OD, MEd, FAAO, Illinois College of Optometry

BACKGROUND: Traumatic brain injuries (TBI) are often associated with functional disorders and performance issues of executive function variety. These can result in adult attentional problems, reduced task concentration, decreased working memory, and poor stamina for sustained performance, which frequently affects success at work and school. In this case series, we present the results from neuro-rehabilitation intervention of five adults with TBI and the attentional problems displayed both pre and then post treatment.

CASE REPORT(S): Our five subjects were given a comprehensive eye exam, visual efficiency evaluation, eye-movement analysis and Quality of Life Survey (QLS). Prosaccades and antisaccades were evaluated with the FixTest, Visagraph, DEM and

King-Devick tests. Sustained and selective attention was determined with the TOVA (Test of Variables of Attention), a neuropsychological test quantifying attention, impulsivity, reaction time and variability of performance. The TOVA results were compared with age matched non-ADHD subjects. Treatment included oculomotor therapy and neuro-rehabilitation. The initial TOVA indicated an executive functioning problem in all 5 subjects, with reaction times and variability of sustained response below normal range by an average of 0.91 standard deviations. Attention and impulsivity responses were within normal range. All subjects displayed abnormal reading fluency and saccades, poor symptomatic score on QLS and inaccurate prosaccades (overlap) and gap antisaccades. Positive performance changes occurred in all areas pre and post therapy including an average improvement of 1.1 standard deviations in TOVA response time and variability scores.
CONCLUSIONS: These 5 cases illustrated the executive functioning attentional problems in adult subjects with TBI and their improvement with treatment. Optometric vision therapy integrated with neuro-rehabilitation improved on-task abilities, sustained and consistent attention, response performance metrics and quality of life.

66. **VISUAL FUNCTION, TRAUMATIC BRAIN INJURY, AND PTSD** (125418)

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RESULTS: Both BR and NBR injury resulted in patient reports and diagnoses of vision problems. PTSD was less common in NBR compared to BR patients ($p<0.001$). PTSD diagnosis was less frequent in blast injured patients with penetrating TBI ($p<0.001$), who were monocular ($p<0.006$), and had eye/orbit trauma ($p<0.04$). Across all groups, PTSD patients had a significantly higher frequency of light sensitivity (<0.009). High rates of accommodative dysfunction and convergence insufficiency were found among TBI patients, but the BR and NBR group differences were not significant. Strabismus, pursuit abnormalities, fixation deficits, and visual field defects were also common in both BR and NBR groups. The only significant differences in vision problems found between the BR and NBR groups were self-reported light sensitivity and saccadic dysfunction.
PURPOSE: Military personnel are at risk for traumatic brain injury (TBI), vision impairment (VI), and post-traumatic stress disorder (PTSD). Brain injury can be blast-related (BR) from proximity to an explosion or non-blast-related (NBR) from motor vehicle accidents, falls, assaults, or other causes. Civilians usually incur TBI from NBR causes. Current literature suggests it may be difficult to distinguish symptoms caused by TBI from those caused by PTSD. The purpose of this study was to examine possible relationships between TBI mechanism (BR or NBR), VI, and PTSD.
METHODS: A retrospective analysis of 100 patients, 50 with BR and 50 with NBR TBI, was conducted. Frequencies of visual symptoms, vision function abnormalities, and PTSD diagnoses were compared for all patients by mechanism of injury and PTSD diagnosis.
CONCLUSIONS: Excluding light sensitivity, TBI, but not PTSD, appears to be associated with ocular injury and vision impairment. Both NBR and BR TBI frequently results in visual loss and/or dysfunction and is associated with PTSD. Eye care

professionals should include questions about TBI history and PTSD symptoms in patient history and be especially attentive to visual loss/dysfunction in patients with a history of TBI.
ADDITIONAL COMMENTS: Research supported by VA grant RRP 11-008.

67. **A CASE PRESENTATION OF ACQUIRED HORNER SYNDROME SECONDARY TO BILATERAL INTERNAL CAROTID ARTERY DISSECTION** (125983)

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BACKGROUND: In nearly 60% of cases, internal carotid artery dissection can present with ophthalmological signs and symptoms such as Horner syndrome's classic clinical triad (miosis, ptosis and anhidrosis), facial, head and neck pain, visual loss or visual disturbances.
CASE REPORT(S): A 37 year old Caucasian male presented with a chief complaint of a headache that started one day prior that was accompanied by ptosis and miosis. Due to the recent onset of his signs and symptoms, pharmacologic testing was deferred and the patient was sent for an emergent CT angiogram of the head and neck. The results of the angiogram indicated a spontaneous internal carotid artery dissection on both the right and left sides. This was later confirmed with MRI and MRA where a sub-acute ischemic event in the left frontal lobe was also identified. He is currently being followed by neurology and is on anti-coagulation therapy.
CONCLUSIONS: It has been estimated that 2.5-2.9% of ischemic strokes in all age groups and up to 20% of ischemic strokes occurring in younger patients may be caused by a carotid artery dissection, as was the case with our patient. There are several different potential causes of carotid artery dissection including trauma, genetic factors such as connective tissue disorders, infections, migraines, smoking, hypertension or contraceptive use. Occasionally spontaneous ICA dissections can occur. In most cases of ICA dissection, spontaneous healing of the internal carotid artery will occur while the patient is on anti-platelet therapy but in rare cases the patient will be considered for surgical therapy if they continue to show persistent symptoms of ischemia. Horner syndrome is often a long-term ocular sequelae, but has been reported, on occasion, to resolve after the diagnosis. It is important to recognize the signs and symptoms of Horner syndrome as it relates to an internal carotid artery dissection because early detection and treatment initiation can potential prevent the devastating sequelae of an impending stroke.

68. **THE IMPORTANCE OF THE EYE EXAM IN DIAGNOSING, PROGRESSIVE SUPRANUCLEAR PALSY** (125177)

Lisa W. Christian, BSc, OD, Tammy Labreche, OD, University of Waterloo School of Optometry and Vision Science

BACKGROUND: Progressive Supranuclear Palsy (PSP) is a neurological disorder that is under-recognized. An estimated 20,000 people in the United States have PSP;

however, less than 25% are properly diagnosed with the disease. Characteristics involve problems with movement, and are often confused with other movement disorders such as Parkinson's disease. Two-thirds of PSP patients develop a variety of visual signs and symptoms within the first year that can be useful in the differential diagnosis. A key distinguishing feature of PSP is the presence of vertical supranuclear gaze palsy.
CASE REPORT(S): A 68 year old South Asian male presented for a full eye examination at one of the University of Waterloo Optometry Clinic's external clinical sites. The patient was diagnosed with Parkinson's disease two years prior, with a presentation of motor imbalance, mild dementia, and fatigue. Assessment revealed a backwards posture and side-to-side head movements. Entering visual acuities were 20/30, OU, with abnormal fixation. Ocular motility was restricted vertically, with downward gaze affected greater than up gaze. Saccadic eye movements were decreased (vertical more than horizontal), and bilateral blepharospasm was noted. All other findings were unremarkable, except for bilateral mild nuclear sclerosis. The ocular findings as well as the head and body posture were not consistent with a diagnosis of Parkinson's disease, but were characteristic for PSP; specifically, the presence of vertical supranuclear gaze palsy. The patient was referred to a neurologist for a brain scan (Positron Emission Tomography) to distinguish the conditions, which confirmed the diagnosis of Progressive Supranuclear Palsy.
CONCLUSIONS: Progressive Supranuclear Palsy is an uncommon neurodegenerative syndrome with characteristics that can resemble other movement disorders. Visual signs and symptoms may help in a differential diagnosis of PSP, especially in separating the disorder from Parkinson's disease. A careful, knowledgeable ophthalmic examination can help in the proper diagnosis of PSP.

69. **THE HEIDENHAIN VARIANT OF CREUTZFELDT-JAKOB DISEASE:, VISUAL SYMPTOMATOLOGY AS INITIAL MANIFESTATIONS** (125647)
Shannon Santapaola, Richard Wu, BA, Kelly H. Thomann, OD, FAAO, Nancy N. Wong, OD, PhD, FAAO, Becky Forman, VA Hudson Valley Health Care System

BACKGROUND: Creutzfeldt-Jakob Disease (CJD) represents a rare neurodegenerative disorder causing rapidly progressive dementia and death within one to two years of diagnosis. The disease is a member of a family of human and animal diseases known as transmissible spongiform encephalopathies. CJD affects approximately 1 per million persons per year with an incidence of ~200 persons per year in the United States. Early manifestations of CJD include failing memory, behavioral changes, lack of coordination and visual disturbances. In the Heidenhain variant of CJD, visual manifestations represent the leading symptoms of the disease and demonstrate persistence throughout the disease course. Visual symptoms can include disturbed perception of colors or structures, optical hallucinations, cortical blindness and visual anosognosia. The most pronounced neuropathological changes in the Heidenhain variant are localized to the occipital lobe.
CASE REPORT(S): A 61 year old male with a previously unremarkable eye and health history presented to the Optometry Service with the complaint of persistently distorted vision in the left upper and lower visual fields. Ophthalmic testing including perimetry were unremarkable. Due to the prominent and persistent visual distortions, neurology

consultation with neuro-imaging was ordered. Testing revealed the Heidenhain variant of CJD.
CONCLUSIONS: This poster examines CJD, the Heidenhain variant, ocular & systemic manifestations and disease natural history. The pathologic & radiologic findings and disease management are reviewed.

70. **TRANSIENT VISUAL FIELD DEFECTS FOLLOWING AN AURA AS A RESULT OF A COMPLEX MIGRAINE** (125724)
Marion J. Haligowski, OD. Phoenix, AZ

BACKGROUND: It is common for patients with a migraine history to experience an aura preceding the onset of their headache. At times headaches do not occur; however, it is still possible to experience an aura. Most auras begin with a wave of depolarization in the striate cortex. The wave of depolarization travels in an anterior direction thru the visual cortex. As this wave of depolarization progresses, a vasospasm is created that can cause secondary neurological signs. A secondary visual field defect can occur anywhere along the visual pathway as a result of this vasospasm. Unilateral visual field defects anterior to the optic chiasm are common and include arcuate, altitudinal, nasal steps and isolated sectorial defects. These defects are usually short lived but in rare cases can persist for weeks. Careful attention to symptomatology and timing of events can help the clinician make an accurate differential diagnosis.
CASE REPORT(S): A 43 year-old female patient reported to our clinic with a chief complaint of the sudden loss of vision of the temporal right eye with orbital pain. Examination of the anterior and posterior segments were unremarkable. The following day, the scotoma persisted and was observable upon visual field testing. The patient was again seen four days later. At this time right facial paresthesia was noted. Neurological testing showed decreasing color saturation of the right eye. The patient underwent an MRI and was found to have a complex migraine episode. The migrainous episode was unique in the fact that it resembled retrobulbar optic neuritis.
CONCLUSIONS: The presence of both a negative scotoma surrounded by the prismatic fortication scotoma is virtually pathognomonic of a migraine aura. However a predominately negative scotoma is a sign of a more serious etiology. Despite a careful history a new onset of an aura in a patient over 40 requires a thorough medical workup. The vasospastic effects secondary to a migraine can have quite perplexing focal neurological defects including lasting visual field loss.
ADDITIONAL COMMENTS: Submitted as clinical case report.

71. **COMPRESSIVE OPTIC NEUROPATHY REQUIRING URGENT ORBITAL DECOMPRESSION IN A PATIENT WITH THYROID EYE DISEASE** (125706)
Kendra Eck, OD, James Esposito, OD, FAAO, Nicholas T Chan, OD, FAAO, Deana Emiko Lum, OD, FAAO, VA Central California Health Care System Fresno Medical Center

BACKGROUND: Various ocular complications due to chronic inflammation with thyroid eye disease are commonly seen. Optic nerve compression occurs in only 5% of

patients with thyroid related eye disease.
CASE REPORT(S): A 64 year old male with a history of thyroid eye disease presented to our clinic with persistent eyelid swelling, ocular redness, intermittent diplopia, and fluctuating vision OU. BCVA was 20/40 OD and 20/20 OS. Pupils were poorly reactive with an afferent pupillary defect OD. Extraocular motilities were restricted in all gazes OU. Examination revealed proptosis, lid edema, and dilated episcleral vessels OU. Intraocular pressures measured 29mmHg OD and 30mmHg OS. The right optic nerve margins were flat and distinct with noted pallor of the nasal rim. Subtle choroidal folds within both posterior poles were seen. Visual field testing revealed a significant temporal depression OD. CT imaging showed diffusely thickened recti muscles OU. The patient was diagnosed with compressive optic neuropathy OD and started on oral prednisone followed by urgent orbital decompression surgery. After surgery, the patient was treated with high doses of prednisone and developed psychosis. Improvements in visual acuity and optic nerve function OD were seen following surgery. Orbital decompression was later performed on the left eye followed by a very short course of low dose oral prednisone without complications.
CONCLUSIONS: Compressive optic neuropathy often requires urgent surgical intervention to prevent further permanent vision loss. Orbital decompression is the standard treatment of choice. Systemic corticosteroids may provide an initial improvement in inflammation, but should be used with caution due to the potential side effects.

72. **BILATERAL OPTIC ATROPHY SECONDARY TO VITAMIN B12 DEFICIENCY S/P ROUX-EN-Y GASTRIC BYPASS SURGERY** (125903)
Tina R. Porzukowiak, OD, FAAO, Misty Cox, BS, Dejana Grk, BS, Stephanie Gerard, BA, Erika Anderson, BS, Preeti Bhukhan, BS, Midwestern University Arizona College of Optometry

BACKGROUND: This case demonstrates the ocular complications of Roux-en-Y gastric bypass (RYGB) surgery with attention to malabsorption of vitamin B12.
CASE REPORT(S): A 61-year-old Caucasian female presented with a complaint of blurred vision at near OU; her last eye exam was 10 years prior. Ocular history included congenital nystagmus. Medical history included diabetes mellitus, s/p RYGB, hypercholesterolemia, triglyceridemia, and GERD. Meds included Lasix, Norvasc, Zocor, Januvia, and Omeprazole. She had no allergies. She denied the use of alcohol, tobacco, or substance abuse. Her best-corrected VA was 20/200 OD & 20/60 OS. Color vision and cover test was NL. Pupils were NL without RAPD. Confrontation VF revealed marked constriction OD, OS. EOMS showed full range of motion OU with horizontal jerk nystagmus. Anterior seg evaluation and tonometry was NL OD, OS. Dilation revealed a PCIOL OD, OS. The optic nerve C/D ratio was 0.30/0.30 OD with 1-2+ temporal pallor and 0.45/0.45 OS with 2-3+ temporal pallor. All other posterior findings were NL OD, OS. Bilateral optic atrophy of unknown etiology was assessed. Old ophthalmology records were obtained which affirmed the condition was acquired. Goldmann VF revealed constriction to less than 20 degrees centrally OD, OS. Serology included NL or non-reactive CBC w/ diff, ESR, CRP, ANA, ACE, RPR, FTA-ABS, folate, BUN and creatinine. Vitamin B 12 was decreased to 227 pg/mL and

methylmalonic acid was increased to 683 nmol/L. MRI brain and orbits & carotid duplex were NL. Bilateral optic atrophy secondary to vitamin B12 deficiency s/p RYGB was assessed. The patient's PCP initiated B12 injections 1 cc IM q1mo. At six months, her VA was stable at 20/200 OD and 20/50 OS, the visual field expanded 20 degrees from baseline OU, and she reported improved energy and concentration. The vitamin B12 and folate was NL.
CONCLUSIONS: Patient education on the importance of post-surgical lifetime vitamin supplementation is imperative in addition to routine serology to monitor for vitamin deficiencies.

73. **OCULAR MYOCLONUS AS A SIDE EFFECT OF FLUOXETINE** (125290)
Matthew C. Simpson, OD, Stephanie Farha, OD, Huntington West Virginia VA Medical Center

BACKGROUND: Myoclonus of various muscle groups has been noted as a rare side effect in patients taking flouxetine, a commonly prescribed selective serotonin reuptake inhibitor (SSRI). Myoclonus of the extraocular muscles may produce frustrating symptoms and functional issues, yet signs may be subtle enough to evade clinicians during a comprehensive eye examination. Ocular myoclonus may precede more serious and potentially life threatening effects of serotonin toxicity and patients often respond favorably to changes in medical treatment.
CASE REPORT(S): A 58 year old established patient with a history of major depression presented to the eye clinic complaining of "buzzing" of the eyes for the past four months. The patient also reported feeling poorly and having balance problems and headaches for a few months. A recent neurology exam and MRI of the brain had revealed small vessel ischemic changes and diffuse cerebral atrophy. No ocular or neurologic abnormalities were noted during the patient's comprehensive eye exam. The findings of the recent neurology exam and MRI were tentatively implicated as the cause of the patient's symptoms. At the one month follow up, the patient complained of worsened ocular symptoms and continued headache and malaise. Careful examination revealed rapid myoclonic eye movements that were most easily viewed under magnification with a slit lamp biomicroscope. A thorough patient history and literature review raised the suspicion of mild serotonin toxicity. Subsequent co management with mental health led to a discontinuation of flouxetine and a resolution of the patients symptoms.
CONCLUSIONS: Though a cases of myoclonus with fluoxetine have been reported in the literature, few cases of isolated and subtle ocular myoclonus have been described. Serotonin toxicity is a purely clinical diagnosis, with no lab testing commonly available to evaluate synaptic levels of this neurotransmitter. The potential progression to more serious problems and excellent resolution of ocular symptoms in this case underscore the importance of awareness of this condition within the eye care community.

74. **UTILIZATION OF EYE VITAMINS IN MANAGEMENT OF ETHAMBUTOL OPTIC NEUROPATHY** (125182)
Vladimir Yevseyenkov, Christina Esposito, Rehna Ismaily, Michelle Nguyen, Midwestern University Arizona College of Optometry

CASE REPORT(S): A 66 year old white female diagnosed with Mycobacteriumavium complex (MAC) in April of 2011 was put on 1800mg ethambutol and 1000 mg Biaxin daily beginning in May. Baseline eye exam findings in July showed 20/25+ vision OD and OS. In early November, the patient noticed a sudden marked decrease in vision, which was rapidly getting worse. All medication was discontinued (BVA 20/50 OD; 20/200 OS). Within 18 days, vision had further decreased to 20/200 OD and OS. At this time, visual field showed bilateral central scotoma in either eye, mild optic atrophy with no APD present. Thus, the patient was diagnosed with ethambutol optic neuropathy and was told that vision most likely would improve on its own once the medication cleared the system. In early January 2012, the patient stated that vision continued to worsen and examination revealed BVA of 10/160 OD and 10/210 OS via Feinbloom chart. New course of action was implemented by an outside counsel operating under the theory that Ethambutol toxic neuropathy is a mitochondrial optic neuropathy and its mechanism of action is chelation of the metals which interfere with both ribosomal function and the cytochrome oxidase system. The treatment regimen involves replacement of the essential metals needed: iron, zinc, and copper. Iron and zinc can be found in the diet, but it is difficult to obtain copper in this manner; thus, patient was started on ICaps mv (Alcon) which contains all three elements in late January. Patient started noticing improvement in vision within a week of taking ICaps and by March 2012 her acuities were 20/80 OD and 20/70 OS, by late April vision was 20/40 OD and 20/50 OS.
CONCLUSIONS: The most common treatment method for Ethambutol optic neuropathy is observation; however, this case report suggests that ICaps vitamins may assist in visual recovery through metal chelation processes. Thus, replacement of these metals through supplementation may be another useful consideration in the treatment of affected individuals.

75. **RARE PRIMARY CENTRAL NERVOUS SYSTEM MELANOMA** (125887)
Kelly A. Malloy, OD, FAAO, Erin M. Draper, OD, FAAO, Pennsylvania College of Optometry at Salus University

BACKGROUND: Melanocytes arise from neural crest cells and contain the pigment melanin. Melanocytes are prevalent in the skin, and as such, melanoma, a malignant tumor of melanocytes, usually originates in the skin. As eye doctors, we know of the presence of melanocytes in the uveal tract of the eye, and the possibility of a uveal melanoma. However, melanocytes are also present in other neural crest derivatives, such as mucous membranes, heart, bowel, bone marrow, and leptomeninges of the brain. Although rare, it is possible to have a melanoma originate from these other locations.
CASE REPORT(S): A 59 year-old man reports blurry vision, reduced peripheral vision, and difficulty reading for the past 3 months. He has a 2-year history of “ocular migraines”, characterized by aura, which occur after exercise. He has been having worsening headaches over the past month, one of which awoke him from sleep. Examination is remarkable for a congruous right inferior homonymous hemianopia. Immediate MRI reveals a mixed cystic and solid mass in the left occipital lobe, most consistent with a glioblastoma, for which the patient undergoes prompt neuro-surgical removal. Unexpectedly, biopsy shows that this is not a glioblastoma, but a melanoma. To this point, thorough work-up shows no other primary site of involvement, therefore going

against a metastatic melanoma, and leaning toward a rarer primary central nervous system (CNS) melanoma.
CONCLUSIONS: Primary CNS melanoma is a rare malignant tumor arising from the melanocytes in the leptomeninges of brain or spinal cord, and accounting for only 1% of all melanomas. Primary CNS melanoma can appear similar to astrocytoma and glioblastoma on imaging, as demonstrated in this case. It is not possible to distinguish a primary CNS melanoma from a secondary metastatic melanoma based on either imaging or histopathology. Therefore, all patients with a CNS melanoma need extensive work-up to rule out a primary site in the skin, mucous membrane, uveal tract, or other neural crest derivative. Only if this extensive work-up is negative can the rare diagnosis of primary CNS melanoma be made.

76. **OLFACTORY GROOVE MENINGIOMA WITH BILATERAL ACUTE ONSET VISION LOSS AS PRESENTING SYMPTOM** (125995)
Karen Reeves, OD, Joseph Allen Miller, VA Medical Center

BACKGROUND: Cranial meningiomas account for 33% of all primary intracranial neoplasms with post-mortem studies showing subclinical disease present in up to 2.8% of the general population. Risk factors include female gender, radiation exposure, increased body mass index, and neurofibromatosis type 2. While the majority of meningiomas are non-malignant, their intra-cranial location can lead to severe and often complicated visual outcomes. The following case presentation illustrates a large intracranial meningioma with presenting signs of bilateral vision loss.
CASE REPORT(S): A 67 year old male presented to our hospital complaining of acute bilateral decreased vision with onset two weeks prior. The patient describes a substantial decrease in vision starting in the left eye then progressing to the right shortly thereafter. Upon initial presentation, the patient's visual acuity was 5/180 in the right eye and 5/225 in the left. Slit lamp and dilated fundus examination were unremarkable with healthy optic nerves and maculas in both eyes. An urgent magnetic resonance imaging (MRI) of the head and neck was ordered and revealed a 7.3 x 7.9 x 6.3 cm mass of the frontal lobes with optic nerve compression. MRI findings were consistent with a large olfactory groove meningioma. The patient underwent a complete resection of the mass with surgical pathology reports confirming a grade II atypical meningioma. An ocular examination was performed one month following the resection. Visual acuity had improved to 20/20 in the right eye and 20/25 in the left eye, with new onset but slowly improving vertical diplopia secondary to residual cranial edema.
CONCLUSIONS: Olfactory groove meningiomas will commonly cause a loss of smell or even change in mental status. However, these changes can often go unnoticed. They can grow large enough to compress the optic nerve and chiasm resulting in vision loss which becomes the presenting symptom. This makes understanding the etiology and possible complications of the tumor essential for prompt and accurate diagnosis as well as improved patient care.

77. **WOLF-HIRSCHHORN SYNDROME WITH OCULAR MANIFESTATIONS COMPLICATED BY INTER-ORBITAL MASS** (125480)
Eileen M. Gable, OD, FAAO, Loyola University Medical Center

BACKGROUND: Wolf-Hirschhorn syndrome (WHS), a rare genetic disorder, is associated with partial depletion of the short arm of chromosome 4. The clinical characteristics include high forehead, hypertelerism, short philtrum, poorly formed ears and micrognathia and microcephaly. In addition to the facio-cranial deformities, effected individuals experience delayed growth and development, hypotony, skeletal and dental abnormalities, epidermal deformities, cleft lid and pallet. These features are known as *greek warrior helmet*. Anomalies have been reported as incomplete formation of the corpus callosum, the cardio -vascular system and urinary tract. Ocular findings include: anterior segment anomalies, iris and retinal colobomas, nystagmus, and optic nerve disease. This unusual case presents with WHS and an orbital lesion limiting his visual prognosis.
CASE REPORT(S): A 21 month old caucasian male with WHS presents for visual evaluation and management of the associated ocular pathologies. There is no measurable response to visual stimulus in the right eye. He is able to fix but not follow with the left eye. The right eye was microphalmic. The left eye exhibited iris coloboma, an inferior retinal coloboma, elevated intra-ocular pressure of 24 mm Hg and C/D ratio of .8/.8. The retinoscopy was -4.00 +4.00 x 180. Radiographic studies show incomplete formation of the corpus callosum with absent splenium and low-density lesion surrounding the right optic nerve. Surgical removal of the orbital lesion was not considered as there was minimal likelihood of improved visual outcome. The advanced cupping and likelihood of angle anomalies contributing to the glaucomatous state warrant aggressive glaucoma management. Visual development warrants creative measures as the patient's facial features do not support spectacle correction
CONCLUSIONS: The ocular and neurological findings of this rare disorder demonstrate the need for aggressive management of ocular pathology in the presence of developmental anomalies.

78. **MISDIAGNOSED GLAUCOMA IN THE US POPULATION** (125742)
Mark W. Swanson, OD, MSPH, FAAO, University of Alabama at Birmingham, School of Optometry

RESULTS: Approximately 4.3% (95% CI 3.6, 4.9) of the US population over the age of 40 is misclassified on the basis of their glaucoma status. Of the population misclassified 69.0% (95% CI 59.9, 78.8) is due to over diagnosis of the disease. African Americans (OR 2.2 95% CI 1.6, 3.0), adults over age 65(3.2 95% CI 1.9, 5.3) and those with health insurance coverage (OR 2.0 95% CI 1.0, 3.8) are more likely to be misclassified. In subgroup analysis those under age 65 have higher odds (OR 7.1 95% CI 2.9, 17.6) of being undiagnosed compared to those over 65. African Americans (OR 2.0, 95% CI 1.4, 3.1) and those over age 65(OR 4.0, 95% CI 2.1, 7.3) are more likely to be over diagnosed.
PURPOSE: The International Society for Geographical and Epidemiological Ophthalmology (ISGEO) has developed a definition of glaucoma based on the 97.5th and 99.5th population percentile of vertical cup disc ratio that can be used in epidemiologic studies. The ISGEO criterion is increasingly used and correlates well with clinical glaucoma. In this study a modification of the ISGEO criterion are used to develop

estimates of misclassified of glaucoma (over and under diagnosis) in the US.
METHODS: Data from the 2005-2006 and 2007-2008 National Health and Nutrition Examination Survey (NHANES) were obtained from the National Center for Health Statistics and merged into a combined four year weighted US population. As part of the NHANES medical examination fundus photographs (n=5575, 94% gradable) and FDT visual fields (n=4547, 88% gradable) were performed on a subsample of participants over the age of 40. A modified ISGEO criterion using these results was applied and estimates of glaucoma prevalence in the United States developed. A person was considered to have glaucoma if either eye met the glaucoma criteria. Prevalent ISGEO glaucoma was then compared to those self-reporting glaucoma and/or using topical medications prescribed for glaucoma. All analyses were performed using SAS Survey 9.3.
CONCLUSIONS: Over and under diagnosis of glaucoma is a significant public health problem in the US and particularly concerning for optometry.

79. **A 3 YEAR QUALITATIVE ANALYSIS OF GLAUCOMA OPHTHALMIC PRESCRIPTION WRITING BY OPTOMETRIST** (125911)
Agustin L. Gonzalez, OD, Austin, TX

RESULTS: Percent change year over year 2007 to 2008 noted as first value, 2008-2009 as second value. Total GLAUCOMA drugs prescribed grew 13.28% in 2007 to 2008 and 14.65% 2008 to 2009. By category: GLAUCOMA-PGA grew 15.39% 2007 to 2008 and 16.01% during 2008 to 2009. OPHTHALMIC BETA BLOCKERS grew 5.69% from 2007 to 2008 and 7.88% from 2008 to 2009. CARBONIC ANHYDRASE INHIB grew 5.69% from 2007 to 2008 and 16.33% from 2008 to 2009. PILOCARPINE decreased -1.51% from 2007 to 2008 and -2.72% from 2008 to 2009. EPINEPHRINE & DERIVATIVE decreased -18.29% from 2007 to 2008 and -41.63% from 2008 to 2009. MIOTICS,OTHER represents less than 0.01% of total prescriptions.
PURPOSE: This study describes the trend by Optometrist to prescribe ophthalmic topical medications for the treatment and management of Glaucoma in the United States over a 3 year period (2007 to 2009).
METHODS: Three year prescribing data was obtained by a pharmaceutical tracking company monitoring prescribing habits of physicians by specialty. The data was limited to optometrist use of topical ophthalmic medications for the treatment and management of Glaucoma. Data is presented and analyzed in six categories: Glaucoma which is mainly the Prostaglandin Analogs (PGA) group, Opthalmic Beta Blockers, Carbonic Anhydrase Inhibitors, Pilocarpine, Epinephrine and derivatives and a "Miotics-Other" category. The data is being interpreted in a directional manner and in no way we believe this reflects absolute values.
CONCLUSIONS: It has been argued that prescription audits can be used to reflect a groups competence in pharmacological therapy and may be useful in determining management paradigms within a community. The analysis describes both positive and negative adoption trend in the various medication categories measured during the 3 year period. Although further information should be gathered, the data is indicative that optometrists in the United States have a preference to prescribe Prostaglandin Analog type ophthalmic drugs for the treatment and management of Glaucoma.

80. **THE RELATIONSHIP BETWEEN MAXIMUM IN-OFFICE INTRAOCULAR PRESSURE AND TIME SPENT IN THE SUPINE POSITION** (125554)

Mark H Sawamura, OD, FAAO, Judy W. H. Tong, OD, FAAO, Mona Adams, OD, Michelle Kirk, OD, Southern California College of Optometry

RESULTS: The IOP was slightly higher in the baseline supine position vs. sitting position (≈ 1 mm Hg) . The maximum IOP measurement, regardless of body position, was at 5 mins in the supine position at both weeks ($p < 0.001$). At 10 mins, the IOP readings decreased, then at 20 mins, increased to similar values obtained at the 5 minute supine position reading. The same pattern was observed at both weeks. It was determined that the highest supine IOP reading was about 3 mm Hg higher than the baseline seated position ($p < 0.001$).

PURPOSE: Historically, diurnal variation of IOP produces the highest measurements in the early morning, making it difficult to identify the peak values. In 2005, Mosaed et al, found that measurements in the supine position showed less fluctuation over 24 hours and were higher in comparison to the seated position. During daytime hours, their patients were put in the supine position and measurements were taken immediately, and after 5 mins. Their conclusion was that body position may be a greater influence on IOP than the time of day. The clinical question that we sought to answer was 5 mins was long enough to determine the peak supine IOP?

METHODS: Twenty-three healthy subjects (age 18-35) were recruited into the study. Baseline IOP measurements were taken in the sitting position and the supine positions with a calibrated Accupen. Subsequent IOP readings were obtained while the patient remained in the supine position at 5, 10, and 20 mins. The same measurement sequence was repeated one week later, within one hour of the time of the initial visit.

CONCLUSIONS: Our findings in a healthy population suggest that the peak IOP values are found after 5 mins in the supine position, similar to the Mosaed study. However, our study also showed the IOP decreases at 10 mins, and then increases at 20 mins. In a glaucomatous population, it is speculated that these values may be even greater. Five minutes remains the critical time point when measuring supine IOP and measurements obtained several minutes later may produce lower values.

81. **SAFETY AND EFFICACY OF THE LATANOPROST PUNCTAL PLUG DELIVERY SYSTEM (L PPDS) IN SUBJECTS WITH OCULAR HYPERTENSION (OH) OR OPEN ANGLE GLAUCOMA (OAG)** (125689)

David G. Evans, OD, Memphis, TN, Carolyn Repke, MD, Philadelphia, PA

RESULTS: After 2 weeks of L-PPDS treatment, IOP showed a statistically significant mean change from baseline of -6.2 mmHg (95% C.I. -6.8, -5.6); 73% of subjects had an IOP reduction from baseline of ≥5 mmHg and 51% of subjects had a reduction of ≥6 mmHg. The mean percentage change in IOP from baseline was -24.3%, which was statistically significant (95% C.I. -26.7, -21.9). After 4 weeks, IOP decrease from baseline was clinically significant at 5.68 mmHg (95% CI -6.45, -4.90); 60% showed an IOP decrease from baseline of ≥5 mmHg and 47% showed a decrease of ≥6 mmHg. The mean percentage change in IOP from baseline was also statistically significant at 22.3%

(95% C.I. -25.4, -19.2). The L-PPDS was well tolerated with AEs similar to those reported for commercial punctal plugs.
PURPOSE: A Phase 2 study to evaluate the safety and efficacy of the L PPDS, utilizing simultaneous placement of punctal plugs in the upper and lower puncta, in subjects with OH or OAG
METHODS: 95 subjects were treated with the L-PPDS. The trial used a later stage proprietary lower punctal plug and an early stage prototype upper punctal plug based on a modified commercially available plug, with a combined latanoprost dose of 141 ?g. The primary endpoint was mean change in IOP from baseline in mmHg at 2 weeks.
CONCLUSIONS: Treatment with the L-PPDS in both puncta resulted in a clinically significant reduction in IOP from baseline. Treatment was safe and generally well tolerated, despite a high incidence of tearing associated with plug wear. Based on these early results, the L-PPDS may be able to deliver long-lasting clinically significant IOP reduction. Adherence would no longer be a factor in preventing disease progression as patients would not be responsible for their eye drop instillation. The procedure appears to be relatively safe, minimally-invasive and simple to perform. Insertion of the plugs is easily learned and builds on current practice skills.
ADDITIONAL COMMENTS: The PPL GLAU 11 clinical trial is funded and sponsored by QLT Inc.

82. **POSTURAL CHANGES OF INTRAOCULAR PRESSURE MEASURED BY REBOUND TONOMETRY** (125933)
Andrew KC Lam, PhD, FAAO, Yi-fei Wu, BSc (Hons), Lok-yan Wong, BSc (Hons), Ngon-ling Ho, BSc (Hons), The Hong Kong Polytechnic University School of Optometry

RESULTS: IOP significantly varied with postures (RMANOVA, $p < 0.001$). The two tonometers had similar IOP findings in each posture ($p > 0.05$). Compared with Pulsair, iCare tonometer gave a slightly higher IOP in the first sitting posture (difference = 0.42 +/- 2.23mmHg), but provided a lower IOP in the supine posture (difference = -0.66 +/- 2.58mmHg) and the second sitting posture (difference = -0.11 +/- 2.24mmHg). Supine IOP was measured 3.10mmHg (SD 2.35mmHg) higher by Pulsair but only 2.02mmHg (SD 2.18mmHg) higher by iCare. This difference was significant (paired t-test, $p < 0.01$).
PURPOSE: Postural intraocular pressure (IOP) variations have been found to be higher in glaucoma patients in particular normal tension glaucoma.Higher IOP variation is associated with greater visual field defects in both primary open angle glaucoma and normal tension glaucoma. Eyes with greater postural IOP changes have demonstrated thinner retinal nerve fiber layer thickness. Apart from contact tonometry such as Perkins, air-puff tonometer can also determine postural IOP variations. This study investigated if rebound tonometry is sensitive to pick up such IOP changes.
METHODS: Fifty-four young adults, one eye randomly selected, had their IOP measured by an air-puff tonometer (Pulsair EasyEye, Keeler Ltd, UK) and a rebound tonometer (iCare, Tiolat, Helsinki, Finland), randomly assigned, in sitting followed by supine and finally sitting postures. IOP was measured after resting for 15 minutes in each posture. Two masked practitioners were responsible for each tonometer. Repeated measures analysis of variations (RMANOVA) followed by post hoc tests were used to compare the IOP findings. Postural IOP changes were measured and compared between

tonometers.
CONCLUSIONS: Postural IOP variations were measured lower by iCare compared with Pulsair. Rebound tonometry may not be sensitive enough to screen for postural changes in IOP.
ADDITIONAL COMMENTS: None of the authors has a proprietary or financial interest in the product mentioned.

83. **THE EFFECT OF CATARACT SURGERY ON SLT** (125548)
Dominick Opitz, OD, FAAO, Ryan Sacksteder, Jonathan Thoele, Illinois College of Optometry, Lisa Marie Young, OD, FAAO, Steven Brown, MD, FACS, Glenview, IL

RESULTS: Twenty eight eyes were included in the study. The mean baseline IOP for all eyes (Group 1) was 17.5mmHg (n=28). SLT reduced the mean IOP from baseline 10.28% to 15.7mmHg in Group 1 (p=0.002). CE reduced the mean IOP an additional 12.17% to 13.8mmHg in Group 1 (p=0.001). Both SLT and CE reduced mean IOP 21.20% from baseline in Group 1 (p<0.001). Analysis of eyes with a baseline IOP <18mmHg (Group 2) showed a mean baseline IOP of 15.1mmHg (n=17). SLT only reduced the IOP 5.09% to 14.4mmHg in Group 2 (p=0.321). CE reduced the mean IOP an additional 7.94% to 13.2mmHg (p=0.138). Both SLT and CE reduced mean IOP 12.63% with a mean IOP drop of 1.9mmHg from baseline for Group 2 (p=0.007). Analysis of eyes with a baseline IOP >18mmHg (Group 3) showed a mean baseline IOP of 21.2mmHg (n=11). SLT reduced the mean IOP 16.10% to 17.8mmHg in Group 3 (p=0.002). CE reduced the mean IOP an additional 17.39% to 14.6mmHg at 1 year (p<0.001). The total mean IOP reduction from baseline in Group 3 after both SLT and CE was 30.69% or 6.5mmHg at 1 year (p<0.001).
PURPOSE: To study the IOP lowering effect of selective laser trabeculoplasty (SLT) followed by clear cornea phacoemulsification cataract extraction (CE) in patients with open angle glaucoma (OAG).
METHODS: IOP was retrospectively reviewed in OAG patients who underwent SLT, then CE 3-5 months later. Three groups of data were collected for each study eye: baseline IOP, the average of two IOPs after SLT, and IOP 1 year after CE. No changes in glaucoma medications were allowed throughout the study and IOP must be stable after SLT for a minimum of 3 months. Mean differences in IOP at baseline, post-SLT and post-CE were compared with a repeated-measures analysis of variance (ANOVA).
CONCLUSIONS: It is our finding that SLT followed by CE is most effective in patients with IOP > 18-20 mmHg. This treatment protocol may be a safer and more cost effective option than combined glaucoma and cataract procedures in this patient demographic.

84. **THE EFFECT OF REPEAT APPLANATION ON INTRAOCULAR PRESSURE USING THE ICARE TONOMETER** (125981)
Stephanie Gerard, Megan Baca, Michelle Meyer, Jessica Neuville, OD, FAAO, Midwestern University Arizona College of Optometry

RESULTS: The results of the study showed that there was not a statistically significant change in IOP with repeat measurement when using the iCare tonometer for all subjects (R²=0.68, p=0.17) or the LASIK subgroup (R²=0.06; p=0.75).

However, more subjects did show a decrease in IOP than an increase (59% vs. 36%). The majority of subjects (62%) had a slope of -0.4 to +0.4 mmHg/measurement. Over the four measurements about half of the subjects (48%) had a difference in range of 3mmHg or greater, which could be considered clinically relevant.
PURPOSE: The iCare tonometer utilizes a new rebound method of measuring intraocular pressure (IOP) and is comparable to the current gold standard, Goldmann Applanation Tonometry (GAT). Previous studies have reported that repeated IOP measurements with GAT result in a decrease in IOP. The aim of this study was to assess IOP after repeat measurements using the iCare tonometer in normal, healthy eyes.
METHODS: Forty-two subjects (26 males: 16 females) between the ages of 22-31 (mean 26.6) participated in this study. One eye of each participant was selected at random and underwent four successive IOP measurements with the iCare tonometer. The first three measurements were performed five minutes apart with a twenty minute interval before the final measurement to evaluate for recovery in IOP if it decreased over the first three measurements. Statistical analysis was performed to evaluate for change in IOP over multiple measurements. Additional analysis was performed on a subgroup of subjects with a history of LASIK (n=5).
CONCLUSIONS: The rebound technology of the iCare tonometer appears to have no statistically significant effect on IOP with repeat measurements in a thirty minute time period. It can be reliably used to repeat an IOP measurement if needed or in comparative studies of different tonometer techniques. However, half of subjects showed a short-term variation in measurement that could be considered clinically relevant.

85. **UTILIZATION OF TEXT MESSAGING IN THE GLAUCOMA PATIENT POPULATION** (125973)
Heather Mira McLeod, OD, FAAO, David Simpson, BS, Illinois College of Optometry

RESULTS: Eighty-five patients were surveyed, 56% (48/85) of which were female and 54% (37/85) were male. 88% (75-85) identified themselves as African-American, 8% (7/85) Caucasian, and 5% (4/85) Hispanic. The ages of patients ranged from 18-96 years old with a mean age of 70. 73% (62/85) patients reported owning a cell phone and 84% (52/85) of those patients carried their cell phone with them the majority of the day. 65% (40/62) of cell phone owning patients had text messaging capabilities on their cell phone. Of the patients who utilized text messaging, 35% (14/40) reported checking their messages immediately, 12% (12/40) checked the same day, 15% (6/40) rarely checked, and 22% (9/40) never checked their text messages. 64% (17/26) of patients who checked their text messages immediately or the same day expressed interest in receiving text message reminders to take their eye-drops.
PURPOSE: Compliance and adherence to glaucoma treatment is suboptimal in more than half of patients. It is important to develop innovative and effective ways to increase the compliance of glaucoma patients. Automated text messaging has been shown in studies to increase rates of attendance to medical appointments and therefore may also be an effective tool to improve treatment compliance. Elderly people have lower ownership rates of mobile phones than the general population but the number is growing. A survey was developed to determine the percentage of glaucoma patients who own cell phones, receive text messages, and have an interest in text message reminders as a method for

increasing compliance with treatment.
METHODS: Patients of the Glaucoma Clinic at the Illinois Eye Institute, who were receiving medical treatment for glaucoma, were asked to complete a 6 question survey about cell phone usage prior to their examination.
CONCLUSIONS: A substantial number of glaucoma patients own cell phones and utilize text messaging. Automated text message reminders may be a cost effective and time efficient strategy to increase patient compliance with treatment. Further studies will investigate this hypothesis.

86. **MEGALOPAPILLA** (125928)
Jane Kuo, VA Palo Alto Healthcare System

BACKGROUND: Bock and Franceschetti originally coined the term megalopapilla to describe enlarged optic discs. It is considered a rare and congenital anomaly. In literature, it is defined as a disc area greater than 2.5mm2. There are two phenotypes of megalopapilla. Type 1 is bilateral with a normal configuration of the cup, whereas type 2 is unilateral with a superiorly displaced cup. Both types are characterized by large cup-to-disc ratios, normal visual fields, normal intraocular pressures, and the absence of other pathological findings. The clinical appearance of megalopapilla resembles that of glaucomatous optic neuropathy and is considered a pseudo-glaucomatous disc. The diagnostic accuracy of optic nerve head (ONH) imaging is therefore important in glaucoma assessment. Unlike the Heidelberg retinal tomography (HRT), studies have shown that optical coherence tomography (OCT) is not influenced by disc size and has a higher sensitivity in differentiating between healthy and glaucomatous eyes with large discs.
CASE REPORT(S): 64 year-old Caucasian male presented with a longstanding history as a high risk glaucoma suspect. BCVA were 20/25 both eyes. IOPS was measured at 10 OD, 10 OS, CCT was 500 OD, 494 OS, and anatomic angles were open on gonioscopy OU. The C/D ratio in both eyes was 0.9H X 0.9V with thin superior and inferior rims. Review of past records indicates stable C/D ratios and IOPs, which were consistently in the low teens, for the past 16 years. The patient had performed numerous HVF with no repeatable glaucomatous defects. On HRT, the RNFL thickness was abnormal. However, on OCT the RNFL thickness was normal in all quadrants and the disc area was measured to be 5.41mm2 and 5.21mm2 right eye and left eye respectively. Management will consist of yearly HVF and biannual OCT secondary to the difficulty of monitoring the patient for glaucomatous damage via clinical appearance of the ONHs.
CONCLUSIONS: Megalopapilla is a rare congenital anomaly that resembles glaucomatous optic neuropathy. It is important for clinicians to consider disc size and utilize the proper ONH imaging in glaucoma management. Although controversial, it is thought that the susceptibility for glaucomatous damage is independent of the optic disc size.

87. **OPTOMETRY'S ROLE IN THE TREATMENT AND MANAGEMENT OF UGH:** (125040)
Jeff Speers, BScH, OD, Vaughan, Ontario, Canada

BACKGROUND: Uveitic-Glaucoma-Hyphema (UGH) Syndrome was first described in the late 1970's. It was not until more recent years that the UGH definition had been expanded to include unstable Posterior Chamber Intraocular Lenses (PCIOL) as a cause. Although PCIOL removal has become common practice to help alleviate the patients' symptoms, long term monitoring may be needed as trabecular meshwork (TM) damage may ensue following acute attacks.
CASE REPORT(S): A pseudophakic 56 y/o white female s/p cataract extraction OU X 6 years had presented with decreased VA and photophobia OS for the past 4 hours. This was the patient's third attack in the last 2 months, with each attack lasting 2-3 days. An anterior uveitis was found with a large area of posterior iris atrophy seen on retro-illumination. On further investigation, the IOL's inferior haptic had shifted anteriorly into the sulcus and out of the bag. Intraocular pressure (IOP) was measured to be 34mmHG. The patient was diagnosed with UGH syndrome and started on Pred Forte (Allergan) and Combigan (Allergan). At subsequent visits, the patient continued to have attacks of decreased acuity and IOP spikes from the haptic chaffing her posterior iris epithelium. Intraocular lens explantation was thus decided to be best mode of treatment. Months after explantation, the patient continued to have increased IOP due to TM damage from increased pigment deposition.
CONCLUSIONS: Treatment options of UGH syndrome range from surgical intervention to medical care. Given the unpredictable nature of acute attacks, medical treatment can be very difficult and time consuming to manage. This case showed how surgical intervention was the best option to help alleviate the patients' acute symptoms; however, UGH attacks have had long-term consequences to this eye's drainage system. At present the patient has ceased steroid topical medications but continues to use Combigan to decrease the risk of optic nerve damage. Due to the chronic nature of UGH, Optometrists should be aware of their critical role in continued IOP monitoring to prevent secondary optic nerve damage.

88. **PRESENTATION OF CHANDLER'S SYNDROME IN PATIENT WITH HISTORY OF GUILLAIN-BARRE SYNDROME** (125348)
Lisa Marie Young, OD, FAAO, Steven Brown, MD, FACS, Glenview, IL

BACKGROUND: Chandler's Syndrome is a unilateral disease that typically affects women in their middle ages and is a variant of the iridocorneal endothelial (ICE) syndromes. The spectrum of ICE syndromes includes essential (progressive) iris atrophy, Chandler's syndrome and Cogan Reese (iris nevus syndrome). Clinically, Chandler's syndrome is characterized by mild iris thinning, pupillary distortion and marked corneal changes which may lead to secondary angle closure glaucoma and chronic corneal edema. Unfortunately, little is understood about the etiology of Chandler's Syndrome, although links to the Epstein-Barr virus (EBV) and/or a viral etiology have been proposed. This case report reveals the diagnosis of Chandler's Syndrome in a patient with history of Guillain-Barre Syndrome (GBS).
CASE REPORT(S): A 56 year old Caucasian female reported episodic blurred vision of the right eye, noting clouding upon awakening and again at the end of the day. She reported a diagnosis of GBS eight years prior with primarily neurologic manifestations. Upon examination, vision was best corrected to 20/25 in the right and 20/20 in the left

eye. Slit lamp examination revealed mild corneal edema in the right eye and deep anterior chambers bilaterally. IOP readings were 32 mmHg in the right and 14 mmHg in the left by applanation. Gonioscopy showed scattered areas of scleral spur with broad based peripheral anterior synechia in the 4-5 oclock position with areas of peaked PAS at 1, 9:30 and 11 oclock. Pachymetry was measured at 596 microns in the right and 544 in the left eye. Dilated fundus ophthalmoscopy showed ratios of 0.1 bilaterally.
CONCLUSIONS: The category of ICE syndromes was first suggested in 1979 by Eagle and Yanoff. There have been several different etiologies proposed for the ICE syndromes, including a link to EBV, and most recently a link to the herpes simplex virus. As well, a strong, positive association has been made between infections with EBV and 20 fold increased GBS risk. This case supports the hypothesis of a potential link between ICE syndromes and EBV.

89. **A RARE CASE OF ANGLE CLOSURE IN A PSEUDOPHAKIC EYE WITH PATENT IRIDOTOMIES** (125901)
Catalina Ruiz Romero, OD, Bascom Palmer Eye Institute

BACKGROUND: Unusual case in Routine Post operative Cataract surgery care.
CASE REPORT(S): 76 year old female who presented to the optometry service as a 1 week post op after uncomplicated Cataract surgery with PCIOL implantation in her right eye. Her medical history was significant for Osteoporosis, Skin Cancer,and Depression. Her ocular history was significant for Chronic Angle Closure Glaucoma status post LPI OU and aqueous misdirection in left eye followed by BGI and vitrectomy. She presented with mild discomfort, decreased VA, elevated IOP and shallow anterior chamber on gonioscopy in the right eye , there were 2 patent peripheral iridotomies by transillumination, intact cornea wound, negative seidel. This case report will discuss the unusual presentation and possible differential diagnosis of pseudophakic pupillary block in a patient with patent iridotomies and Posterior chamber IOL.
CONCLUSIONS: Optometrists that co-manage Post surgical Cataract patients must be aware of possibility of Acute Angle Closure attack in small hyperopic eyes. This case report will discuss presentation and differential diagnosis of aqueous misdirection in pseudophakic pupillary block.

90. **LIMBAL STEM CELL DEFICIENCY SECONDARY TO CHRONIC TOPICAL GLAUCOMA THERAPY** (125245)
Kacey Gilford, OD, San Francisco VA Medical Center

BACKGROUND: The complicated anatomy of the limbus is unique in its ability to create a barrier between the avascular cornea and the vascularized bulbar conjunctiva. The limbus contains the palisades of vogt, which is the location of stem cells that constantly renew corneal epithelial cells from their peripheral location. Damage to these limbal stem cells results in recurrent corneal epithelial defects, conjunctivalisation and neovascularization of the cornea. There is a constant inhibitory growth pressure against conjunctivalisation of the cornea with competition of proangiogenic and antiangiogenic signals. This case demonstrates a patient with limbal stem cell deficiency secondary to chronic topical glaucoma therapy.

CASE REPORT(S): An eighty three year old male came in for a cataract evaluation. The patient had a history of chronic topical antiglaucoma therapy with exposure to multiple classes of IOP lowering agents and currently instilling azopt twice daily OU. The vision was reduced to 20/60 in each eye. Examination showed corneal neovascularization and conjunctivalisation greatest superiorly and approaching the visual axis more in the left eye and moderate cataracts in both eyes. The patient wore extended wear contact lenses for multiple recurrent corneal epithelial defects. Azopt was discontinued and extended wear contact lenses were continued. Extensive lubrication was recommended with preservative free artificial tears every hour. At a one month followup the patient had no improvement in clinical appearances. The patient was scheduled for cataract surgery and will be place on preservative free antiglaucoma therapy.
CONCLUSIONS: Corneal limbal stem cell deficiency and corneal conjunctivilisation represents a lost battle against angiogenic factors of the conjunctiva. Causes may be iatrogenic including topical glaucoma therapy. Treatment may involve switching patients with glaucoma to preservative free topical therapies, or more aggressive management including limbal stem cell transplants.

91. **HIGH-RESOLUTION ULTRASOUND ECHOGENIC LINES OVERLYING THE PARS PLANA IN NORMAL AND AGE-RELATED LONG ANTERIOR ZONULE EYES** (125176)

Daniel K. Roberts, OD, PhD, FAAO, Cherie Nau, OD, Jacob Wilensky, MD, University of Illinois Chicago

RESULTS: Subjects included 48 LAZ probands (median age=70 yrs, 40 females), 50 control probands (median age=68.5 yrs, 42 females), 22 LAZ relatives (median age=57 yrs, 14 females), and 24 control relatives (median age=52.5 yrs, 16 females). Echogenic lines were frequently present among the total group, with quadrant (sup=S, temp=T, nas=N, infer=I) percentages being S=9.0%, T=6.3%, N=7.6%, I=0.0% for right eyes and S=11.2%, T=9.2%, N=5.6%, I=0.7% for left eyes. Quadrant percentages for LAZ proband right eyes were S=14.6%, T=8.3%, N=4.7%, I=0.0%, and for control proband right eyes were S=4.0%, T=4.0%, N=8.0%, I=0.0%. Combining all subjects, while controlling for age and gender, echogenic lines were more likely in the superior quadrants (OR=6.7, P<0.02) of the LAZ case subjects and their family members than controls.
PURPOSE: High-resolution ultrasound biomicroscopy (UBM) echogenic lines, likely consistent with partial detachment of the anterior hyaloid, were discovered over the pars plana region during study of normal and age-related long anterior zonule (LAZ) trait eyes. The purpose of the current analysis was to report this clinical finding and investigate its nature because it might improve understanding of intraocular pathophysiology related to a narrow-angle glaucoma subtype.
METHODS: A total of 144 African-Americans (LAZ probands, control probands, first-degree relatives) had bilateral UBM imaging as part of a larger investigation. Cross-sectional images (15-degree, 2x mag) were randomly selected from the 12, 3, 6, 9 clock hour meridians, and each quadrant was classified by masked review according to the presence or absence of a characteristic echogenic line.
CONCLUSIONS: Echogenic lines overlying the pars plana region were common among our subjects and deserve further study. Superior quadrant predilection might be more

likely in people with LAZ and their family members, which could suggest gravity-accentuated differences in zonular tractional forces that are associated with the LAZ trait.
ADDITIONAL COMMENTS: Support: NEI/NIH K23EY018183

92. **UTILIZATION OF LATEST NOVEL TECHNOLOGY IN IMAGING OF THE ANTERIOR CHAMBER ANGLE** (125490)

Christina M. Sorenson, OD, ABCMO, FAAO, Jessica Neuville, OD, FAAO, Vladimir Yevseyenkov, OD, PhD, Midwestern University Arizona College of Optometry

RESULTS: The following were the mean degrees that were found utilizing the Scheimpflug imaging system in comparison to the Spaeth grading system: B grade= 28.5Â±5.5, C grade = 39.22Â±7.7, D grade=40.85Â±6.5, E grade = 52.8Â±4.4. Average nasal angle OD=37.55, OS=38.14; temporal OD=44.5; OS=45.0. Limitations of Visante OCT studies was resolution. We were able to use high quality resolution images of the Spectralis, Scheimpflug and anterior segment photography. Further correlation of the devices will occur upon availability of the software for the Spectralis anterior segment analysis in July 2012.
PURPOSE: The purpose of the study is to evaluate the validity of measuring the anterior chamber angle with the utilization of the latest available technological advance in spectral domain Optical Coherence Tomography (Spectralis Anterior Segment Module) and Scheimpflug imaging with a Placido Disk based technology (Sirus Corneal Analyzer).
METHODS: Twenty visually normal adults had their nasal and temporal anterior chamber imaged with Spectralis Anterior Segment module and Sirius imaging system. Gonioscopy was then performed and photographed with Haag-Streit Slit lamp camera all on the same visit. Imaging angles and Gonioscopy photos evaluated utilizing Spaeth grading system.
CONCLUSIONS: Comparison of the three techniques has never been combined in a single study. Our goal was to gather baseline data on normal patients to evaluate the validity of the above mentioned devices in measuring the anterior chamber angle. Objective automated devices are non-invasive and the advancement of technology makes them quick and easy for the non-professional to perform, leaving the professional for interpretation of the images. From this series of eyes, a trend of the automated technology devices appears to be underestimation of the anterior chamber angle degree. Gonioscopy remains the gold standard for angle evaluation.

93. **REPRODUCIBILITY OF ANTERIOR CHAMBER DEPTH MEASURED USING PENTACAM** (125524)

Pinakin Gunvant Davey, OD, PhD, FAAO, Laura Gedge, MS, Western University of Health Sciences College of Optometry, Anna Ablamowicz, Subba Gollamudi, MD, Southern College of Optometry

RESULTS: The 95% upper and lower limits of agreement of central anterior chamber depth measurements were -0.06 to +0.04 mm and -0.08 to +0.07 mm for first and second and first and third measurements respectively. The 95% limits of agreement for peripheral anterior chamber depth for the first, second and third measurement ranged

between -0.11 to +0.09, -0.10 to +0.07, -0.19 to +0.17 and -0.15 to +0.086 for Temporal, Nasal, Superior and Inferior positions respectively. The repeat measurements obtained were not significantly different than the baseline measurements in all locations except the inferior (mean difference 0.03 mm paired t-test p=0.007). Overall the central measurements were more reproducible than peripheral anterior chamber depth measurements. Superior measurements were the least reproducible measurement, with wider 95% confidence limits of agreement than central, nasal, temporal and inferior measurements.
PURPOSE: To evaluate the reproducibility of anterior chamber depth measurements in normal healthy eyes obtained using the Pentacam®; a slit illumination system and a Scheimpflug camera, both centrally and peripherally.
METHODS: This prospective, cross sectional study examined thirty ocular healthy participants(mean 33.5 SD 10.88 years). Three sequential measurements (one baseline and two repeat) were performed using the Pentacam. The values of anterior chamber depth were obtained using standard machine software in millimeter (mm). Altman and Bland analysis was performed to evaluate the 95% limits of agreement for the multiple measurements obtained from the central and peripheral anterior chamber.
CONCLUSIONS: The Pentacam provides measurements of anterior chamber depth that are within tolerance of repeatability for clinical care, The central anterior chamber depth measurements are more reproducible than peripheral measurements, may be in part due to greater higher signal strength obtained centrally.

94. **EFFECT OF PHOTOGRAPH-ASSISTED CONTOUR LINE DRAWING ON HRT OPTIC NERVE CLASSIFICATION** (125108)
Dominick Opitz, OD, FAAO, Daniel K. Roberts, OD, PhD, FAAO, Illinois College of Optometry, Jacob Wilensky, MD, University of Illinois Chicago

RESULTS: Data for both eyes of 232 subjects was analyzed. The mean disc area of Group A was 1.92mm² OD and 1.93mm² OS. The mean disc area of Group B increased to 2.27mm² OD and to 2.28mm² OS (p<0.0001). The mean rim volume of Group A was 0.36mm³ OD and 0.37mm OS. The mean rim volume of Group B increased to 0.47mm³ OD and to 0.52mm² OS (p<0.0001). Mean NFL remained unchanged between each Group. In Group A, 15.5% (n=36) OD and 12.5% (n=29) OS had an MRA "outside normal limits". Only 5.2% (n=12) OD and 5.2% (n=12) OS in Group B had an MRA "outside normal limits". The MRA changed in 32.8% (n=76) OD and 26.3% (n=61) OS between each Group. Group B resulted in improved agreement between MRA "normal" and the two masked reviewers' ONH classification. For Reviewer 1 vs. MRA, kappa improved from 0.18 (95% CI=0.06 to 0.30) to 0.41 (95% CI=0.26 to 0.56) OD. For Reviewer 2 vs. MRA, kappa improved from 0.06 (95% CI=-0.06 to 0.17) to 0.15 (95% CI=0.00 to 0.30) OD. Similar results were found for left eyes.
PURPOSE: Use photography guided placement of HRT3 contour lines to compare change in optic nerve head (ONH) parameters and Moorfield Regression Analysis(MRA) compared to masked expert reviewer for ONH assessment.
METHODS: HRT3 images were captured. Contour lines were placed by an experienced

observer using standard three dimensional reconstruction (Group A). Original contour lines were deleted. A second observer used ONH photographs to guide contour line replacement (Group B). The mean disc area, mean rim volume, mean nerve fiber layer thickness (NFL), and MRA of both Groups were compared. The MRA of both Groups was compared to the ONH classification of masked expert reviewers.
CONCLUSIONS: ONH photographs to guide the placement of contour lines for HRT3 imaging resulted in more "normal" MRA classifications. Both clinicians and researchers should consider using ONH photographs when marking contour lines with HRT3.
ADDITIONAL COMMENTS: This study was apart of a larger investigational study: NEI Grant K23 EY0181883 (DKR)

95. **STAGING GLAUCOMA USING STRATUS OCT IN A VETERAN POPULATION** (125067)

James P. Smith, OD, FAAO, Togus VA Medical Center, Albert D. Woods, MS, OD, FAAO, Nova Southeastern University

RESULTS: A total of 247 normal subjects and 157 glaucoma subjects were included. Of glaucoma subjects 75 had mild, 43 had moderate, and 39 had severe visual field defects. The population was predominantly Caucasian (98.5%) and male (96.8%). Nonparametric comparisons demonstrated significant differences in average and quadrant RNFL between all groups ($P<0.05$). Significant differences were observed in clock hour RNFL between all groups with the exception of 9, 10, and 12 O'Clock in mild vs moderate disease, and 3 and 9 O'clock in moderate vs severe disease. ROC analysis showed highest area under the curve was average RNFL for normal vs mild glaucoma (0.86), inferior quadrant for mild vs moderate glaucoma (0.80), and superior quadrant for moderate vs severe disease (0.86). A positive linear correlation between average RNFL and mean deviation ($r2=0.58$) and negative linear correlation between average RNFL and pattern standard deviation ($r2=0.52$) were found. The correlations decreased when only glaucoma subjects were considered.
PURPOSE: This study examined the ability of OCT RNFL to discriminate between normal and three stages of glaucomatous vision loss in a US Veteran population.
METHODS: A review of consecutive patients who underwent Humphrey 24-2 standard automated perimetry and Stratus OCT Fast RNFL imaging within a six month period was conducted. Subjects had spherical RE within +/-5.00D and best corrected VA of 20/30 or better. Patients with nonglaucomatous ocular disease were excluded. Glaucomatous eyes were staged using the Hodapp-Parrish-Anderson visual field grading system. Average, quadrant and clock hour RNFL between all groups were compared.
CONCLUSIONS: In this largely homogenous male, Caucasian population, the average, inferior and superior RNFL were the best parameters for staging glaucoma; the best parameter varied with severity of disease. Significant overlap was present among stages highlighting the limitations of OCT RNFL in the assessment of glaucomatous vision loss.
ADDITIONAL COMMENTS: This material is the result of work supported with resources and facilities at the VA Maine Health Care System.

96. **COMBINING INTER- AND INTRA-EYE STRUCTURAL ASYMMETRY TO IDENTIFY GLAUCOMA** (125167)

Claudia C. Ruegg, OD, Michael Sullivan-Mee, OD, FAAO, Denise Pensyl, OD, MS, FAAO, Kathy D. Halverson, OD, FAAO, Albuquerque VA Medical Center

RESULTS: Inter-eye global PP asymmetry ≥ 4um demonstrated the highest sensitivity (0.83), correctly identifying 59/71 glaucoma subjects. Using the best intra-eye asymmetry parameter (inferior/superior RNFL difference), all 12 subjects not identified in PP inter-eye asymmetry analysis (false negatives) were identified as having glaucoma. The specificity (false positive rate), however, did not change, as intra-eye RNFL difference did not correctly re-classify the 4 false positive subjects as normal subjects.
PURPOSE: Glaucoma is often characterized by structure and function asymmetry, both between eyes and upper and lower hemispheres within an eye. In this study, we investigate the diagnostic utility of sequentially combining inter-eye and intra-eye macular and nerve fiber layer thickness asymmetry to identify the presence or absence of glaucoma.
METHODS: We used spectral domain OCT (Spectralis, Heidelberg Engineering, Carlsbad, CA) to obtain macular thickness (posterior pole [PP] scan protocol) and circumpapillary retinal nerve fiber layer (RNFL) thickness of both eyes of 38 normal and 71 primary open-angle glaucoma subjects, defined as glaucomatous optic neuropathy with reproducible visual field loss in at least one eye. We calculated global, superior, and inferior PP and RNFL inter-eye and intra-eye differences. Receiver operating characteristic (ROC) curves were generated for inter- and intra-eye differences, and diagnostic sensitivity and cutpoints were determined at 90% specificity. In subjects misclassified by the inter-eye parameters (false negatives and false positives), we used intra-eye asymmetry cutpoints to improve diagnostic yield.
CONCLUSIONS: Combining inter-eye with intra-eye asymmetry provides improved sensitivity for identifying glaucoma compared to using either approach alone. Further work in validating the model in other samples and with very early glaucoma is warranted to determine the true power and value of the model.

97. **OCULAR RESPONSE ANALYZER BEST SINGLE VALUE PARAMETERS ARE ASSOCIATED WITH GREATER VARIABILITY THAN MULTI-MEASUREMENT MEAN VALUE PARAMETERS** (125277)

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RESULTS: In Bland-Altman analysis, mean differences (Â± 95% confidence intervals) between corresponding MV and BSV parameters were: IOPcc (0.2 Â±3.0) , IOPg (0.1 Â±2.4), CRF (0.1 Â±1.5), and CH (0.1 Â±1.8). Using regression analysis, coefficients of determination (r²) between MV and BSV for IOPcc, IOPg, CRF and CH were 0.93, 0.96, 0.87 and 0.80 respectively. BSV parameters showed 33-45% higher inter-session variability versus MV parameters, and CH_MV was more closely associated with glaucoma diagnosis, CCT, DCT-IOP, RNFL, and MD than was CH_BSV.
PURPOSE: To compare mean values generated from multiple Ocular Response Analyzer measurements versus single measurement values associated with the highest reliability score.
METHODS: In three-hundred sixteen eyes of 316 subjects, we obtained four ORA

measurements and calculated mean values (MV) for corneal compensated IOP (IOPcc), Goldmann-correlated IOP (IOPg), corneal resistance factor (CRF), and corneal hysteresis (CH). The best single measurement was then identified using ORA waveform reliability scoring, and its values (BSV) were recorded. We assessed agreement between MV and BSV variables with Bland-Altman plots and regression analyses. We also assessed reproducibility of BSV and MV parameters by obtaining a second set of ORA measurements in 60 subjects. Finally, we compared strengths of association between CH_BSV and CH_MV for glaucoma diagnosis, IOP by dynamic contour tonometry (DCT-IOP), central corneal thickness (CCT), peri-papillary retinal nerve fiber layer thickness (RNFL), and visual field mean defect (MD) using regression analyses.
CONCLUSIONS: BSV parameters consistently exhibited greater variability than MV parameters, and the degree of variability in CH_BSV was large enough to significantly impact its clinical value. These findings suggest that MV parameters have better precision and utility for individual patient care.

98. **CORNEAL ELASTICITY MEASUREMENT USING OCT-BASED AIR-JET INDENTATION SYSTEM AND ITS CHANGE WITH IOP** (125278)

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RESULTS: On average, the measured IOP was 5.47mmHg, 12.31mmHg, 20.22mmHg and 31.75mmHg at each water level. Corneal elasticity derived from corneal displacement demonstrated a linear and positive relationship with IOP elevation. For a normal physiological IOP, say 12.31mmHg, the average corneal elasticity was 0.044 N/mm. No relationship was shown between corneal elasticity and central corneal thickness.
PURPOSE: Corneal biomechanical properties were difficult to be measured clinically. Ocular Response Analyzer provides corneal hysteresis (CH) which represents the viscoelasticity of the cornea. CH has been found to be lower in eyes with keratoconus, high myopia and glaucoma. There are queries on its measurement principle and whether it measures the physical property of cornea. This study revealed the measurement of corneal elasticity using an OCT-based air-jet indentation system and its change from intraocular pressure (IOP) variations.
METHODS: Six fresh porcine enucleated eyes were obtained from a local slaughterhouse and prepared for the experiment between 2 to 5 hours post-mortem. A needle was introduced to the vitreous chamber of the porcine eye, and the needle was connected to a water column filled with 0.9% sodium chloride solution. IOP was measured using a rebound tonometer and was varied by adjusting the water column heights. Corneal displacement was measured at water levels of 20cm, 30cm, 40cm and 50cm. To measure the corneal displacement, an air-jet with a maximum pressure of 9.27kPa was applied to deform the central cornea. The OCT system captured the corneal displacement and calculated the corneal elasticity by using the relationship of force/deformation. One series of measurement contained three air-jet exposures lasting for 8 seconds. The measurement was repeated three times for each water level.
CONCLUSIONS: We demonstrated the feasibility of the system to measure corneal

elasticity and change of corneal elasticity with the change of IOP in vitro using porcine eyes. With further modification, it has the potential to be applied in human cornea.

99. **PREVALENCE OF GLAUCOMA AND STROKE IN A HOSPITALIZED POPULATION OF OLDER ADULTS HAVING ALZHEIMER DISEASE** (125338)
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RESULTS: The age of the subjects ranged from 66 to 101 years. The prevalence of glaucoma was 6.7% in our population (n=30/446). Glaucoma was significantly more prevalent in the DAT group (n= 21; 9.4%) than in the control group (n= 9; 4.0%) [χ^2_1 = 5.146; p = 0.023]. The prevalence of stroke was 16.4% (n=73/446) but was not different between the two groups (DAT group 35/223, 15.7%; control group 38/223, 17% [χ^2_1 = 0.147; p = 0.701]). The prevalence of stroke was not different between those with (n=4/30; 13.3%) or without (n=69/416; 16.6%) glaucoma (χ^2_1 = 0.216; p = 0.642).
PURPOSE: To determine the prevalence of glaucoma and stroke in subjects with dementia of the Alzheimer type (DAT) compared to a comparable control group.
METHODS: Retrospective chart review: The prevalence of glaucoma and stroke were compared between adults with a diagnosis of DAT admitted to the geriatric or neurology units of CHUM and HMR between April 2008 and April 2010 (n=223; DAT group) to the first 223 individuals without dementia matched for age and date of hospitalisation either in gastroenterology, internal medicine or cardiology units of the same hospitals (control group). A diagnosis of glaucoma was deemed positive if recorded in the past medical history or in presence of a compatible medication for this diagnosis. Stroke was compiled from the chart past medical history. Chi-square tests were used for between-group comparisons.
CONCLUSIONS: The prevalence of glaucoma was more important in a group of adults with DAT than in a comparable control group. Prevalence of stroke was however not different between the DAT and control groups, nor was it different between those with vs without glaucoma.
ADDITIONAL COMMENTS: Grant: CAREC-IUGM; FDERC-EOUM

100. **BILATERAL NONARTERITIC ANTERIOR ISCHEMIC OPTIC NEUROPATHY (NAION) COMPLICATED WITH CHRONIC LYMPHOCYTIC LEUKEMIA INFILTRATION (CLL)** (125929)
Jane Kuo, VA Palo Alto Healthcare System

BACKGROUND: NAION is the most common optic neuropathy resulting from acute infarction to the ONH and a cause of visual impairment in the elderly population. Involvement of the fellow eye has ranged from 10.5% to 73% of patients. CLL is the most common leukemia in Western countries and mainly affects the elderly population. Studies have described visual obscuration and disc edema as first signs of ON infiltration

and early clinical manifestations CLL patients. Swelling of the ONH in leukemic patients can be related to different underlying mechanisms: direct infiltration into septae with distention causing axonal compression, obstruction of CSF flow leading to papilledema, and hyperviscosity from increased WBC counts leading to small vessel thrombosis. Histological infiltration of the eye is more common than ocular clinical manifestations and has been discovered upon autopsy in 8% to 71% of patients.
CASE REPORT(S): A 71 y.o. Caucasian male presented with a chief complaint of "fog over OS". Past systemic history was significant for controlled type II diabetes, hyperlipidemia, sleep apnea, and stage 0 CLL. BCVA were 20/20 OD, 20/25 OS with a grade 1+ APD OS. Examination of the posterior segment revealed a healthy ONH with C/D 0.3rd and moderate disc edema OS. At subsequent visits over three months the vision OS continued to decrease (20/25 → 20/100 → CF at 2 feet → HM) and the OD subsequently developed disc edema two months after. The patient had multiple workups by various subspecialties with negative MRI, borderline opening pressures on LP, and negative malignant cells on CSF flow cytology. Since a negative workup, although reassuring, doesn't rule out CNS leukemic infiltration, the patient began chemotherapy treatment for CLL and hyperbaric oxygen therapy. The patient reported subjective improvements to vision after initiating chemotherapy.
CONCLUSIONS: The question remains whether the disc edema was due to bilateral NAION or CLL infiltration. However, it's likely that both underlying mechanisms played a contributing factor.

101. **TUBULAR SCLEROSIS COMPLEX WITH ASTROCYTIC HAMARTOMA OF THE RETINA** (125999)
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BACKGROUND: Tuberous sclerosis complex (TSC) is an autosomal dominant phacomatosis. It is characterized by the development of hamartomas in multiple organ systems from all primary germ layers including the eyes, brain, skin, kidneys, heart, and lungs. TSC may consist of a classic triad of epilepsy, mental retardation, and adenoma sebaceum. There are several ocular complications associated with TSC. One complication may be an astrocytic hamartoma of the retina or optic disc.
CASE REPORT(S): A 22-year-old male university student presents for a comprehensive eye examination complaining of blur in both eyes. His medical history reveals a diagnosis of tuberous sclerosis since 1992. There was no family medical or ocular history reported including TSC. An external evaluation revealed facial angiofibromas in the characteristic butterfly pattern associated with tuberous sclerosis. A mulberry lesion of one disc area in size was found in the inferior temporal retina of the left eye which had not been previously reported to the patient.
CONCLUSIONS: Diagnosing TSC historically consisted of Vogt's triad of epilepsy, mental retardation and angiofibromatosis. Today it is known that TSC has a far more diverse set of symptoms and a new system of primary and secondary diagnostic criteria have been developed for diagnosing TSC. This criterion consists of cortical tubers, retinal astrocytomas, facial angiofibromas, ungual fibromas, hypomelanotic skin lesions, shagreen patch, and renal angiomyolipomas. Our patient demonstrated only the

angiofibromatosis of the historical diagnosis. Tuberous sclerosis complex is inherited in an autosomal dominant pattern or by spontaneous mutations. Mutations in either of 2 genes (TSC1 and TSC2) have been determined to cause tuberous sclerosis complex. There is no sexual or racial predilection. Due to the lack of family history of the disease, we can assume that this patient likely acquired TSC by spontaneous mutation.

102. **INVASIVE ADENOCARCINOMA PRESENTING AS A SCINTILLATING SCOTOMA** (125694)

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BACKGROUND: Choroidal malignancies can be primary or metastatic. Breast, lung or unknown primary tumors are most common yet ocular findings may be the first detected sign of a metastatic condition. Presenting symptoms can be blurred vision, flashes, floaters, visual field defects or most often none at all. Rapid referral for primary site and other metastatic detection and treatment is recommended along with management of the ocular condition.
CASE REPORT(S): A 38-year-old white female presented with concern of a constant kaleidoscope effect inferior temporal to primary gaze OS 3 weeks in duration. History was positive for hypothyroid and classic migraine but no headache was associated with this atypical and localized visual disturbance. Distance acuities were 20/15 OD/OS. Anterior segment was normal. Dilated exam OS revealed an elevated 1.67DD lesion just superior to the nerve and a single retinal hemorrhage 0.5DD temporal to the nerve. OCT line scan showed a serous detachment surrounding the lesion. 30-2 HVF demonstrated a corresponding dense inferior temporal defect. Exophthalmometry was normal/equal. Further questioning revealed a grandmother deceased from a blinding brain tumor. She was referred for B-Scan and FA. A metastatic work-up was initiated through Primary Care. Chest x-ray showed a 10x13mm lesion right mid-lung. Colonoscopy was normal but biopsy revealed invasive moderately differentiated adenocarcinoma. CT and PET scan showed extensive metastatic disease involving the mediastinum, lung, liver, pancreas, subcutaneous, bone, orbit and brain with gastrointestinal or pancreas as primary site. She was referred to a cancer center where she underwent chemotherapy and whole brain radiation. She expired 10 months later.
CONCLUSIONS: Gastrointestinal cancers metastasize to the eye in about 2% of women. This case demonstrates a unique presentation of initial ocular detection of extensive metastatic disease in a young patient reporting good health. Extensive test results will be presented along with differential diagnoses, pathophysiology and treatments both available and proposed.

103. **CILIARY BODY MELANOMA IN AFRICAN AMERICAN MALE** (125224)

Heather Melanson, OD, VA Medical Center

BACKGROUND: Ciliary body melanomas are very uncommon ocular tumors, accounting for only 10% of all melanomas of the choroid. As these tumors cannot be readily seen on clinical exam and rarely cause symptoms, early detection is difficult.

They most commonly occur in Caucasians with light colored irides and are extremely rare in African American patients, accounting for less than 1% of all cases.
CASE REPORT(S): This is a case report of a 58 year old African American male who was found to have a ciliary body melanoma as an incidental finding on MRI imaging when the patient was evaluated in the emergency room complaining of intermittent diplopia. The MRI revealed a 1.1 x 0.8 x 0.4 cm enhancing mass of the left globe, posterior to the ciliary body. On subsequent examination, the patient was found to have normal visual acuities, a left hyperphoria, and a gray striated lesion posterior to the iris from four to six o'clock. B-scan ultrasound demonstrated a lesion of medium reflectivity extending towards the equator. As the patient had not received medical care in over 15 years, a complete work up was performed. Significant findings include a lipoma on the patient's left upper arm, a benign thymoma on chest x-ray, and abnormal liver enzymes tests from previously undiagnosed Hepatitis C. No definitive evidence of metastatic disease was found, and the patient had the melanoma excised.
CONCLUSIONS: Since ciliary body tumors are typically not deteced in the early stages, when the diagnosis is made, it is critical to determine if the tumor is primary or metastatic. For a primary ciliary body tumor, the most common metastasis is to the liver, and most common primary sites for metastatic ciliary body tumors are the lung in men and the breast in women. Given the potential mortality of metastatic disease, a comprehensive work up is critical to appropriately manage the patient, and will determine the patient's overall prognosis. Therefore, despite the rarity of ciliary body tumors, it is important to be aware of the clinical signs, appropriate work up, treatment, and evaluation for metastatic disease.

104. **SECTORAL RETINITIS PIGMENTOSA IN AN ATYPICAL CASE OF USHER SYNDROME TYPE II** (125000)
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BACKGROUND: Usher syndrome (US) is a hereditary syndrome which presents with hearing and vision loss in childhood. In typical cases of US, vision loss is from retinitis pigmentosa (RP), which presents 360 degrees OU by the teen years and is progressive into adulthood. Here we describe a patient with US and a stable, sectoral RP.
CASE REPORT(S): A 52 year old female presented with a complaint of photophobia and a change in vision. She had profound hearing loss in both ears and communicated by sign language and writing. Best-corrected visual acuity was 20/20 OD and OS. Pupils reacted normally with no afferent pupillary defect present. An Octopus kinetic visual field (VF) was performed using the standard III4e as well as the I4e stimulus sizes. The III4e VF was normal but the smaller stimulus yielded a defect in the superior temporal region OU, reduced to 30 degrees. The fundus exam revealed mid-peripheral bone spicule pigment in the inferior nasal quadrants OU, consistent with the VF results. No other fundus abnormalities were observed. The VF and fundus appearance were stable at one year. An electroretinogram (ERG) and multifocal ERG (mfERG) were performed. The ERG showed greatest dysfunction in scotopic testing. The photopic ERG also showed a mild reduction in the flash and flicker testing, but the mfERG (central 45 degrees) was normal. The patient was educated about her vision and functional test

results. She was prescribed tinted lenses to aid with her photophobia.
CONCLUSIONS: Usher syndrome can present with sectoral fundus changes and functional loss of both rods and cones. Visible fundus changes can be stable over time. In a patient with this unusual presentation, additional functional testing, on both the kinetic VF and ERG, were helpful in determining the visual experience of the patient. There is one other case in the literature of US presenting with sectoral RP, indicating that this is not an isolated finding, and should be considered when examining patients with childhood hearing loss.

105. **PEDIATRIC CHORIODAL NEOVASCULAR MEMBRANE FORMATION FOLLOWING INFECTION WITH ROCKY MOUNTAIN SPOTTED FEVER** (125105)

Abigail Jackson, OD, Krystal Wells, OD, Midwest Eye Care, Omaha, NE

BACKGROUND: Rocky Mountain spotted fever (RMSF) is a bacterial disease that is spread by the bite of a tic carrying the organism *Rickettsia ricketti*. Approximately 1 out of 1,000 wood or dog tics carry the organism. Symptoms can range from mild to severe. Earlier ocular findings include uveitis and retinal vasculitis. Late stage of the disease can result in serious complications including permanent neurological damage which can manifest in the eye as neuroretinitis.
CASE REPORT(S): A 16 year old Caucasian male presented to clinic with a "spot in vision" in his right eye found incidentally while taking a driver's license test. Past ocular history was unremarkable. Past medical history included RMSF infection eight months prior for which he was hospitalized. Reports indicate that RMSF was misdiagnosed and unsuccessfully treated for nearly a month. The delay in diagnosis contributed to the patient progressing to late stage disease with neurologic involvement. At the initial exam, the patient was found to have BCVA of 20/100 in the right eye and 20/25 in the left eye. Pertinent findings in the right eye include sectional swelling of the optic nerve with significant macular and peripheral chorioretinal scarring. The left eye had significant chorioretinal scarring. At later follow-up the patient developed a peripapillary choroidal neovascular membrane in the left eye. He is currently undergoing treatment, and thus far has undergone two focal lasers and one Lucentis injection. **CONCLUSIONS:** Ophthalmic complications from RMSF, although uncommon, can permanently affect vision. Obtaining a detailed case history is crucial because early symptoms of RMSF can mimic other diseases. If case history includes a rash and ocular symptoms are suggestive of RMSF, the patient should be sent for immediate testing in order to prevent progression to neurologic involvement.

106. **UTILIZING HIGH DEFINITION OPTICAL COHERENCE TOMOGRAPHY (HD-OCT) IMAGING TO AID IN THE DIAGNOSIS OF TALC RETINOPATHY** (125365)

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BACKGROUND: Talc retinopathy is a common ocular manifestation of chronic intravenous drug abusers. Retinal crystalline deposits in the macula area are the most typical presentation of talc retinopathy. Differentials for crystalline deposits include drusen and tamoxifen retinopathy. Many differentials can be eliminated by review of systemic history and medication use. The use of spectral domain optical coherence tomography can additionally help to identify talc via imaging of which retinal layers the particles are isolated to. Talc typically lies in the nerve fiber and inner nuclear layers; in rare cases, it can be seen in the choriocapillaries. By detection of talc retinopathy, optometrists can be the first to identify chronic drug abusers. Management includes referral for surgical management, if needed, and a multi-disciplinary team approach to prevent further systemic complications.
CASE REPORT(S): A 74 year old African American male presented to the optometry clinic with history of IV cocaine, morphine, and heroin use for 43 years. Visual acuity was 20/20 OU. Posterior segment exam revealed posterior pole refractile particles concentrated more in the macular area. Spectralis HD-OCT imaging revealed the particles to be located in the ganglion cell layer and inner nuclear layer, consistent with talc retinopathy. Management entailed notification of the PCP for pulmonary imaging and function testing, as well as further visual field and OCT RNFL testing. A 66 year old African American male presented to the clinic with history of IV heroine use for 40 years. Visual acuity was 20/25 OU. Dilated fundus evaluation revealed refractile particles concentrated in the macular area. Cirrus HD-OCT imaging revealed talc particles located in the ganglion cell layer. Management included follow-up visual field and OCT RNFL testing. Pulmonary imaging ordered by the PCP revealed a granuloma in the right lung base.
CONCLUSIONS: These cases demonstrate the use of HD-OCT in visualization of talc retinal crystals to aid in the diagnosis of talc retinopathy.

107. **TALC RETINOPATHY, SILENT OR BLINDING???** (125918)
Azadeh Razmandi, OD, Houston, TX

BACKGROUND: Magnesium Silicate, artificial filler, added to recreational drugs, causes the appearance of glistering yellow deposits on the path of retinal arterioles termed talc retinopathy. Ocular involvement ranges from no complications to ischemic retinal precursor to tractional retinal detachment. These complications and systemic involvement resulting from IV drug abuse will prompt appropriate referral and treatment for the particular presentation and stage of the disease.
CASE REPORT: 52 African-American male walked in to the clinic for a complete eye exam. Patient complained of decrease in vision at distance and near first noticed 1.5 years ago. Patient's history revealed systemic hypertension for 5 years for which the patient took an unknown medication for. Patient also admitted to IV drug use for more years that he could remember. He was a ? pack smoker for 34 years. He no longer used drugs. Patient's entire preliminary, refractive, and anterior segment assessment was normal. His VA was corrected to 20/20 OD and OS. The only abnormal finding was yellow, refractile cysts throughout the posterior pole of both eyes. At this exam, fundus photos were taken to monitor changes. Patient was referred to PCP to rule out systemic involvement.

CONCLUSION: Talc retinopathy although silent in this patient, could have significant disabling effects on patient's systemic and ocular systems. Each of these complications is managed accordingly with respect to the standard of care. However, close monitoring of retinal changes and relationship with the patient's PCP could prevent debilitating outcomes.

108. **BILATERAL RETINAL AND DISK NEOVASCULARIZATION IN A 28 YEAR OLD HISPANIC FEMALE DIAGNOSED WITH EALES' DISEASE** (125505)

Katrina A Chang, OD, Randall R. McPherran, OD, FAAO, Chelsia Leong, University of California Berkeley

BACKGROUND: This report details signs and symptoms of Eales' disease, and examines a rare case of a patient with bilateral retinal neovascularization, vitreous hemorrhages and disk neovascularization.
CASE REPORT(S): A 28 year old Hispanic female presented with initial symptoms of bilateral reduction in vision, first noted approximately one month ago. Her initial best corrected visual acuities were 20/60- OD and 20/40 OS. Posterior segment evaluation was significant for vitreal cells and numerous intraretinal hemorrhages 360 OU. The patient denied any history of diabetes, hypertension or other coagulopathies, as well as any prescription/OTC medications. After missed appointments and a large gap in follow up, the patient presented again with symptoms of "spots of blood" and floaters OU. Posterior segment findings revealed extensive neovascularization of the disk, multiple vitreous hemorrhages in each eye and advanced fibrovascular proliferation extending from the optic disk. Extensive blood work was ordered, and all returned negative, including a negative MRI. Accordingly, the diagnosis of Eales', a diagnosis of exclusion, was made. The patient underwent PRP 360 OU, with vitrectomy and ERM peel OS, resulting in visual acuities of 20/20 in each eye, and is currently being followed on a monthly basis.
CONCLUSIONS: Eales' disease is rare in the U.S. It affects healthy individuals, between the ages of 20 and 30 years old. Eales' disease is characterized by vascular changes including (but not exclusive to) kinky venules, abnormal anastomoses, peripheral retinal neovascularization, recurrent vitreous hemorrhages, and although rare, disk neovascularization. Management and close follow up with these patients is important as Eales' affects young patients who have a lifetime ahead of them – it is not unrealistic to predict another vitrectomy as well as cataract surgery shortly in this patient's future.

109. **"STOP THE PRES" POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME AND VISUAL OUTCOMES** (125884)

Lynn D. Greenspan, OD, FAAO, Rahul Gupta, BA, Pennsylvania College of Optometry at Salus University

BACKGROUND: Posterior reversible encephalopathy syndrome (PRES) is characterized by neurological injury secondary to cerebral edema. PRES is caused by a variety of systemic conditions that may create breakdown of the blood-brain barrier such as hypertension, post-transplantation, immunosuppresion, autoimmune conditions, high

dose chemotherapy or IV immunoglobulin. Two theories exist for the pathogenensis of PRES. The first is that hypertension creates failure of cerebral autoregulation and the second is that endothelial dysfunction causes vasoconstriction, hypoperfusion, and ischemia with resulting vasogenic cerebral edema. The edema is typically found in the posterior circulation's watershed in the parieto-occipital lobes but can also be present in other lobes. Blurry vision, visual field loss, scotoma, and visual hallucination have been reported. Ophthalmic examination including visual fields should rule out other potential causes. Clinical suspicion, predisposing factors, and neuroimaging make the diagnosis. The management of PRES requires a multidisciplinary team including neurology for seizure prohylaxis, internal medicine for hypertension control and perhaps oncology.
CASE REPORT(S): An 84 yo female reports sudden onset cortical blindness after intrathecal morphine pump replacement. Findings include cognitive confusion, elevated BP 179/94 and seizures on EEG. MRI and MRA confirm PRES. A 58 year old male is admitted to the hospital with septic shock, aspiration pneumonia and acute renal failure. CT and MRI indicate bilateral subdural hematoma and abnormal signal in bilateral parieto-occipital lobes consistent with PRES. Both patients present for evaluation with symptoms of blurry vision visual field loss and mental confusion.
CONCLUSIONS: PRES is neurological injury from cerebral edema caused by a breakdown of the blood-brain barrier. Although a good prognosis exists for resolution of visual manifestations as indicated by its title "reversible encephalopathy" the overall prognosis is based upon the systemic condition. Vision should be monitored throughout recovery.

110. **NEUROSYPHILIS DIAGNOSED FROM ASYMPTOMATIC BILATERAL OPTIC PAPILLITIS** (125026)

Janel L Chou, OD, FAAO, Makesha L Sink, OD, FAAO, Department of Veteran Affairs

BACKGROUND: Swollen optic nerve heads are a sign of numerous conditions and often require an extensive work-up to determine their etiology. Although we often assume papilledema or benign intracranial hypertension as the cause of bilateral optic papillitis, a thorough work-up to rule out infectious or inflammatory diseases must be performed in order to appropriately manage this finding and in some cases, to ultimately save lives.
CASE REPORT(S): This case will present an asymptomatic 52 year old white male with a new finding of bilateral optic papillitis during a routine exam. With further questioning, this patient reported a history of “migraine” headaches that awoke him from sleep and occurred on a daily basis for the past six months. Visual field testing revealed normal field results OD/OS and MRI testing was unremarkable. Serology testing revealed a positive MHA-TP (Microhemagglutination assay - treponema pallidum) and spinal tap revealed positive VDRL (Venereal Disease Research Laboratory) test of the cerebrospinal fluid confirming neurosyphilis. The patient was treated for syphilis and had resolution of optic nerve swelling and a vast improvement in his headaches.
CONCLUSIONS: Syphilis is a debilitating multisystemic disease resulting from infection with the spirochete Treponema pallidum. Syphilis is often called the “great masquerader” because its varied symptoms and clinical signs can mimic other conditions. With nearly 46,000 cases reported each year in the United States, it cannot be overlooked

as a possible cause for atypical clinical findings. A delay in the diagnosis and failure to treat in a timely manner may lead to progression of the disease to involve the central nervous system which can have devastating consequences. In this case, a non-symptomatic ocular finding of bilateral optic papillitis prompted a sequence of testing which ultimately was determined to be caused by neurosyphilis. With treatment, this finding, as well as other symptoms later determined to be from neurosyphilis, were either eliminated or vastly improved.

111. **CHROMOSOME 18P DELETION SYNDROME: A CASE OF BLEPHARO, FACIAL AND LARYNGEAL SPASM** (125482)

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BACKGROUND: Chromosome 18p Deletion Syndrome is a rare chromosomal anomaly that occurs in approximately 1 in 50,000 live births.No two persons with 18p- presents with the same characteristics. Common ophthalmic manifestations are hypertelorism, ptosis, strabismus, epicanthus, horizontal palpebral fissures, hyperopia, myopia, and anomalous optic discs.Systemic manifestations include dystonia, microcephaly, holoprosencephaly, heart defects, musculoskeletal changes, and hypothyroidism.
CASE REPORT(S): 40 year old black male complains of increasing difficulty opening eyes OS>OD and a droopy lid OS.The patient's ocular history is significant for a long standing left exotropia, blepharospasm OU, and bilateral facial spasms with subjective symptom worsening, for which the patient has sought treatment for in the past.Previous treatments included 30 Botox injections to the periorbital area and face, two bilateral blepharoplasties, ptosis crutch, and oral medication to reduce facial muscle spasms.His medical history is significant for mild mental handicap, hypothyroidism, and laryngeal spasm secondary to Chromosome 18p Deletion Syndrome. His best corrected distance visual acuities were 20/40 OD and 20/50 OS. Pupils were equal, round and reactive to light and extraocular muscles were noted to be restricted superiorly OU, superior temporal OD, and superior nasal OS. Examination of the anterior segment structures were significant for severe and constant blepharospasm OU and ptosis OS. Intraocular pressures, measured digitally, were noted to be soft and symmetrical OU. Fundus examination was unremarkable OU. The consulting oculoplastic surgeon recommended treatment included additional Botox injections to reduce neurological spasms followed by a left brow and lid lift.
CONCLUSIONS: Chromosome 18p Deletion Syndrome is a rare chromosomal anomaly that manifests both systemic and ocular signs and symptoms. These symptoms can be quite severe and debilitating.Treatment for patients with this condition necessitates a multiple disciplinary approach requiring both medical and surgical intervention.

112. **RADIOGRAPHIC FINDINGS AND OPHTHALMOLOGIC ASSOCIATIONS OF CORPUS CALLOSUM AGENESIS** (125464)

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BACKGROUND: The corpus callosum is the midline structure in the brain that conducts information between the left and right cerebral hemispheres. During fetal development, this structure may have incomplete or partial agenesis. It can occur in isolation, or can be associated with complex, multi-system disorders. As eye doctors, we are aware of many associated ophthalmologic findings including: hypoplastic optic nerves, colobomas, microphthalmus, and chorioretinal lacunae. However, we also need to understand how this congenital finding can have associated acquired neurologic and visual sequellae later in life. This poster reviews associated radiographic findings including: azygous anterior cerebral artery, Dandy Walker Malformation, Chiari II malformation, and arachnoid cysts, and describes how these can be associated with congenital and acquired visual and neurologic symptoms.
CASE REPORT(S): Thirty-eight eye old man with known agenesis of the corpus callosum underwent a CT scan for syncope symptoms. Radiographic findings showed absence of the corpus callosum, enlarged irregularly shaped ventricles, and a large posterior fossa arachnoid cyst causing anterior displacement of the cerebellum.
CONCLUSIONS: Agenesis of the corpus callosum may occur as an isolated condition or in association with other neurologic and ophthalmologic abnormalities. Even though this is a congenital condition, the degree of symptoms at birth varies. Patients may become symptomatic later in life due to associated neurologic findings related to the evident and possibly progressive radiographic features. Therefore, depending on the involved location, these patients may present for an eye examination because of visual changes related to an enlarging arachnoid cyst or progressing Chiari malformation.

113. **ACQUIRED BITEMPORAL PALLOR SECONDARY TO MICROCYTIC ANEMIA IN A 16 YEAR OLD PATIENT** (125450)
Ryan Bulson, OD, FAAO, Denise Goodwin, Pacific University College of Optometry

BACKGROUND: Acquired bitemporal optic nerve pallor in otherwise healthy patients requires systemic workup to rule out a toxic or metabolic etiology. In some cases, ophthalmic manifestations may be the first indicator of systemic toxicity or deficiency. Given that such conditions have the potential to improve following treatment, prompt diagnosis by the eye care provider and referral for systemic evaluation is essential.
CASE REPORT(S): A 16 year old Hispanic female presented complaining of blurred distance vision OU for the previous month. Systemic and ocular history was unremarkable. On examination, best corrected distance acuities were OD 20/50 OS 20/50 with a minor compound myopic prescription. Ocular motilities were full and pupils were equally round and reactive to light with no afferent pupillary defect. Anterior segment examination was unremarkable. Intraocular pressures were 12mmHg OU. Blood pressure was 104/50 mmHg. Dilated fundus examination revealed distinct optic discs with a cup to disc ratio of 0.2 and mild temporal pallor bilaterally. Retinal vasculature, macula, posterior pole, and peripheral retina findings were unremarkable. Color vision testing revealed a mild color deficiency OD and OS. A 30-2 visual field of low reliability demonstrated generalized depression not consistent with optic nerve appearance. The patient was referred to her primary care provider for blood work and systemic evaluation including complete blood count, thyroid stimulating hormone, and vitamin B1, B12, and folate. This workup revealed microcytic anemia secondary to iron deficiency for which

the patient was placed on a liquid vitamin supplement. Following 2 months on the supplement, visual acuity, color vision, optic nerve appearance and visual fields were normalized.
CONCLUSIONS: Anemia is a rare cause of vision loss; however, it can produce optic nerve ischemia. Anemia has been associated with ischemic optic neuropathy, papilledema, and central retinal artery occlusion. This case demonstrates the resolution of visual function in a patient following treatment for anemia.

114. **BILATERAL DISC EDEMA AS THE PRESENTING SIGN OF ANAPLASTIC LARGE CELL LYMPHOMA IN A COMBAT VETERAN** (125397)
Donald W. Rademacher, OD, Michigan College of Optometry

BACKGROUND: Anaplastic Large Cell Lymphoma (ALCL) is a type of non-Hodgkin lymphoma with a preference for invading lymphoid sinuses. ALCL is categorized based on two protein markers, anaplastic lymphoma kinase (ALK) positive or negative. ALK positive is associated with extranodal involvement of skin, bone, soft tissues and lung. Symptoms of ALCL include high fever, diplopia, ophthalmoplegia, papilledema, and variable systemic symptoms.
CASE REPORT(S): A 22 year old white male presented to the clinic with symptoms of blur, headaches, and nausea. The symptoms presented three weeks prior to examination during combat training for deployment to Afghanistan. Best corrected visual acuity was 20/25 OU. Ocular motilities were full with pupils equal, round, and reactive OU. Amsler grid revealed normal findings OD with temporal metamorphopsia OS. Posterior segment findings revealed bilateral disc edema with hemorrhage and exudates surrounding the left optic nerve. The patient was immediately sent to the emergency room for an MRI and CT of the brain and orbits with contrast. The MRI revealed six (6) multi-focal lesions in the left frontal and right temporal lobe. The patient underwent a craniotomy to remove two masses for biopsy and began chemotherapy.
CONCLUSIONS: ALCL has variable clinical presentations based upon the lymph nodal involvement. Ocular symptoms become evident with orbital or brain involvement causing compressive changes. Although the ocular involvement of ALCL is uncommon, patients may initially only experience ocular symptoms making an accurate diagnosis critical. The use of chemotherapeutic agents and surgical intervention target the involved lymph nodal tissue causing a reduction in symptoms. With successful chemotherapeutic treatment, younger ALK positive patients generally experience complete remission. It is imperative that eye care practitioners make an appropriate referral for patients with unexplained ocular symptoms for accurate diagnosis and treatment.

115. **COMPLICATIONS FROM FETAL DEMISE LEAD TO MATERNAL VISION LOSS** (125048)
Patricia M. Cisarik, OD, PhD, FAAO, Kellen Wiseman, BS, Southern College of Optometry, John Elfervig, MD, Memphis, TN

BACKGROUND: Fetal demise requires surgical abortion, which can be followed by excessive bleeding and coagulopathy due to the release of thromboplastin into the circulation. Widespread thrombus formation occurs, leading to sudden vision loss when

the eye or brain are involved.
CASE REPORT(S): A 20-year old previously healthy Hispanic female presented 2 weeks after surgical abortion due to fetal demise at 22 weeks gestation, complaining of severe vision loss OS immediately after fetus delivery. She reported normal blood pressure throughout the pregnancy, but related a blood pressure spike at delivery. Vision was improving but still subnormal. She denied visual symptoms during the pregnancy and had no past ocular or visual disorders other than refractive error. She reported an allergic reaction 3 days before the abortion to an unknown medication given to her at the emergency room for headaches, which were an episodic, pre-pregnancy issue. She took no medications. Her blood pressure at this visit was 132/87. Examination revealed a best-corrected visual acuity of 20/30 OD and 20/70 OS. Pupils, extraocular muscle function, and anterior segment were normal OU. Intraocular pressures were 16 mm Hg OU. Automated static perimetry showed a potential left homonymous hemianopia OU and central scotoma OS. Dilated fundus examination showed a pseudo-MEWDS appearance: multiple discrete, subtle yellow dots scattered through the posterior poles of both eyes, sparing the fovea OD. Macular OCT OD and OS showed central thickness less than normal for age (outside the 95% CI), and thickening inferiorly OS due to serous retinal detachment. Retinal consult confirmed the choroidopathy OU with serous detachment OS, and treatment with bromfenac ophthalmic solution BID OU was initiated. Follow-up visit 3 weeks later showed visual acuity improved to 20/20 OD, 20/25+ OS. The yellowish lesions in the fundi were unchanged, but the serous detachment had improved.
CONCLUSIONS: Fundus appearance in isolation can be misleading. History is key to determining the etiology of a choroidopathy.

116. **OCULAR EXPRESSION OF ALAGILLE SYNDROME** (125403)
Maryke Neiberg, OD, FAAO, Robert Lee, OD, Western University of Health Sciences College of Optometry

BACKGROUND: Alagille syndrome is a multisystem variably expressed autosomal dominantly inherited disorder associated with abnormalities of the liver, heart, skeleton, kidneys and eyes. The eye findings, seen in 78-98% of affected individuals, include posterior embryotoxon, decreased axial length, unilateral myopia, small corneal diameter and shallow anterior chamber. Pigmentary retinopathy is seen in approximately 32% of cases.
CASE REPORT(S): We present a male patient with the typical facial features Alagille syndrome, deep set eyes, micropthalmia, myopia and enopthalmos. The universally expressed facial features of the mutation include broad forehead, pointed chin and saddle nose. Our patient demonstrated posterior embryotoxon and unilateral retinal pigmentary degeneration. Regional peripapillary retinal pigmentation and bilateral choroidopathy with severe acuity degeneration, and angulated retinal vessels have been reported in the literature. Optic disc drusen is common(90%), optic pit and serous macular detachment can occur. The male parent of the proband expression in our case represents a de novo mutation; one of the two female siblings also affected. Cardiac disease presentation is variable, from benign heart murmurs to ventricular septal defects, tetralogy of Fallot and pulmonary stenosis. The skeletal defects present as characteristic “butterfly” vertebrae. A

small percentage of patients (2%) have intellectual disability. Depending on the exact locus of the mutation, the patient may have liver disease. The genetic locus has been mapped to two distinct locations on the JAG1 gene, and involves NOTCH 2 mutations. De Novo mutations represent the majority of cases, while 30-50% of cases are inherited.
CONCLUSIONS: The prevalence of embryotoxon is approximately 6.8% in the general eye clinic, the finding itself is not an indicator of Alagille syndrome, but if present, the anterior chamber should be carefully evaluated and the patient monitored for glaucoma. When the diagnosis of Alagille syndrome is suspected, the patient should be referred to the internist for full systemic work up, genetic work up and counseling.

117. **BILATERAL ANTERIOR UVEITIS IN A PATIENT TREATED WITH ERLOTINIB: A CASE REPORT** (125619)

R. Jacob Gunn, OD, Lynna Kim, OD, FAAO, Group Health Permanente

BACKGROUND: Erlotinib (Tarceva; Genentech, Inc, San Francisco, CA) is an antineoplastic agent approved by the Food and Drug Administration for treatment of advanced non-small cell lung cancer. To date only 1 case of bilateral anterior uveitis secondary to erlotinib has been reported in the literature (Lim LT , 2010). This poster discusses a case of bilateral anterior uveitis in a patient on erlotinib where other causes of uveitis were ruled out.
CASE REPORT(S): A 63 year old Caucasian female presented to the clinic with a complaint of "foggy vision" that persisted over the previous week. She was diagnosed with stage IV lung cancer 3 months previously, and was started on erlotinib approximately 6 weeks before she presented with symptoms. Her examination revealed a bilateral anterior uveitis that was treated aggressively with prednisolone acetate, fluorometholone ointment, and homatropine. A consult with rheumatology, review of history, and previous imaging ruled out other causes of bilateral anterior uveitis presuming the cause to be related to her erlotinib treatment.
CONCLUSIONS: Bilateral anterior uveitis may be a rare but vision threatening side effect of erlotinib. It has known ocular side effects including trichomegaly, periorbital rash with associated ectropion, persistent corneal epithelial defect (Johnson KS 2009), keratitis, and conjunctivitis (Lim LT, 2010). Lim LT, et al. published the first case of bilateral anterior uveitis secondary to erlotinib (Lim LT, 2010). This case has several similarities to that of Lim, LT et al including presentation around the 6th week after starting erlotinib treatment, and bilateral involvement, keratic precipitates, and posterior synechiae. This poster supports that erlotinib may be a cause of bilateral anterior uveitis.

118. **COINCIDENTAL MANAGEMENT OF RHINITIS WITH BEPOTASTINE 1.5% OPHTHALMIC SOLUTION** (125030)

Agustin L. Gonzalez, Richardson, TX

BACKGROUND: Drainage of topically applied medications via naso-lacrimal system has been documented as a potential way of systemic toxicity. This case presents a rather uncommon ocular complication of chronic nasal steroid use and a coincidentally beneficial nasolacrimal drainage side effect secondary to the management of allergic symptoms by the use of topical Bepotastine 1.5% ophthalmic solution.

CASE REPORT(S): A 32 year old healthy male with signs and symptoms of allergic conjunctivitis and elevated IOP after treatment of allergic rhinitis with Fluticanose Propionate (Flonase) experienced relief of allergic rhinitis and conjunctivitis after 9 weeks of treatment with Bepotastine 1.5% solution. The patient presented with signs and symptoms of allergic conjunctivitis and was currently treated Flonase for allergic rhinitis QD sometimes TID for 3 years. The clinical exam was normal with VA of 20/20 and IOP's of 24 OD and 26 OS. After 9 weeks of treatment with Bepotastine 1.5% ophthalmic solution and discontinuation of Flonase, IOP measurements were 18 OD and 19 OS. Coincidentally, patient reported relief of allergic rhinitis symptoms after treatment with Bepotastine 1.5% ophthalmic solution bid (+/- q 12 hr) for allergic conjunctivitis. Patient continues to use Bepotastine 1.5% ophthalmic solution for the treatment of ocular allergy symptoms with continued relief of allergic rhinitis symptoms.
CONCLUSIONS: Drainage via nsao lacrimal system of topically applied medications has been documented as an alternate method of systemic drug delivery potentially causing unwanted systemic side effects. In this patient the unique characteristics of the Bepotastine molecule have helped alleviate the nasal rhinitis while limiting the use of nasal steroids.

119. **A PILOT STUDY ON THE CHANGES OF PATTERN VISUAL-EVOKED POTENTIALS DURING REDUCED CONTRAST ADAPTATION** (125549)

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RESULTS: There were different characteristics in cortical activity at various spatial frequencies during the adaptation period. Compared to habitual condition, the cortical activity at high spatial frequency was reduced with the removal of goggles after 4 hours of adaptation but the activities at low and middle spatial frequencies were almost the same. During the reduced contrast adaptation period, the activity at high spatial frequency showed a subtle increase but was remained nearly constant at low and middle spatial frequencies.
PURPOSE: To investigate the electrophysiological changes at the visual cortex during reduced contrast adaptation.
METHODS: Three young adults with normal ocular health underwent the condition of acuity and contrast reduction wearing diffuser goggles for 4 hours. During the adaptation period, the subjects were allowed to undergo their daily life activities. Pattern-reversal visual evoked potentials (PVEP) were measured at four time points: habitual condition, immediate effect after goggles, 2 hours after goggle on, 4 hours after goggle on and immediate effect after removal of goggles. The patterns of checkerboard for PVEP recording were set at low (15%), middle (50%) and high (96%) contrast levels. The checkerboard sizes for measurement were at 0.4 cpd (low), 2.1 cpd (middle) and 4.2 cpd (high). The amplitude of VEP as a function of contrast under particular spatial frequency was used to study the change in cortical activity during different adaptation period.
CONCLUSIONS: Our preliminary result showed evidence of spatial frequency selective change of cortical activity during the reduced contrast adaptation. Further exploration of

the cortical activity may help to understand the underlying mechanism of reduced contrast adaptation.

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