



# Poster Presentations

*122th Annual AOA Congress & 49th Annual  
AOSA Conference: Optometry's Meeting®*

*June 19-23, 2019*

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# Poster Presentations

## Optometry's Meeting® • St. Louis, MO • June 19-23, 2019

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### POSTER SESSION #1

Thursday, June 20 from 6- 6:30 p.m.

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#### Screen #1 OD-Ocular Disease

*Electroretinographic Findings in Pityriasis Rubra Pilaris*

Laura Addy, OD  
Co-Author(s)  
Kaila M. Osmotherly, O.D.

#### Screen #2 Case Report Abstract

*OD-Ocular Disease*

*Differentiating Subclinical Retinal Detachment, Peripheral Retinoschisis, and White Without Pressure with Optical Coherence Tomography.*

Jessica Haynes, OD  
Co-Author(s)  
Mohammad Rafieetary, OD

#### Screen #3 Information Abstract

*Reactivation of Herpes Zoster*

Tony Tran, OD student

#### Screen #4 OD-Ocular Disease

*A Case of Polypoidal Choroidal Vasculopathy - Utilizing advanced imaging modalities to appreciate the Pachychoroid Spectrum of Diseases*

Nathan Traxler, OD

#### Screen #6 Scientific Abstract

*Prevalence of Visual Deficits and Dysfunctions associated with Traumatic Brain Injury (TBI): A Meta- Analyses*

Felix M Barker II OD MS  
Co-Author(s)  
Natalya Merezhinskaya PhD  
Rita K Mallia OD MPA  
DoHwan Park PhD  
Daniel W Bryden PhD  
David A Eliason MD  
COL Mark E Reynolds MD MPH  
Andrew Morgenstern, OD

#### Screen #7 Scientific Abstract

*Evaluation of Dynamic Amsler for Estimation of Visual Field in Low Vision*

Carlos Grandela, OD  
Co-Author(s)  
Tapuwa L. Chikwinya, OD, MPH  
Tracy Matchinski, OD, FAAO  
Kara Crumbliss, OD, FAAO

#### Screen #8 OD-Ocular Disease

*An Atypical Case of Retinitis Punctata Albescens*

Jeff Rabin, OD, MS, PHD  
Co-Author(s)  
Anjali Patel  
Melanie Cadavos, BS  
Jacob Hansen, BS  
Hiten Patel, BS

#### Screen #9 OD-Ocular Disease

*Ocular Complications of Intraconal Cavernous Hemangioma*

Noor Abushagur, OD  
Co-Author(s)  
Jennifer Deakins, OD, FAOO  
Andrew Kemp, OD, FAAO

#### Screen #10 OD-Ocular Disease

*Find the Culprit: A Case of Reversible Bilateral Visual Field Defect and Aripiprazole use*

Karen Choi, OD

#### Screen #11 Scientific Abstract

*Sustained IOP Control with Single or Multiple Trabecular Micro-Bypass Stents (iStent) Evaluated in Subjects with Open-Angle Glaucoma: 5 Year Outcomes*

Whitney Hauser, O.D.

#### Screen #12 OD-Ocular Disease

*Spondylometaphyseal Dysplasia with Cone-Rod Dystrophy*

Kathryn Deliso, OD

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#### Screen #13 Scientific Abstract

*Accommodative Stabilization with use of NaturalVue Multifocal Contact Lens*

Amber Zaunbrecher, OD  
Co-Author(s)  
Jennifer Dattolo, OD

#### Screen # 14 OD-Ocular Disease

*Syphilitic Optic Neuropathy*

Rebecca Hales, OD

#### Screen #15 Scientific Abstract

*Pilot Study Assessing Patient Knowledge and Understanding of Their Diagnosis*

Karen Squier, OD, MS

#### Screen # 16 OD-Ocular Disease

*Herpes Simplex Virus Keratitis*

Jacob Diedrich, OD

## POSTER SESSION #1B

Thursday, June 20 from 6:30-7 p.m.

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#### Screen #1 Scientific Abstract

*The Effect of Video Educational Media on Anti-Reflective Spectacle Lens Coating and Patient Purchasing Decisions*

Laura Addy, OD  
Co-Author(s)  
Brienne Hobbs, OD, FAAO  
Alex Christensen  
Russell Gray  
Brandon Harr  
Jamison Langston

#### Screen #2 Scientific Abstract

*The Impact of Ocular Surface Disease Signs and Symptoms on Optical Remakes*

Alexis Smith, OD candidate

Co-Author(s)  
Whitney Hauser, OD  
Michael Christensen, OD

#### Screen #3 Scientific Abstract

*Toric contact lens performance with digital devices*

Anna-Kaye Logan, OD  
Co-Author(s)  
Ananya Datta  
Kelsea Skidmore  
Chuan Hu, MD, OD  
Erin S. Tomiyama, OD  
Moriah A. Chandler, OD  
Julia S. Benoit, PhD  
James S. Wolffsohn

#### Screen #6 Scientific Abstract

*Durable IOP and medication reduction with iStent inject (second-generation trabecular micro-bypass stent) in subjects with open-angle glaucoma on 1 preoperative medication: 48-month outcomes*

Walter Whitley, OD, MBA, FAAO

#### Screen #7 BV-Biocular Vision

*Binocular Ramifications of Arteriovenous Malformation*

Carlos Grandela, OD

#### Screen #8 BV-Biocular Vision

*Amblyopia vs. Pathology in Pediatric Visual Loss: The Utility of Electrodiagnosis*

Jeff Rabin, OD, MS, PHD  
Co-Author(s)  
Emily Zediker, BS  
Brian Hatch, BS  
Kelsey Crawford, BS  
Rachna Patel, BS  
Nancy Phan, BS

#### Screen #9 OD-Ocular Disease

*Treatment and Management of Multiple Evanescent White Dot Syndrome*

Noor Abushagur, OD

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Co-Author(s)  
Jennifer Deakins, OD, FAOO  
Andrew Kemp, OD, FAAO

**Screen #10**  
**OD-Ocular Disease**

*When It's Not Your Average Chronic Central Serous Chorioretinopathy*

Karen Choi, OD

**Screen #11**  
**OD-Ocular Disease**

*Panuveitis as Presenting Sign Leading to a Diagnosis of Syphilis and HIV*

Ashley Toland, OD

**Screen #12**  
**OD-Ocular Disease**

*Malignant Hypertension*

Rashad Haddad, 4th year optometry student

**Screen #13**  
**PC-Primary Care**

*A clinical case of Trigeminal Neuralgia*

Amal Mansoor, OD

**Screen #14**  
**PC-Primary Care**

*Erythema Multiforme and Serum Sickness*

Jillian Nirenberg, OD

Co-Author(s)

Roger Juarez, OD

**Screen #15**  
**OD-Ocular Disease**

*Coat's Disease*

Mohit Adlakha, OD

**Screen #16**  
**OD-Ocular Disease**

*Orbital Pseudotumor Spectrum Disorder and Posterior Scleritis in a Systemic Lupus Erythematosus Patient*

Christopher Borgman, OD

**POSTER SESSION #2**  
**TOP 5 POSTER PRESENTATIONS**

*Friday, June 21 from 9-10 a.m.*

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**Screen #1**

**Screen #2**  
**PC-Primary Care**

*Clomiphene Citrate Induced Visual Palinopsia in Polycystic Ovary Syndrome Case*

Breanne McGhee, OD, MEd, FAAO

**Screen # 3**  
**OD-Ocular Disease**

*Obscurities and Peculiarities- Bilateral Posterior Subcapsular Cataracts, Vitritis and Optic Disc Drusen as Presenting Signs of Atypical Retinitis Pigmentosa*

Laine Higa, OD, FAAO

Co-Author(s)

Tina Choe

**Screen #4**  
**Scientific Abstract**

*Reading Efficiency on Print vs. iPad Reading*

Amanda Lallensack

Co-Author(s)

Elizabeth Pallante

Nicole DeMarco

Melanie Nielsen

Alicia Feis, OD

**Screen # 5**  
**Scientific Abstract**

*Comparison of the potential acuity meter, interferometer, and near super-pinhole in cataract patients*

Janice McMahon, OD

Co-Author(s)

Susan M. Ksiazek, MD

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## POSTER SESSION #2

Friday, June 21, 2019 from 9-9:30 a.m.

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### Screen #6 BV-Biocular Vision

*Neuro-Optometric Rehabilitation in a Patient with Visual Perceptual Deficits Following an Acquired Brain Injury*

Angela Howell, OD  
Co-Author(s)  
Lydia Luther, O.D. Candidate 2019

### Screen #7 OD-Ocular Disease

*Is it, or is it not, Pellucid Marginal Degeneration? A case series.*

Jami Parsons Malloy, OD  
Co-Author(s)  
Louis A. Frank, O.D., F.A.A.O.  
Joseph Stamm, OD, FAAO

### Screen #8 CL-Contact Lens

*Orthokeratology for Myopia Control*

Leanne Leung, OD

### Screen #9 OD-Ocular Disease

*Idiopathic Macular Hemorrhage*

Kirsten Weitzel, Optometry Student

### Screen #10 OD-Ocular Disease

*Pellucid Marginal Degeneration*

Christina Romano, BS

### Screen #11 Scientific Abstract

*Exploratory Data Analysis of Infant Patients Seen at an Academic-Based Urban Clinic from 2015 - 2018*

Tamara Petrosyan, OD

### Screen #12 OD-Ocular Disease

*Posterior Polymorphous Corneal Dystrophy (PPMD)*

Kaitlyn Bishop, Optometry Student  
Co-Author(s)

Jonathan Jacesko, OD

### Screen #13 OD-Ocular Disease

*Symptoms Preceding Signs: Atypical Presentation of Central Retinal Artery Occlusion*

Suzzane Li, OD, FAAO  
Co-Author(s)  
Danielle L. Weiler, OD, FAAO  
Huey-Fen Song, OD, FAAO

### Screen #14 Scientific Abstract

*Innovation in Education - OCTaVIA - OCT Visual Atlas iOS App*

Elena Biffi, OD

## POSTER SESSION #2b

Friday, June 21 from 9:30-10 a.m.

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### Screen #6 OD-Ocular Disease

*The Role of Imaging Techniques in the Case of Paracentral Acute Middle Maculopathy (PAMM)*

Stephanie He, OD  
Co-Author(s)  
Steven Ferrucci, OD, FAAO  
Brenda S. Yeh, OD, FAAO

### Screen #7 OD-Ocular Disease

*PXE: A Complex Genetic Disorder*

Kellen Plomski, OD, MPH

### Screen #8

*A Case of Polypoidal Choroidal Vasculopathy - Utilizing advanced imaging modalities to appreciate the Pachychoroid Spectrum of Diseases*

Nathan Traxler, O.D.

### Screen #9 PC-Primary Care

*Macular Pattern Dystrophies in Two Sisters*

Lori Gray, OD

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#### Screen #10 Scientific Abstract

*Readability of Wayfinding Signage at Midwestern Eye Institute for the Low Vision Population*

Caitlin Jomoc, B.S.  
Co-Author(s) Brianne Hobbs, OD, FAAO  
Laura Addy, OD  
Vladimir Yevseyenkov, O.D., Ph.D.  
Nicole Putnam, Ph.D.

#### Screen #11 OD-Ocular Disease

*Management of a Persistent Epithelial Defect in a Patient with Stevens-Johnson Syndromes/TENS*

Kathleen Prendergast, BS

#### Screen #12 OD-Ocular Disease

*Scleral Lenses Treatment Modality of Moderate to Severe Dry Eye Disease*

Herman Nijjar, Optometry (OD) Student  
Co-Author(s)  
Louis A. Frank, O.D., F.A.A.O.

#### Screen #13 OD-Ocular Disease

*Orbital capillary hemangioma removal in a premature infant resulting in dragged optic disc*

Emily Crump, OD in May 2019

#### Screen #14 OD-Ocular Disease

*Bilateral Papillitis Secondary to Neurosyphilis*

Maneh Gevorgyan, student

## POSTER SESSION #3

*Friday, June 21, 2019 from 12-12:30 p.m.*

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#### Screen #1 OD-Ocular Disease

*Combating Dry Eye in a GP Lens Wearer with Ocular Rosacea*

Tina Zhu, OD  
Co-Author(s)  
Robert Fintelman, MD, FACS  
Florescia Yeh, OD, FAAO, FSLs

#### Screen #2 OD-Ocular Disease

*Rethinking Risk for Hydroxychloroquine Maculopathy*  
Nicole Ethridge, OD

#### Screen #3 OD-Ocular Disease

*Emergent Giant Cell Arteritis Presenting as Unresolving Unilateral Conjunctivitis*

Kimberly Skyles, OD

#### Screen #4 Scientific Abstract

*4-year outcomes of micro-invasive glaucoma surgery with iStent inject (2nd generation trabecular micro-bypass stent) combined with topical prostaglandin*

Justin Schweitzer, OD

#### Screen #6 Scientific Abstract

*A randomized pivotal clinical trial of iStent inject (second-generation trabecular micro-bypass stents) implanted in conjunction with cataract surgery compared to cataract surgery alone*

Roberto Saenz, OD, MS, FAAO

#### Screen #7 Scientific Abstract

*Review of a digital contact lens fitting support tool for Eye Care Professionals*

Jennifer Palombi, OD, FAAO  
Co-Author(s)  
Amanda Bogers, BSc(EU), MCOptom, MBA  
Dan Prest

#### Screen #8 OD-Ocular Disease

*Roth Spots secondary to vitamin B-12 deficiency*  
Adrian Kun, OD

#### Screen #9 Scientific Abstract

*Primary Eye Care and Obstructive Sleep Apnea: An Objective Neurologic Test of Eye Movements Demonstrates Baseline Dysfunction And Improvement With Treatment*

Lori Grover, OD PhD  
Co-Author(s)  
Martina Mookadam, MD

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Michael L. Grover, DO  
Yu-Hui Chang, MPH, PhD  
Lanyu Mi  
James Parish, MD

#### Screen #10 PC-Primary Care

*Using OCT-Angiography to Evaluate Retinal Vein Occlusions*  
Pierce Kenworthy, OD, FAAO

#### Screen #11 OD-Ocular Disease

*Characteristic Imaging Findings in Acute Macular Neuroretinopathy*  
Gabriel Fickett, OD

#### Screen #12 Scientific Abstract

*Positive Predictive Value of Vision Screening Devices During Well-child Visits*  
Brittney Morales, OD

#### Screen #13 Scientific Abstract

*Establishing an Open Access Clinic to Increase Compliance with Annual Diabetic Eye Exams*  
Juan Ding, OD, PhD  
Co-Author(s)  
Manisha Anand, M.A., COA  
Shlomit Schaal, MD, PhD

#### Screen #14 OD-Ocular Disease

*Masquerades of Carotid Cavernous Fistula*  
Eun-Young Ko, BSc

#### Screen #15 OD-Ocular Disease

*Multiple Sclerosis: Making the Diagnosis when Atypical Findings are Present*  
Jacqueline Molinda, OD  
Co-Author(S)  
William Denton, OD

#### Screen #16 OD-Ocular Disease

*Stellate Nonhereditary Idiopathic Foveomacular Retinoschisis*

Kiyavash Tebyanian, OD student  
Co-Author(s)  
Kathryn Deliso, OD

## POSTER SESSION #3B

*Friday, June 21 from 12:30-1 p.m.*

#### Screen #1 Scientific Abstract

*Interim results of a prospective, randomized phase 2 study evaluating the safety and efficacy of Travoprost Intraocular Implants*  
Mitch Ibach, OD

#### Screen #2 PC-Primary Care

*Mild Vision Loss as the Sole Manifestation of a Meningioma*  
Brienne Hobbs, OD, FAAO  
Co-Author(s)  
Grace Liao, OD  
Kaila M. Osmotherly, O.D.

#### Screen #3 OD-Ocular Disease

*Pediatric Orbital Floor Fracture with Symptoms Mimicking Inferior Rectus Entrapment*  
Kimberly Skyles, OD

#### Screen #6 OD-Ocular Disease

*Toric Implantable Collamer Lens (ICL) implants in eyes contraindicated for LASIK*  
Roberto Saenz, OD, MS, FAAO  
Co-Author(s)  
Anjli Patel

#### Screen #7 Scientific Abstract

*Modern approach to assist toric lens fitting using a web-application*  
Jennifer Palombi, OD, FAAO  
Co-Author(s)  
Doerte Luensmann, PhD Dipl Ing (AO), FAAO  
Jill Woods, BSc(Hons), MCOptom, FAAO  
Shail Patel, BSc(Hons) MCOptom FBCLA

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#### Screen #8 Scientific Abstract

*Perception of Earliest Recommended Pediatric Eye Exam Age by Health Professional Students*

Eric Woo, OD

#### Screen #9 Scientific Abstract

*Improvement in Batting Performance through the Use of Stroboscopic Glasses*

Matthew Roe, OD, FAAO

Co-Author(s)

Sarah Huff

Sarah Thomas, OD

#### Screen #10 CL-Contact Lens

*Custom Scleral Lens Designs for Protection of Type I Boston Keratoprosthesis*

Melanie Frogozo, OD

#### Screen #11 OD-Ocular Disease

*Management and Treatment of Chronic Central Serous Chorioretinopathy with Eplerenone*

Yuyeng Lor, Optometry Student

Co-Author(s)

Kathryn Deliso, OD

#### Screen #12 Scientific Abstract

*The Effects of Over-the-Counter Topical Allergy Eye Drops on Soft Contact Lens Densitometry*

Hera Ansari, OD candidate 2020

Co-Author(s)

Emalea J. Deschamps, OD candidate 2020

Michael Schmalle, OD candidate 2020

Joshua Baker, OD

Grace Liao, OD

#### Screen #13 OD-Ocular Disease

*Role of Supplements in Exacerbation of Central Serous Chorioretinopathy*

Nhat Nguyen, OD

Co-Author(s)

Heather McLeod, OD

#### Screen #14 PC-Primary Care

*Continuous observation on Chinese children's ocular axial length growth with the relationship to myopia development*

Yining Shi, MD, PhD

Co-Author(s)

Yi Li, MD, PhD

#### Screen #15 OD-Ocular Disease

*Atypical Presentation of Idiopathic Intracranial Hypertension*

*Maciel Cruz, Doctor of Optometry Candidate*

Co-Author(s)

Kathryn Deliso, OD

#### Screen #16 OD-Ocular Disease

*West Nile Viral Retinitis vs APMPPE*

Kristin Kosch, B.S.

## POSTER SESSION #4

*Friday, June 21, from 3-3:30 p.m.*

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#### Screen #1 BV-Biocular Vision

*Improving Stereopsis of an Adult with Intermittent Suppression*

Patrick Stark, OD

#### Screen #2 OD-Ocular Disease

*Lamellar Hole-Associated Epiretinal Proliferation*

Jasmine Lynn, OD

Co-Author(s)

Brenda S. Yeh, OD, FAAO

Steven Ferrucci, OD, FAAO

#### Screen #3 OD-Ocular Disease

*Recurrent Non-arteritic Anterior Ischemic Optic Neuropathy*

Paige Small, Optometry Student

Co-Author(s)

Kelly Schoorens, OD

#### Screen #6 Scientific Abstract

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#### *Evaluation of Two Toric Designs and Lens Stability Performance*

Jennifer Palombi, OD, FAAO  
Co-Author(s)  
Ruben Velasquez, MSc FIACLE  
Gary Orsborn, OD, MS, FAAO, FBCLA  
Jose Vega, O.D.

#### **Screen #7 LV-Low Vision**

*CNS Lymphoma*  
Maria Nguyen, OD

#### **Screen #8 Information Abstract**

*P.A.N.D.A. Scopic Vision - The Optometrists Role in Identifying Pediatric Autoimmune Neuropsychiatric Syndrome*  
Megan Meus, OD

#### **Screen #9 Information Abstract**

*Lessons of successful provision of ophthalmic equipment and supplies to optometry schools and sustainable clinics in developing countries: VOSH/International's Technology Transfer Program (TTP)*

Tracy Matchinski, OD, FAAO  
Co-Author(s)  
Maria A. Moreira, MSc  
David Stacy, OD

#### **Screen #10**

#### **Screen #11 Scientific Abstract**

*Evaluating the visual performance of a daily disposable multifocal lens, designed with two differently powered intermediate zones*

Gary Orsborn, OD, MS, FAAO, FBCLA  
Co-Author(s)  
Jill Woods, BSc(Hons), MCOptom, FAAO  
Jalaiah Varikooty, MSc, MBBS  
Lyndon Jones, PhD, DSc, FCOptom, FAAO

#### **Screen #12 LV-Low Vision**

*Prescribing Pelli Prism for a Stroke Patient with a Bilateral Homonymous Visual Field Defect*  
Kimberly Skyles, OD

#### **Screen #13 OD-Ocular Disease**

*Bilateral peri-papillary choroidal neovascularization membranes secondary to optic nerve head drusen in a young patient*

Raman Bhakhri, OD, FAAO  
Co-Author(s)  
Patrick Yoshinaga, OD, MPH, FAAO

#### **Screen #14 LV-Low Vision**

*Diagnosis and Low Vision Management of Occult Macular Dystrophy*

Maggie Man Ki Ho, OD, MS  
Co-Author(s)  
Stephanie Schmiedecke Barbieri, O.D., F.A.A.O., Dipl. Low Vision  
Patricia C. Sanchez-Diaz, DVM, PhD, F.A.A.O.  
Jeff C. Rabin, O.D., M.S., Ph.D., F.A.A.O., Dipl. Vision Science

#### **Screen #15 LV-Low Vision**

*Spectacle Prescribing Recommendations for Visually Impaired Patients*

Tyla Girouard, 4th year Optometry Student

#### **Screen #16 OD-Ocular Disease**

*Questionable Idiopathic Roth Spot in a Pediatric Patient*  
Jared Reinert, OD Candidate

## POSTER SESSION #4B

Friday, June 21, from 3:30-4 p.m.

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#### **Screen #1 OD-Ocular Disease**

*Presumed Ocular Ischemic Syndrome Diagnosis with Coronary Computed Tomography Angiogram*

Justin Schaefer, BS

#### **Screen #2 OD-Ocular Disease**

*Differentiation between Herpes Zoster and Herpes Simplex Viruses*

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Nhi Phan, OD

#### **Screen #3** **OD-Ocular Disease**

*Vision Loss and Sensory Exotropia due to Untreated Ocular Toxoplasmosis*

Abby Small, Optometry Student

#### **Screen #6** **Scientific Abstract**

*Toric Implantable Collamer Lenses: Early United States Experience*

Roberto Saenz, OD, MS, FAAO

Co-Author(s)

Hiten Patel, BS

#### **Screen #7** **LV-Low Vision**

*Beauty Parlor Syndrome: Beauty is Pain*

Ashton Ehlers, OD

#### **Screen #8** **OD-Ocular Disease**

*Management of an Acute Traumatic Hyphema After Being Hit in the Eye with a Padlock*

Inrava Khasnabish, B.Sc., O.D.

#### **Screen #9** **PC-Primary Care**

*Life-saving paradigm shift in central retinal artery occlusion management*

Andrea Yee, OD

Co-Author(s)

Sylvia Sparrow, OD

#### **Screen #10** **CL-Contact Lens**

*Scleral Lens and Prism Management of Chronic Progressive External Ophthalmoplegia*

Rebecca Chung, OD

#### **Screen #11** **PC-Primary Care**

*Optic Nerve Coloboma*

Eun Lee, MM

#### **Screen #12**

#### **Screen #13** **Scientific Abstract**

*The Effect of Social Support and Visual Function on Perceived Stress*

Tatevik Movsisyan, OD, MS

Co-Author(s)

San-San Cooley, OD, MS

Rebecca Deffler, OD

Frederick Davidorf, MD

Bradley Dougherty, OD PhD

#### **Screen # 14** **LV-Low Vision**

*Diagnosis and Low Vision Management of Enhanced S Cone Syndrome in a Patient Showing Retinoschisis and Genetic Mutation in NR2E3.*

Maggie Man Ki Ho, OD, MS

Co-Author(s)

Stephanie Schmiedecke Barbieri, O.D., F.A.A.O., Dipl. Low Vision

Patricia C. Sanchez-Diaz, DVM, PhD, F.A.A.O.

Jeff C. Rabin, O.D., M.S., Ph.D., F.A.A.O., Dipl. Vision Science

#### **Screen #15** **OD-Ocular Disease**

*Malignant or Benign? – But not a tumor.*

Elizabeth Nace, OD

Co-Author(s)

Moshe S. Roth, OD, FCOVD;

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## **POSTER ABSTRACTS**

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### **Case Report Abstract**

**Thursday, June 20, 2019**

**6-6:30 p.m.**

#### **OD-Ocular Disease**

##### **Electroretinographic Findings in Pityriasis Rubra Pilaris**

Pityriasis rubra pilaris (PRP) is a rare dermatological condition that results in hyperkeratotic papules and scaling erythemic plaques. Systemic retinoids (vitamin A derivatives) are often prescribed, as pathogenesis of PRP may be linked to vitamin A metabolism, and studies involving retinoids have shown some effectivity in managing the uncomfortable skin manifestations. Classic electroretinogram (ERG) findings of vitamin A deficiency consist of reduced rod and cone responses with normal implicit times. Limited studies also show ERG oscillatory potentials (OPs) to be a marker of vitamin A deficiency.

A 60-year-old female was referred for ERG following diagnosis of PRP and subsequent vitamin A treatment. She had been prescribed retinoids for 4 months and denied nyctalopia or loss of vision. ERG scotopic amplitude was above an age-expected value OD and normal OS, the difference of which was attributed to prior peripheral retinal detachment OS. Multifocal ERG was also slightly reduced in amplitude at the central ring OS, though still in normal range OD and OS. Visual field and optical coherence tomography were essentially normal. One year later, scotopic ERG was reduced OU from the previous year but normal in amplitude. Unexpectedly, the ERG OPs were also diminished nearly 50% in amplitude OU from previous. Other repeat testing and fundus appearance were unchanged.

This case study is the first to our knowledge documenting electroretinographic findings in a patient with the rare condition PRP. There is limited

evidence of OP reduction due to vitamin A deficiency in humans and animal models; however, this is typically found in severe vitamin deficiency, and when vitamin A levels returned to normal levels, OPs would be expected to return to baseline. It is unclear if the proposed vitamin A metabolic changes thought to be involved in PRP pathogenesis were responsible for changes in our patient's ERG scotopic and OP amplitudes, or if a generalized inflammatory state from the PRP contributed to reduced OPs. Eye care providers should be aware of potentially sight-limiting retinopathy that may be resultant of vitamin A deficiency in PRP. Electrodiagnostic testing is recommended at initial diagnosis and throughout and following vitamin A supplementation.

*Author*

*Laura Addy, O.D.*

*Co-Author(s)*

*Kaila M. Osmotherly, O.D.*

### **Case Report Abstract**

**Thursday, June 20, 2019**

**6-6:30 p.m.**

#### **OD-Ocular Disease**

##### **Differentiating Subclinical Retinal Detachment, Peripheral Retinoschisis, and White Without Pressure with Optical Coherence Tomography**

Subclinical retinal detachment (RD) is a term used to describe shallow RD in an asymptomatic patient. Typically originating from small retinal holes or breaks and progressing slowly, the condition is often found on routine examination. Conditions such as white without pressure and peripheral retinoschisis are frequently mistaken as subclinical RD. While subclinical RD will likely require intervention, peripheral retinoschisis and white without pressure do not. Even more convoluted, peripheral retinoschisis can progress to retinal

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detachment resulting in a lesion that has components of each. A misdiagnosis of subclinical retinal detachment can result in an unnecessary urgent referral, causing undue alarm for a patient. While there are several fundus evaluation strategies that are beneficial in differentiating these conditions, optical coherence tomography (OCT) of the lesion in question can result in a definitive diagnosis. As OCT scanning techniques are generally performed to obtain information of the macula or optic nerve, the technique used to obtain peripheral OCT with the Heidelberg Spectralis will be discussed. Testing limitations with this strategy will also be discussed.

(Case 1) A 43-year-old white female with history of laser for retinal holes OD and lattice OS presents for routine six-month follow up. Examination found questionable sub retinal fluid superiorly around retinal hole and lattice, confirmed with peripheral OCT. (Case 2) A 67-year-old black female referred for retinal detachment with multiple breaks OS. On examination there was subclinical RD versus retinoschisis infratemporally OD. OCT confirmed subclinical RD requiring laser retinopexy. (Case 3) A 28-year-old black male patient referred for possible RD OD. Examination and OCT confirms white without pressure. (Case 4) A 58-year-old black female referred for retinal hole OD. Examination and OCT confirms infratemporal retinoschisis combined with subclinical retinal detachment requiring laser retinopexy. (Case 5) A 53-year-old white male referred for retinoschisis vs. retinal detachment OS. Exam and OCT confirm supratemporal bullous retinoschisis.

This case series will demonstrate the utility of optical coherence tomography (OCT) in the evaluation of subclinical RD, retinoschisis and white without pressure and the OCT characteristics of each.

*Author*

*Jessica Haynes, O.D.*

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#### Information Abstract

**Thursday, June 20, 2019**

**6-6:30 p.m.**

#### Reactivation of Herpes Zoster

Background Varicella zoster virus (VZV) causes two major syndromes: one is varicella (chickenpox-primary infection) and the other is zoster (shingles-reactivation). The average incubation period for varicella is 14 to 16 days after exposure to a varicella virus or a herpes zoster rash. The virus lies dormant in the nerve tissue after an active infection and the virus can reappear as shingles. Shingles presents as lesions on only one side of the body and is limited to a specific dermatome. Prodromal symptoms include: headache followed by tingling, itching, or sensitivity in the affected area. A rash usually develops, followed by lesions that eventually blister over. Case summary: A 49-year-old Asian female presented with a chief complaint of an itchy right eye with two papules on the right side of her face along with a rash on her lower cheek that respect the vertical line. She reported no prior chicken pox infection and recalled receiving vaccination for chicken pox 10 years ago. Ocular involvement was not seen. This suggested that the maxillary division of the trigeminal nerve is affected and corneal involvement is not expected. She was diagnosed with Herpes Zoster given the fact that there was a rash and papule on one side of her face that respect the vertical line along with symptoms of prodrome. Patient was given Valtrex 1 gram TID po for 7 days. Conclusion: Sensory nerve of the dorsal root ganglion harbors the herpes virus. If the nasociliary nerve of the ophthalmic branch of the trigeminal nerve is affected, this can lead to corneal involvement. Since this patient presented with lesions on the cheek only, this suggested that the maxillary division V2 of the trigeminal nerve is involved, which includes the zygomatico-temporal nerve, zygomaticofacial nerve, and the infraorbital nerve. I

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do not expect any corneal involvement but I expect vesicles in the upper lips, zygomatic region, lower eyelid, upper labial mucosa, and the upper hard palate. Since there is no ocular involvement present in this case, the standard of care is to take Valtrex 1 gram TID po for 7 days and return in one week.

*Author*

*Tony Tran, OD student*

#### Scientific Abstract

**Thursday, June 20, 2019**

**6-6:30 p.m.**

#### **Prevalence of Visual Deficits and Dysfunctions associated with Traumatic Brain Injury (TBI): A Meta- Analyses**

Traumatic brain injury (TBI) is common—in 2013 alone, an estimated 2.8 million people in the United States sustained a TBI<sup>1</sup>. Over 383, 947 cases of TBI were reported in U.S. service members since 2002. TBI is associated with numerous co-morbidities, including visual deficits, dysfunctions and photophobia<sup>3,4</sup>. Retrospective studies show that 65% to 79% of TBI patients report subjective visual complaints<sup>5,6</sup>. We report here meta-analyses of available published data with estimated prevalence of five visual outcomes: accommodative dysfunction (AD), convergence insufficiency (CI), visual field loss (VFL), visual acuity loss (VAL) and photophobia (PHP).

Four databases were queried (PubMed, EMBASE, EBSCO, and Cochrane Library) for relevant literature using the terms: prevalence, head injury, vision, and deficit/dysfunction for AD, CI, VFL and VAL; for PHP, the terms head injury, PHP, and topic/scope for PHP were used. Database searches yielded 2,104 unique publications related to AD, CI, VFL, and VAL; and 1,574 unique publications for PHP.

Random-effects models yielded the following combined prevalence estimates for the four

conditions: AD (40.4%), CI (36.9%), VFL (17.7%), and VAL (0.0%). Meta-regression analyses revealed that VFL was significantly more prevalent in moderate-to-severe (29.6%) compared to mild TBI (7.1%). Combined estimate for TBI-associated photophobia was 27.8% and the prevalence was highest less than 24 hours after injury. The observation that TBI-associated photophobia persists for a long time after injury was further supported by the prevalence rates from the studies with non-TBI controls. In these studies, the overall prevalence of photophobia in TBI patients (32.9%) was higher than in control patients (9.6%). Risk ratio estimates showed that immediately after TBI, patients are at >4.5 times greater risk of experiencing photophobia than non-TBI patients and that TBI patients were twice as likely to have photophobia at 12 months after the traumatic event.

Our meta-analyses demonstrate that TBI can affect the visual system in different ways in many TBI patients, and these effects can persist for a long time. However, visual acuity, which is assessed most frequently, is rarely affected.

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#### Scientific Abstract

Thursday, June 20, 2019

6-6:30 p.m.

#### Evaluation of Dynamic Amsler for Estimation of Visual Field in Low Vision

The Dynamic Amsler technique has been used by low-vision optometrists in assessing constricted visual fields for decades without published comparison to other well-established field tests. We hypothesized that Dynamic Amsler is non-inferior to Tangent Screen, Octopus perimetry, and Humphrey visual analyzer in testing patients with a central visual field of 20 degrees or less. We conducted a prospective, randomized pilot study of nine patients to evaluate Dynamic Amsler in comparison with these well-known methods, with Octopus perimeter as our standard.

Patients with a comprehensive eye exam since November 2017, visual acuity of 20/70 or better, and a documented visual field of 20 degrees or less were included in this study. Criteria for exclusion were: central scotomas, visual acuity of 20/80 or worse, visual field greater than 20 degrees in diameter, inability to accurately perform visual field testing, or no comprehensive eye exam since November 2017. After verifying visual acuity for eligibility, patients were tested with the Dynamic Amsler, Tangent Screen, Octopus perimeter, and Humphrey Visual Field 30-2. All testing was conducted in one visit, with randomized test order and breaks to eliminate fatigue. Total area of field for each test result was calculated in degrees squared. Results from tests were analyzed as a percentage of the area measured by the Octopus perimeter.

Octopus perimetry found an average area of field 88.6+/-28.5<sup>o2</sup>. Humphrey visual field 30-2 identified an average field of 26+/-23.8<sup>o2</sup> with an average percentage of 10.7+/-8.3%. Tangent screen testing had an average area of 15.9+/-6<sup>o2</sup> and average percentage of 31.7+/-19.6%.

Dynamic Amsler testing showed an average 36.7+/-12.7<sup>o2</sup> with average percentage 58+/-25.5%.

Data from this pilot study indicates inferior ability of Dynamic Amsler, Humphrey visual analyzer 30-2, Tangent Screen to replicate field area identified by Octopus perimetry in this patient population. The Dynamic Amsler performed statistically higher than Tangent Screen in average area but not percentage, and higher than Humphrey in percentage but not average area. Further testing in a larger sample is desirable to confirm these results.

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#### Case Report Abstract

Thursday, June 20, 2019

6-6:30 p.m.

#### OD-Ocular Disease

#### An Atypical Case of Retinitis Punctata Albescens

Retinitis punctata albescens (RPA, prevalence 1/800,000) is a rare variant of rod-cone dystrophy (retinitis pigmentosa or RP, prevalence 1/4000). RPA is characterized by early onset of white deposits in the mid-peripheral fundi and nyctalopia. Like fundus albipunctatus (FA), another early onset "white dot" syndrome, RPA involves a mutation in the RLBP1 gene. Unlike FA, RPA eventually includes pigment migration into the fundus often producing an RP-like appearance in elderly patients. We describe a presumed case of RPA with late onset of symptoms and signs which may have eluded early detection.

A 57-YO Hispanic female was referred to our

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Visual Neurophysiology Service from a retinal specialist to assist in diagnosis of RP or a related condition. The patient reported difficulty driving and seeing in dim settings which first began 9 years ago. VA was 20/25 OD, OS with correction for hyperopic astigmatism. Humphrey 120-point fields showed significant constriction to 20 degrees. Cone Contrast Test color testing (Innova Systems, Inc.) showed moderate decreases in red, green and blue cone sensitivity. Two color red-blue dark adaptometry, conducted during the dark adaptation phase of flash electroretinograms (ERGs), showed a 16X decrease in rod sensitivity and an 8X decrease in cone sensitivity coupled with delayed dark adaptation. Scotopic (rod only) and maximum amplitude (rod and cone) flash ERGs were non-recordable OU. Photopic (cone only) single flash and 30 Hz flicker ERGs were non-recordable as well. Multifocal ERGs (mfERGs), which reflect cone and cone-bipolar responses from multiple retinal sites, showed significantly decreased focal ERGs compared to age-matched norms. Fundus evaluation revealed multiple white-yellow fundus deposits as well as less frequent areas of black pigmentation resembling RP.

Fundus appearance, impaired dark adaptation, acquired color deficiency, decreased ERGs and constricted visual fields are consistent with RPA or a related condition. However, the late onset of nyctalopia was unexpected. We referred the patient for functional evaluation and genetic testing in our Low Vision Service, the results of which will be available soon. This case highlights the need for inter-professional communication between retinal, electrophysiological and low vision specialists to optimize vision care.

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### Case Report Abstract

**Thursday, June 20, 2019**

**6-6:30 p.m.**

### OD-Ocular Disease

#### Ocular Complications of Intraconal Cavernous Hemangioma

Cavernous hemangioma is a benign orbital tumor, most commonly seen in middle-age females. It is the most common orbital tumor in adults and is thought to be a congenital vascular malformation.

A 31-year-old black female presented with decreased vision in the right eye. The vision loss slowly became more noticeable in the past year. The patient also noted long-standing proptosis of the right eye, which had progressively worsened this year during pregnancy. She had been referred by her primary care doctor for a complete eye exam and MRI of the brain and orbits with and without contrast. She states that there has been no associated pain, headaches, diplopia or tinnitus. The patient has no pertinent medical history and is not taking any medications, though she was currently nursing. Upon initial examination, the right eye had marked proptosis, a 2.25D hyperopic shift with a best-corrected visual acuity of 20/40. Her extraocular muscles were full and unrestricted. Her right optic nerve was swollen with indistinct margins. The posterior pole had a wrinkled appearance with choroidal folds noticeable near the macula. Her b-scan was consistent with a well-defined, retrobulbar mass with anterior displacement of the orbit and optic nerve head. Her visual field test showed few scattered, non-repeatable defects. All findings in the left eye were within normal limits. The patient's MRI impression noted the presence of a large, 2 by 2 by 2.7 cm lobulated, homogeneously enhanced intraconal mass in the right orbit. The mass is interposed between the optic nerve and right

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inferior rectus. The optic nerve is elevated and displaced laterally. The most likely differential diagnosis was a cavernous hemangioma. Surgical removal of the mass was recommended in order to relieve the pressure on the orbit and optic nerve.

\*internal/external photos, OCT, b-scan, visual field, and MRI images available upon request.

Although observation is often appropriate for most cases, the symptoms of the patient and size of the lesion in this case warranted surgery. Cavernous hemangiomas are typically well encapsulated and relatively easy to remove. Visual prognosis is excellent and recurrence is rare unless the tumor is not completely excised.

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#### **Case Report Abstract**

**Thursday, June 20, 2019**

**6-6:30 p.m.**

#### **OD-Ocular Disease**

#### **Find the Culprit: A Case of Reversible Bilateral Visual Field Defect and Aripiprazole Use**

Aripiprazole (Abilify) is an atypical antipsychotic medication commonly used to treat schizophrenia. It is also widely used as adjunctive therapy to treat major depressive disorder. Despite the reduced risk of side effects in atypical vs. typical antipsychotics, the eye remains as one of the leading organs to manifest drug toxicity. It is important to follow a standard approach to monitor and be aware of potential ocular complications with the use of these agents, thereby allowing timely intervention to prevent permanent adverse visual sequelae. This case report will discuss a patient who developed severe visual field constriction during treatment with Aripiprazole, followed by complete resolution

of the visual field defects after termination of the medication.

A 50-year-old white male presents with constant “wobbling images” and difficulty recognizing faces. His medical history consists of depression, anxiety, insomnia and PTSD treated with Aripiprazole, Pregabalin and Quetiapine. Uncorrected visual acuity fluctuated from 20/40 to 20/25 in each eye. Pupils were normal without afferent pupillary defect. The anterior segment and dilated posterior segment findings were normal in both eyes. OCT imaging of the macula and optic nerve were also unremarkable. History of imaging with MRI within 6 months revealed normal findings. Humphrey visual field testing demonstrated severe bilateral constriction. The patient reported starting Aripiprazole approximately 2-3 months prior to the onset of his visual complaints. After careful review of medical treatment with the prescribing psychiatrist, the dosage of Aripiprazole was tapered then eventually discontinued. Sequential visual field testing and dilated fundus exams were obtained over the course of 15 months, for careful monitoring for any additional ocular pathology. Complete resolution of the visual field defects was demonstrated after the termination of Aripiprazole.

Patients who are prescribed aripiprazole should be properly educated on adverse effects. Other reported cases of ocular side effects with aripiprazole are blurred vision, transient myopia, and pigmentary chorioretinopathy. Although there is no established medical evidence, this case shows a clear correlation of visual field changes with the use of Aripiprazole.

*Author*

*Karen Choi, O.D.;*

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#### Scientific Abstract

Thursday, June 20, 2019

6-6:30 p.m.

#### **Sustained IOP Control with Single or Multiple Trabecular Micro-Bypass Stents (iStent) Evaluated in Subjects with Open-Angle Glaucoma: 5 Year Outcomes**

To assess IOP- and medication- reducing effects and safety of 1, 2 or 3 trabecular micro-bypass stents (iStent®) implanted in eyes with open-angle glaucoma (OAG) on topical glaucoma medication.

Subjects with OAG on 1 to 3 ocular hypotensive medications were enrolled in this prospective, randomized study. Preoperative IOP was 18-30 mmHg on medication and 22-38 mmHg following medication washout. Subjects were randomized to undergo MIGS surgery with one, two or three iStent(s) as a standalone procedure. Annual medication washout was performed to assess unmedicated IOP. The study assessed IOP and medication use, as well as standard safety parameters (i.e., BCVA, slit-lamp examination, gonioscopy findings, fundus/optic nerve evaluation, and adverse events).

Preoperatively, mean medicated IOP ranged from 19.8-20.4 mmHg and post-washout IOP was 25.0. Preoperatively, mean medicated IOP ranged from 19.8-20.4 mmHg and post-washout IOP was 25.0-25.1 mmHg in the three groups. Through 5 years postoperative, mean medicated IOP was  $\leq 18$  mmHg in all 3 groups. A  $\geq 20\%$  reduction in unmedicated IOP was achieved in  $\sim 80\%$  of multi-stent eyes and 31% of single-stent eyes. Medication was needed in significantly more single-stent eyes (22 of 38 initial eyes) than eyes with 2 or 3 stents (9 of 41 initial eyes, and 6 of 40 initial eyes, respectively). A high safety profile was observed with no reports of intra- or perioperative complications. Importantly, there were no reports of peripheral anterior synechiae, hypotony or

choroidal hemorrhage or effusion. C:D ratio remained stable through 5 years.

Outcomes through 5 years months following single- or multiple-stent implantation as a standalone procedure demonstrated safe and clinically meaningful IOP and medication reduction in patients with OAG, with incrementally greater benefits in eyes implanted with multiple stents.

*Author*

*Whitney Hauser, O.D.*

#### Case Report Abstract

Thursday, June 20, 2019

6-6:30 p.m.

#### OD-Ocular Disease

#### **Spondylometaphyseal Dysplasia with Cone-Rod Dystrophy**

Spondylometaphyseal Dysplasia with Cone-Rod Dystrophy (SMD-CRD) is a rare autosomal-recessive disorder characterized by uniform skeletal abnormalities, short stature, lower limb bowing, and cone-rod dystrophy.

A 58-year-old Kenyan female presented for a low-vision evaluation referred from the state Commission for the Blind. She states she has a longstanding history of photophobia and decreased central vision and started wearing glasses at age 5. She reports that both daytime and nighttime vision slowly declined until she was in her early twenties, at which point she was told there was nothing that could be done to improve her vision. She moved to the United States one year ago and was seen by a local ophthalmologist who diagnosed her with probable Cone Dystrophy, but she was not referred for genetic or electrodiagnostic testing to confirm. She has 7 siblings and 2 are short stature with similar vision problems. Upon questioning family history, it appears her parents were first cousins once removed. Physical evaluation demonstrated

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profound short stature, shortened limbs, and bowing of the legs. Best corrected acuities were 20/150 OD and 20/300 OS. Entrance testing was unremarkable apart from color deficiency in both eyes measured 4/14 OD and 3/14 OS with Ishihara. At the completion of the functional low-vision evaluation, the patient inquired further about the certainty and accuracy of her ocular diagnosis. A dilated exam was performed and demonstrated hypopigmented focal macular changes and peripheral pigment clumping in both eyes. She was referred to the Department of Inherited Retinal Disease for electrodiagnostic testing, which revealed markedly decreased photopic and moderately decreased scotopic ERGs, suggestive of cone-rod dystrophy. A diagnosis of Spondylometaphyseal Dysplasia with Cone-Rod Dystrophy was suggested and later confirmed with genotyping revealing a defect in the PCYT1A gene.

Clinical evidence of a retinal dystrophy can elicit further testing (including electrodiagnostic and genetic testing) in patients who may demonstrate systemic findings suggesting a multi-system syndrome. SMD-CRD is associated with recessive defects in the PCYT1A gene, and when suspected clinically can be confirmed with the Genetic Eye Disease Panel involving next-generation sequencing of all known inherited retinal disease genes.

*Author*

*Kathryn Deliso, O.D.*

#### **Scientific Abstract**

**Thursday, June 20, 2019**

**6-6:30 p.m.**

#### **Accommodative Stabilization with use of NaturalVue Multifocal Contact Lens**

Patient blur can be secondary to accommodation infacility, paresis or spasm. This retrospective case report series questions the

impact of NaturalVue Multifocal (NVMF) center distance 1-day contact lenses on the visual system of pre-presbyopic patients with accommodative disorders.

In this retrospective study, six non-presbyopic patients presented for annual eye exams with a primary complaint of blur at distance and near while uncorrected. Patients were a mix of no correction or glasses correction for reading only. No patients were previous contact lens wearers. Complete eye exams included components of: distance/near visual acuity, autorefraction, fused cross cylinder, near point of convergence, phorias at distance and near, negative relative accommodation, positive relative accommodation, accommodative push up amps, flipper bars, vergence ranges and a cycloplegic exam of the ocular external and internal structures. All patients were fit with NVMF in each eye with insertion and removal training. Exams were performed on a digital acuity chart with variable letters.

All patients experienced an improvement in both subjective and objective blur. Initial uncorrected visual acuity varied between 20/25 and 20/30 OU and improved to 20/20 OU post treatment with the NVMF. Cycloplegic refraction revealed all patients were low hyperopes. All patients reported improvements in: headache frequency, visual acuity fluxuations, length of comfortable reading time, and ability to translate from near to far.

All patients accommodative systems experienced immediate enhanced stabilization demonstrated by improvement in NRA/PRA, push up amps, near vergences and increased subjective visual comfort with the use of NVMF. Contact lenses provide same-day treatment to patients with accommodative dysfunction. Understanding this is a small sample size, continued testing of like-symptom patients is warranted for increased validity of current findings and to address the actual mechanism of action that leads to the increase in visual stability.

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Additionally, expansion into vergence disorders and their reaction to the aspheric rapid plus power of the NVMF is merited.

*Author*

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*Co-Author(s)*

*Jennifer Dattolo, O.D.*

#### **Case Report Abstract**

**Thursday, June 20, 2019**

**6-6:30 p.m.**

#### **OD-Ocular Disease**

#### **Syphilitic Optic Neuropathy**

Syphilis is caused by the bacteria *Treponema pallidum* and this bacterium can spread to the CNS within days after exposure. Clinical manifestations can occur at any stage of the infection and can include asymptomatic neurosyphilis. The majority of cases are reported in HIV-infected patients but the epidemiology is not well-defined. Systemic and ocular involvement of syphilis can be described in three stages with the tertiary stages being the most severe and involving the CNS.

A 76-year-old white male presented to the clinic complaining of floaters in the left eye that had been occurring for one week. He also noticed a black line that looked like an EKG line and lasted about 10 seconds and did not recur. His systemic health is significant for HIV, hypothyroidism and COPD. Ocular history includes blepharitis, normal tension glaucoma suspect, choroidal nevus of the left eye and early cataracts. Visual acuity was 20/40 in the right eye and 20/25-2 in the left eye. Pupils showed a mild apd in the left eye. On dilated fundus examination the c/d ratio was 0.5 in the right eye and 0.1 in the left eye with no appreciable cup. The left optic nerve head had significant swelling with hemorrhages and cotton wool spots. Ancillary testing was performed and the OCT of the optic nerve head showed correlating swelling of

the retinal nerve fiber layer. Blood work was ordered for the patient and the syphilis IgG/IgM AB and RPR panel were reactive. The patient was treated with IV Penicillin G and followed up closely.

Optic neuropathy can be caused by demyelination, inflammation, ischemia, infiltration, compression, hereditary, as well as toxic/nutritional causes. It is essential that patients undergo careful clinical evaluation and diagnostic testing to find the underlying cause of the optic neuropathy. In cases with a suspected etiology of syphilis, ordering specific testing such as MHA, TPPA, IgG/IgM, and HIV status is imperative. Recognition of cases such as this not only has an effect on the visual prognosis of patients but the neurological prognosis as well.

*Author*

*Rebecca Hales, O.D.*

#### **Scientific Abstract**

**Thursday, June 20, 2019**

**6-6:30 Pp.m.**

#### **Pilot Study Assessing Patient Knowledge and Understanding of Their Diagnosis**

Patient understanding of his or her diagnosis is one of the first steps to successful vision rehabilitation (1). Successful rehabilitation benefits from a patient who is knowledgeable about their condition and has a reasonable understanding of his or her prognosis (2). However, patients referred to a low-vision rehabilitation clinic have a variable understanding of their vision loss and limited understanding of prognosis, which influences rehabilitation outcomes. The aim of this study was to assess patient knowledge of their diagnosis and how patients learn about their ocular condition.

A questionnaire was administered to 50 new patients in low-vision clinics pre- and post- low-vision exam in an urban setting. Questions related to understanding of their diagnosis as well as their access to information about their diagnosis were

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asked.

Before their low-vision examination, 76% of patients reported they knew what the cause of their vision loss was, however only 62% were able to name the condition correctly. Fourteen percent of participants felt their diagnosis had not been explained to them. After their low-vision examination, 98% felt confident in their ability to name their condition with 86% being correct. As for resources to learn about their condition, exactly half of the participants did not have access to the internet to research his or her visual diagnosis. Of those with internet access only 12 patients looked up information about their vision loss online. Other sources utilized were books, a family doctor, journals, a technician or an optometrist; however, only half of patients reported using those resources.

This study suggests patients presenting to low-vision clinics for the purpose of rehabilitation may require additional education regarding their diagnosis. Additionally, attention to gaps in health literacy in this population should be considered to improve rehabilitation outcomes.

*Author*

*Karen Squier, O.D., MS*

#### **Case Report Abstract**

**Thursday, June 20, 2019**

**6-6:30p.m.**

#### **OD-Ocular Disease**

#### **Herpes Simplex Virus Keratitis**

The Herpes Simplex virus is one of the most common viruses that affects the human body. There are two types of the herpes simplex virus, with HSV type 1 affecting the oropharynx region of the body. HSV type 1 can manifest itself to the ocular surface and will most commonly cause epithelial keratitis. If not managed properly, the virus has the ability to cause further damage to

other corneal layers, which can ultimately lead to blindness.

A 59-year-old white female presented to the clinic complaining of discomfort, irritation and scratchiness OS that had been constant for the past 4 days. The patient also reported associated symptoms of photophobia, watering and reduced vision OS, and she denied any relieving factors. The patient presented with corrected distance visual acuities of CF@1ft and NIPH OD with reduction due to long-term history of optic atrophy, and 20/50 with NIPH OS. Pupils were measured in dim light at 4mm OD and 3mm OS with a mild APD OD. Slit lamp examination revealed two epithelial dendritic corneal ulcers OS. No stromal involvement and no anterior chamber reaction were observed.

This patient was diagnosed with Herpes Simplex Virus keratitis OS based on the patient's complaint and the clinical findings. The patient was prescribed oral Valtrex 500mg PO TID and 1gtt Zirgan 5x/day OS. At the 2-day follow-up, there was no observable improvement of the dendritic corneal ulcers, so a BioDOptix amniotic membrane was inserted OS. One week following the initial presentation, the dendritic corneal ulcers had completely resolved with no corneal scarring and vision improved to 20/30 OS.

In cases in which there is no improvement of HSV epithelial keratitis following topical treatment, an alternative treatment may be sought out to improve the rate of resolution. An amniotic membrane is a useful medical device to aid in the treatment of any corneal epithelial disease. The regenerative components of an amniotic membrane allow for it to be a beneficial option for HSV keratitis because of its ability to reduce inflammation, promote re-epithelialization, and reduce corneal scarring.

*Author*

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#### Scientific Abstract

Thursday, June 20, 2019

6:30-7 p.m.

#### **The Effect of Video Educational Media on Anti-Reflective Spectacle Lens Coating and Patient Purchasing Decisions**

Patient education facilitates shared decision-making, improves satisfaction and empowers patients to become advocates for their health. Proper education also can lead to increased revenue potential in an optical setting by informing patients how to optimize visual performance. This study evaluated the impact of a novel educational video on spectacle antireflective coating (ARC) purchases.

Subjects were selected among patients receiving a spectacle prescription during their exam at the Midwestern University Eye Institute (MWUEI.) Subjects were given a brief survey assessing current level of understanding of ARCs using a five-point Likert Scale, and asking if ARC was used in their habitual spectacles. They then watched a two-minute video explaining the function and purpose of ARC. A follow-up survey assessed knowledge of ARCs post-video viewing, and likelihood of purchase. Optical purchases were tracked and the rate of ARC was compared to a random sample of controls from the same exam dates, and to a national average as reported by MWUEI's primary lab.

Among 40 subjects, 63% reported little to no knowledge of ARC prior to the video. After the video, this rate dropped to 0%, with 70% reporting very good to excellent knowledge. Converting to a 1-5 numerical scale, average understanding improved from 2.2 to 3.9 points ( $p < 0.001$ ). Prior to the video 39% were unsure if ARC was present on their current spectacles. After the video, 78% said they were either very likely or definitely would purchase ARC, with 0% who definitely would not purchase. This was consistent with actual

purchases, with 75% of spectacles including ARC. The overall MWUEI ARC rate was 65% during the study period, and the national rate was 61%.

This study demonstrates that a short video could positively impact patient purchasing decisions. This intervention was easily implemented, well-received and generally effective. Subjective knowledge of ARC improved substantially. Better informed patients are more informed consumers, making them more likely to invest in a product that can improve visual function. It's possible that this methodology can be applied to other health care topics to improve patient understanding and enhance overall well-being and quality of life.

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#### Scientific Abstract

Thursday, June 20, 2019

6:30-7 p.m.

#### **The Impact of Ocular Surface Disease Signs and Symptoms on Optical Remakes**

Dry eye disease (DED) is a chronic, progressive condition that has been demonstrated to lead to reduced functional visual acuity. Patients complaining of reduced visual acuity with their spectacles may request an optical remake. DED may be the cause of the reduced visual acuity rather than the optical quality of the spectacles.

A pilot study was conducted to determine if DED contributed to optical remakes. Thirty-seven patients who requested optical remakes and 17 control patients satisfied with their glasses at the time of dispense were enrolled in the study.

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Potential subjects were excluded for pregnancy or nursing, diabetes, recent surgery, corneal surgery, or if they were younger than 18 years old. Pertinent case history, demographic data, and Ocular Surface Disease Index (OSDI) were collected from subjects. Initial and average non-invasive keratography break-up time (NIK BUT) were taken on subjects via the Oculus Keratograph 5M. After one week, control subjects were called to determine if they were still satisfied with their glasses.

Compared to participants satisfied with their glasses, participants who requested optical remakes showed significantly worse NIK BUT OD, and worse NIK BUT OS (which approached significance). Participants who requested optical remakes showed worse OSDI than participants satisfied with their glasses, but this result was not statistically significant.

A larger sample size in future studies may shed more light on whether optical remakes are related to DED.

*Author*

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*Co-Author(s)*

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*Michael Christensen, O.D.*

#### **Scientific Abstract**

**Thursday, June 20, 2019**

**6:30-7 p.m.**

#### **Toric Contact Lens Performance with Digital Devices**

It is known that patients with low amounts of astigmatism may achieve better visual acuity with toric versus spherical soft contact lenses. Visual demands today incorporate a significant amount of time utilizing digital devices. This study measured subjective and objective outcomes of astigmatic patients wearing toric contact lenses using real-world digital devices.

Participants, ages 20-38 years with -0.75 to -1.50D of astigmatism were enrolled in this double-masked, crossover study. Participants wore Alcon Dailies Aqua Comfort Plus Sphere and Toric contact lenses in a randomized order. High and low contrast near LogMAR visual acuity was measured. Reading performance was assessed using two custom-made iPad applications; one utilized the Radner reading sentences test and calculated critical print size and optimal reading speed (ORS), while the other app used website articles and analyzed zoom and contrast modifications as well as the distance at which the iPad was held. Participants completed Near Acuity Visual Questionnaires (NAVQ), and were asked their preferred contact lens correction at the conclusion.

Thirty-four participants completed the study. Toric lens correction improved near high and low contrast visual acuity by 0.5 to 1 full line ( $p < 0.0001$ ). This translated to reading performance, where participants also read about one line smaller text on the iPad ( $p = 0.013$ ). There was no significant difference in ORS above threshold acuity ( $p = 0.48$ ). Participants increased the zoom about 10% ( $p = 0.0039$ ) and the contrast about 5% ( $p = 0.006$ ) more with spherical compared to toric lenses during the reading articles functional vision test. Participants held the iPad at approximately the same distance, about 33 cm ( $p = 0.6304$ ). Participants reported improved satisfaction by the NAVQ ( $p = 0.0002$ ) and noticed the most benefit with tasks such as reading small print, reading labels/instructions, and conducting near work. Eighty-five percent of participants preferred the toric contact lens correction ( $p < 0.0001$ ).

Participants were able to read smaller print size more comfortably, and preferred the toric lens correction compared to the spherical equivalent lens correction. This study demonstrated realistic benefits of fitting toric lens designs for astigmatic patients using digital devices.

*Author*

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## Poster Presentations

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*Anna-Kaye Logan, O.D.*

*Co-Author(s)*

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#### Scientific Abstract

**Thursday, June 20, 2019**

**6:30-7 p.m.**

#### **Durable IOP and Medication Reduction with iStent Inject (Second-generation Trabecular Micro-bypass Stent) in Subjects with Open-angle Glaucoma on 1 Preoperative Medication: 48-month Outcomes**

Micro-invasive glaucoma surgery (MIGS) is gaining popularity as an effective treatment for patients with glaucoma. This study evaluates the safety and IOP-lowering efficacy of 2 second-generation trabecular micro-bypass stents (iStent inject®) implanted as a standalone procedure in subjects with open-angle glaucoma (OAG) not controlled on one ocular hypotensive medication.

This is a prospective, single-arm study that enrolled subjects with OAG not controlled on a single ocular hypotensive medication whose preoperative IOP was 18-30 mmHg (medicated) and 22-28 mmHg (after medication washout). 1 Qualified subjects underwent implantation of 2 iStent inject stents as a standalone procedure without concomitant cataract surgery.

Assessments performed over the course of the study included IOP, medication burden, adverse events, visual acuity, slit-lamp, gonioscopy, and fundus/optic nerve examinations.

A total of 57 qualified subjects were enrolled in this study and all completed 48 months of follow-up. Preoperative mean medicated IOP was  $19.5 \pm$

1.5 mmHg and post-washout IOP was  $24.4 \pm 1.3$  mmHg. Postoperative mean IOP was 13.2 mmHg at M48 (representing a 32% and 46% reduction from medicated and washed-out baseline measures, respectively). IOP was observed to be 14.6 mmHg or lower at all timepoints assessed through M48. At M48 95% of subjects achieved both an IOP  $\leq 18$  mmHg and a reduction of  $\geq 20\%$  on no medication compared to preoperative, unmedicated IOP. All but 3 subjects remained medication-free out to 48 months. An overall favorable safety profile was observed with no intraoperative or device-related AEs. There were no reports of peripheral anterior synechiae or hypotony. Best-corrected VA of 20/40 or better was achieved in 93% of eyes. Optic nerve and visual fields remained essentially unchanged at M48 versus preoperative.

Long-term outcomes from this study demonstrate safe and sustained reduction of IOP in eyes with OAG following implantation with iStent inject stents performed as a standalone procedure. The study demonstrated that IOP reduction to  $\leq 15$  mmHg with elimination of medication can safely be achieved out to 48 months post-surgery. These findings of iStent inject show significant beneficial outcomes.

*Author*

*Walter Whitley, O.D., MBA, FFAO*

#### Case Report Abstract

**Thursday, June 20, 2019**

**6:-6:30 p.m.**

#### **BV-Biocular Vision**

#### **Binocular Ramifications of Arteriovenous Malformation**

An Arteriovenous Malformation is an abnormal tangle of blood vessels in the central nervous system that forms without a capillary bed, allowing direct exchange of blood from arteries to veins.

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This tangle is thought to form during fetal development and may be asymptomatic for many years. Although rare (1 in 100,000), it can have devastating effects. AVMs pose an increased risk of aneurysms and hemorrhaging in the brain. Resulting symptoms include severe headaches, vomiting, seizures, severe pain, muscle weakness, paralysis, visual disturbances, mental confusion, and more.

A 26-year-old black female presented for intermittent horizontal binocular diplopia and glare that began in 2014 after a stroke. She reported a history of Arteriovenous Malformation over the right cerebellum since birth that became symptomatic in 2012 with vomiting and headaches. She had since undergone multiple neurosurgeries for treatment and reported that the 2014 stroke was a complication to her second surgery. The stroke resulted in muscle weakness, poor mobility, verbal difficulties, nystagmus and diplopia that has improved but never fully resolved. She had previously been prescribed plano glasses with 10 prism diopters of base out for the diplopia, but was intolerant of the prism. Visual acuity was measured at 20/20 OD, OS and 20/15 OU. She demonstrated orthophoria at distance and near, full ocular motility, 25" of stereo vision, accommodative amplitudes of 8 in each eye, and near point of convergence at 4cm with recovery at 7cm. Vergence testing with prism bar showed BO: x/14/8 and BI: x/0/2 at distance and BO: 10/14/8 and BI: 10/14/8 at near. Trial frame refraction was plano in both eyes, however diplopia resolved with use of 2-4pd BO OU. All other testing was unremarkable.

This patient was prescribed 3pd BO OU in plano glasses with photochromic and tint options for glare and then referred for a vision therapy evaluation. She was counseled on how therapy to strengthen vergence and accommodative skills would be beneficial and could reduce long-term reliance on prism. Therapy may also benefit further ocular symptoms of AVM.

*Author*

*Carlos Grandela, O.D.*

#### **Case Report Abstract**

**Thursday, June 20, 2019**

**6:30-7 p.m.**

#### **BV-Biocular Vision**

#### **Amblyopia vs. Pathology in Pediatric Visual Loss: The Utility of Electrodiagnosis**

Strabismus, anisometropia or visual deprivation (e.g., unilateral monocular cataract) are amblyogenic factors that often eventuate in decreased acuity (VA) and stereopsis. However, the etiology can be less clear, particularly if the condition includes organic factors such as optic nerve hypoplasia as well as failure to respond to amblyopia therapy. We describe a 5-year-old female referred to our Visual Neurophysiology Service (VNS) to distinguish between amblyogenic and organic bases for decreased vision.

A 5-year-old white female in good general health was referred from pediatric ophthalmology to determine if decreased VA OD and lack of response to amblyopia therapy was due to undiagnosed pathology. The patient had moderate hyperopic astigmatism, which was not corrected until age two and her grandmother noted that prior to correction her right eye turned inward frequently, indicating right esotropia early in life as the basis for her current decreased vision. Correction of the hyperopia improved ocular alignment, resulting in an intermittent right exotropia. However, the patient has not responded to traditional amblyopia therapy and was referred with VA of: OD 20/125, OS 20/50. Refraction revealed an improvement in vision OD to 20/70. While entering VA OS was 20/50+1 due to atropine penalization OS refraction to best VA was deferred. Gross stereopsis was present and cover test confirmed small angle intermittent exotropia OD. Visual evoked potentials (VEPs), which assess central vision at the visual cortex, revealed decreased amplitude and delayed latency OD while OS was normal both consistent

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with amblyopia. Electroretinogram (ERG) cone flicker responses and ERG photopic negative responses, which measure cone, bipolar and ganglion cell function, were normal and equal OU providing evidence of normal retinal and optic nerve function as expected in amblyopia. Sweep VEPs across a range of pattern sizes showed comparable responses from each eye indicating potential for improved vision OD with updated correction and continued amblyopia therapy emphasizing reward-based eye-hand coordination tasks during patching.

Electrodiagnosis helps eliminate organic bases for visual loss in pediatric amblyopia. This case also exemplifies the importance of inter-professional collaboration in patient care.

*Author*

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*Rachna Patel, BS*

*Nancy Phan, BS*

#### **Case Report Abstract**

**Thursday, June 20, 2019**

**6:30-7 p.m.**

#### **OD-Ocular Disease**

#### **Treatment and Management of Multiple Evanescent White Dot Syndrome**

Multiple Evanescent White Dot Syndrome (MEWDS) is a rare, idiopathic disease most commonly seen unilaterally in middle-age females, and can sometimes present before a viral illness. It can cause acute, painless vision loss, photopsia, color-vision changes, or visual field loss.

A 30-year-old black female presented with sudden onset flashes of light in her temporal visual field of the right eye. The flashes began one week

prior. She also was experiencing associated headaches and light sensitivity. The patient had no pertinent medical history and was not taking any medications. Upon initial examination, the right eye had a best-corrected visual acuity of 20/50 with multiple, distinct, flat, gray-white lesions scattered throughout the retina. No holes, tears or detachments were noted. Fundus autofluorescence showed hyper-autofluorescence corresponding to the retinal lesions. The optical coherence tomography (OCT) of the macula showed disruption of the photoreceptor integrity line. The visual field showed an enlarged blind spot. All findings were normal in the left eye. Two weeks later, the right eye had a best-corrected visual acuity of 20/25 with very subtle gray-white lesions scattered throughout the retina. Fundus autofluorescence showed very subtle areas of hyper-autofluorescence. The OCT of the macula remained the same. The visual field no longer had an enlarged blind spot. All findings were normal in the left eye. Two months after the initial examination, both eyes had a best-corrected visual acuity of 20/20. The OCT of the macula was normal in both eyes. All further testing was unremarkable in both eyes and complete resolution was seen.

This case demonstrates resolution through serial fundus photography paired with fundus autofluorescence of MEWDS. MEWDS is a self-limiting disease that resolves over several weeks without any treatment. Recurrence is rare and visual prognosis is excellent.

*Author*

*Noor Abushagur, O.D.*

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#### Case Report Abstract

Thursday, June 20, 2019

6:30-7 p.m.

#### OD-Ocular Disease

##### When It's Not Your Average Chronic Central Serous Chorioretinopathy

Fluticasone propionate (Flonase®, GlaxoSmithKline, Brentford, London), widely available over-the-counter, represents an inhaled corticosteroid agent inhibiting phospholipase A2 inflammatory cascades associated with allergic rhinitis and sinusitis. Corticosteroids are utilized to help manage systemic inflammatory conditions ranging from auto-immune and inflammatory disease to surgical healing. Well documented adverse effects from corticosteroid use include predilection for infection, hyperglycemia, ocular hypertension and central serous chorioretinopathy. This case discusses a patient who presents with PPRS and serous maculopathy after the use of intranasal corticosteroids.

A 67-year-old male presented with complaints of a "green ring" in the center of his vision OS. Medical history includes hypertension, hyperlipidemia and seasonal allergies treated with Losartan, Amlodipine and Flonase. Best corrected visual acuity (BCVA) was 20/20 in each eye. Pupils, confrontation fields, and ocular motility were all unremarkable. Amsler grid revealed metamorphopsia in the central 5° of fixation OS. The patient had normotensive IOPs. Slit lamp examination revealed a flat macula with mild retinal pigment epithelium (RPE) mottling OS, otherwise unremarkable ocular health OU. The patient was diagnosed with macular mottling OS and recommended to return at his annual exam. The patient returned the following year with the same visual complaints. BCVA was 20/20 OD and reduced to 20/30 OS. Fundusoscopic examination yielded macular edema and intraretinal thickening

adjacent to the optic nerve. Retinal consultation confirmed OCT and examination findings of the presence of peripapillary retinoschisis (PPRS) OU and central serous chorioretinopathy OS. Fluorescein angiography showed late multifocal stippled leakage with no evidence of neovascularization. Micro-pulse grid laser was administered; the resolution of retinal edema remains continuously monitored.

Central serous chorioretinopathy has been previously linked to the use of systemic corticosteroids, altering ionic pump function and blood-aqueous barrier permeability along the retinal pigment epithelium. Peripapillary retinoschisis is most commonly associated with congenital optic nerve anomalies and glaucomatous optic neuropathy. Although the pathophysiology behind PPRS remains unclear, environment factors should be considered as potential triggers for acquired PPRS. A temporal relationship of therapy and similar retinal findings have been previously reported. Further investigation is indicated to elucidate the temporal relationship and possible cause-effect.

*Author*

*Karen Choi, O.D.;*

#### Case Report Abstract

Thursday, June 20, 2019

6:30-7 p.m.

#### OD-Ocular Disease

##### Panuveitis as Presenting Sign Leading to a Diagnosis of Syphilis and HIV

Syphilis, a sexually transmitted bacterial infection, is increasing in incidence worldwide. Ocular manifestations are rare and represent a subtype of neurosyphilis. Syphilis is the most common bacterial co-infection in HIV-positive patients, and the ocular manifestations of syphilis are often more severe in HIV-positive patients.

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Panuveitis has been reported to be the most common ocular manifestation of syphilis, especially in HIV-positive patients. Although the association between uveitis, syphilis, and HIV is well-documented, it is thought to be rare for uveitis to be the initial clinical sign leading to a syphilis and HIV diagnosis.

In this case, a 31-year-old white female presented complaining of floaters and decreased inferior vision in her right eye. She had visited the ER the week before for dizziness, loss of appetite, fatigue, and a sore mouth and nose for the prior three months. She also reported losing 120 pounds in the past year without trying. Ulcers on the tongue and nose were noted during the ER exam. The ER physician initially diagnosed UTI and possible thyroid problems. Upon ocular examination, the patient was found to have panuveitis more severe in the right eye than the left. Bloodwork was ordered to determine the cause of panuveitis. RPR, FTA-ABS, and VDRL were reactive, and neurosyphilis was confirmed with a lumbar puncture. HIV testing was ordered following syphilis diagnosis, and the patient was diagnosed with HIV with a normal CD4 count. The patient's ocular signs and symptoms improved dramatically with IV penicillin treatment, and she was scheduled to begin HAART treatment.

Although syphilis is a rare cause of uveitis, the incidence of syphilis is increasing. Optometrists should consider syphilis as an etiology of uveitis, and remember that HIV is a common co-infection in patients with syphilis. Ocular signs can be critical in identifying the correct initial diagnoses and guiding proper ocular and systemic treatment.

*Author*

*Ashley Toland, O.D.*

#### **Case Report Abstract**

**Thursday, June 20, 2019**

**6:30-7 p.m.**

#### **OD-Ocular Disease**

#### **Malignant Hypertension**

Malignant hypertension occurs when blood pressure exceeds 180/120, leading to damage of one or more organs in the body. This condition is rare and only affects around 1% of people with high blood pressure but when manifests is detrimental due to risk of stroke or death. There are many causes such as discontinuing blood pressure medications, kidney failure, tumor of the adrenal gland, and more. Dilated fundus examinations are a critical diagnostic element in the diagnosis of malignant hypertension because of the classic appearance it will have with fundus evaluation, and optometrists should be aware of the significance in prompt diagnosis and treatment.

A 49-year-old new female patient came in as an emergency walk-in with a complaint of noticing a black spot in her vision in the left eye. It started a week ago and is ongoing. She also noticed that she has been getting headaches, which started around the same time and have been getting gradually worse. Visual acuity was 20/30+2 in the right eye and 20/40 in the left eye with no improvement with pinhole in the left. Preliminary tests were all normal and anterior segment was unremarkable. IOP was 16 mmHg for both eyes. Fundus evaluation showed bilateral disc edema with scattered flame-shaped hemorrhages, cotton wool spots, and arteriovenous nicking in both eyes. OCT of the macula revealed bilateral serous retinal detachment and OCT of the optic nerve agreed with edematous nerve appearance on fundus evaluation. Due to bilateral disc edema, blood pressure readings were measured and significantly elevated at 196/126. She was urgently referred to her primary care physician to manage

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her blood pressure and to return for re-evaluation in 3 weeks.

Treatment of malignant hypertension is emergent due to risks of irreversible damage but must be done in a controlled setting as decreasing one's blood pressure too fast can also cause damage. It is important for patients to see their internist for treatment. Patients with hypertension should have regular fundus examinations to monitor for sudden changes in retinal vasculature, lesions or edema.

*Author*

*Rashad Haddad, fourth-year optometry student*

#### **Case Report Abstract**

**Thursday, June 20, 2019**

**6:30-7 p.m.**

#### **PC-Primary Care**

#### **A Clinical Case of Trigeminal Neuralgia**

Trigeminal neuralgia is a chronic pain that affects the trigeminal nerve. There are two types: the classic form, which is a sudden sporadic shock that lasts for minutes, or an "atypical attack," described as a chronic stabbing pain. The trigeminal nerve is divided into three branches: the ophthalmic, mandibular and maxillary. Trigeminal neuralgia can be caused by blood vessels pressing on the trigeminal nerve as it exits the brain stem, causing damage to the myelin sheath or caused by a tumor.

A 62-year-old female complains of headache and chronic pain above her right eye that has persisted since an injury when she fell in the summer of 2018. She states that the pain's severity is 8/10 and has not taken any medication. The headache radiates from the back of head to behind her right eye. Patient has a history of schwannoma, sinus surgeries and Hashimoto's disease. The patient used a nasal spray, which helped her sensation of "throbbing." History of

vision loss is described as a curtain that came over her vision when she woke up one year ago. It has not happened since this occurrence. The patient denies any flashes of light, floaters, discharge or watering. Ocular manifestations include entering VA of 20/20 OU, EOM OU (-) Diplopia (-) Pain, CVF FTFC OD, OS. Anterior and posterior segment were unremarkable. Patient was educated on condition and on possible length of duration. The patient began to become emotionally upset during the exam and began to cry. She was referred to ambulatory care to see a nurse in primary care for pain-relieving medication secondary to emotionally unstable behavior due to trigeminal neuralgia. The patient was also given a neurological consult and will return to clinic after to perform a VF 24-2.

Patients with trigeminal neuralgia suffer from chronic, persistent pain that may need to be treated with pain-relieving medication. Many times, the patient's signs and symptoms are ignored because of lack of physical evidence. A diagnosis is based on the signs/symptoms, a patient history and clinical evaluation including a neurological consult.

*Author*

*Amal Mansoor, O.D.*

#### **Case Report Abstract**

**Thursday, June 20, 2019 6:30-7 p.m.**

#### **PC-Primary Care**

#### **Title: Erythema Multiforme and Serum Sickness**

Erythema Multiforme is a type IV hypersensitivity reaction that can present with a varying degree of severity. Symptoms can range from a mild upper respiratory tract infection and rash to influenza-like symptoms. Over half of the cases of erythema multiforme are related to medication use. Serum sickness is when the immune system reacts to a medication that contains foreign proteins. Symptoms develop one

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to three weeks after starting a medication and can present with fever, hives, itching, joint pain, joint swelling, swollen lymph nodes and rash. Both of these conditions can have ocular side effects such as blurred vision, keratoconjunctivitis sicca, and trichiasis that can lead to scarring.

A 2yo 3 month Hispanic female presented to her nurse practitioner with an internal hordeolum of her left inferior eyelid. She was treated with a course of Amoxicillin suspension, 400mg/5mL for 10 days, the appropriate dose for her age and weight of 12kg (26lbs). The hordeolum did not completely heal after the 10-day treatment. She was then placed on a 10-day treatment of Amoxicillin + Clavulanic acid, 600mg/5mL suspension. On day 19 of antibiotic treatment, the patient developed "target-shaped" skin lesions on her upper chest. The patient was brought to the ER and diagnosed with erythema multiforme and serum sickness. All antibiotic medication was immediately stopped and she was placed on Diphenhydramine HCL 12.5mg (Pediatric Benadryl), 5 mL every 6 hours, as well as Ibuprofen 100 mg every 4-6 hours for swollen joints as needed. Acetaminophen 160 mg every 6 hours, was given as needed for fever. Her condition was monitored daily until it resolved.

Hospitalization may be necessary to treat the sequelae of erythema multiforme when mucous membranes show signs of an inflammatory response. Systemic steroids are an option for treatment, but there is some controversy in literature as to when and how to use them. Most cases are self-limited and subside within two to three weeks of onset. Symptoms from serum sickness clear up in a few weeks with antihistamine and NSAID treatment.

*Author*

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*Co-Author(s)*

*Roger Juarez, O.D.*

### Case Report Abstract

**Thursday, June 20, 2019**

**6:30-7 p.m.**

### OD-Ocular Disease

### Coat's Disease

Coat's disease is an idiopathic retinal vascular disease that involves telangiectasia and massive exudation. The exudation can be intraretinal and subretinal, which can lead to exudative retinal detachment. It is unilateral 80% of the time affecting mainly young males with no racial predilection. Its clinical presentation involves unilateral vision loss strabismus and leukocoria.

An 18-year-old Hispanic male presented to the clinic complaining of decrease in the vision from right eye with onset of 3-4 weeks. He says that his vision has always been 20/20 in both eyes during his school screenings. This was his first eye exam. He denied any trauma/injuries or surgeries to his eyes. His system and ocular health was unremarkable as well as his family's ocular and health history. Visual acuity was CF@5ft in the right eye and 20/20 in the left eye. Pupils showed 2+ APD in the right eye. All other entrance testing was unremarkable. On SLE, there was a noticeable leukocoria during retroillumination over right eye. DFE showed massive exudation from 4-12 O'clock with sectoral retinal detachment in the right eye. Left eye was unremarkable. The c/d ratio was estimated to be 0.30 h/v for right and left eye. Ancillary testing was done by doing a montage fundus photo of the right eye. Patient was referred to Boston Medical Center where cryotherapy was done with 35 spots in the right eye. Time course of Coat's disease was unclear, but presentation suggests a degree of chronicity. Patient is being closely followed by retina specialist at Ophthalmic consultants of Boston.

Coat's disease has acute exacerbations followed by periods of quiescence. It tends to wax

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and wane thus it is crucial for typically young children to get periodic eye exams. If caught early, blindness can be prevented, and disease can be slowed/halted from progressing. Patients with coat's disease in one eye should go through extensive testing on the other eye including regular DFE's, extended fundus photography and FA should be implemented in follow-up care.

*Author*

*Mohit Adlakha, O.D.*

#### **Case Report Abstract**

**Thursday, June 20, 2019**

**6:30-7 p.m.**

#### **OD-Ocular Disease**

Orbital Pseudotumor Spectrum Disorder and Posterior Scleritis in a Systemic Lupus Erythematosus Patient

A 75-year-old AAF presented to our clinic with complaints of a red, swollen, irritated left eye that started approximately one month earlier. She denied any trauma, or recent ocular surgeries. Her medical history was positive for: hypertension, hypothyroidism, GERD, heart valve replacement, and systemic lupus erythematosus (SLE). She reported she was seeing her primary care physician every 3 months, but had not seen her rheumatologist for her SLE in over a year because of insurance complications. Current medications included: warfarin, hydroxychloroquine (400 mg daily), metoprolol, indapamide, losartan, and lansoprazole.

Entering visual acuity was 20/20 OD and 20/40 OS. External slit lamp examination revealed an edematous conjunctiva OS with mild temporal restriction of eye movement laterally OS. Dilated examination was WNL OD, but showed choroidal folds OS. Reflexive B-scan and posterior pole OCT imaging confirmed classic findings of posterior scleritis with choroidal folds. And an orbital CT scan showed diffuse scleral enhancement of the

involved eye. Given both the anterior and posterior segment findings, she was diagnosed with an orbital pseudotumor spectrum disorder. The patient was started on 40 mg of prednisone with a 10 mg/week taper over 1-month period until her next rheumatology consult appointment approximately 1 month later. Full resolution of her ocular findings occurred within 1 week of initiation of oral prednisone.

Prompt recognition of orbital pseudotumor spectrum clinical findings helped lead to this anterior and posterior scleritis diagnosis and appropriate treatment. Appropriate ocular workup can help identify underlying clinical diagnosis quickly, as in this case. Additionally, timely referral to a rheumatologist for continued medical management is important when a patient's underlying systemic conditions, such as SLE in this case, are less than ideally controlled.

*Author*

*Christopher Borgman, O.D.;*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**9-10 a.m.**

#### **PC-Primary Care**

#### **Clomiphene Citrate Induced Visual Palinopsia in Polycystic Ovary Syndrome Case**

Palinopsia is the occurrence of visual images after the stimulus has been removed. The etiology of palinopsia is unknown; however, it may be idiopathic or present secondary to cortical lesions, seizures, or pharmaceutical drug therapy. Clomid (clomiphene citrate) is an ovulatory stimulant used in infertile women. Visual side effects, including palinopsia, are rare.

A 32-year-old white female presented with symptoms of constant "trailing after images" in both eyes for 2 days duration. She denied headaches, pain, photopsia and other associated

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symptoms. She revealed a prior medical history of polycystic ovary syndrome and initiated her monthly treatments of oral Clomid (clomiphene citrate) 100 mg daily less than one week ago. Ocular histories were unremarkable. Unaided acuities were 20/20 OD, OS. Normal pupillary, extraocular motilities and color vision and intraocular pressures OU. Normal anterior and posterior segment findings OU, respectively. Humphrey visual field (24-2) and optical coherence tomography (OCT) were reliable and showed no evidence of significant defects. She was instructed to return to her gynecologist to rule out toxicity. An MRI of the brain and orbits was ordered, which yielded normal findings. The patient was diagnosed with probable clomiphene-citrate-induced visual palinopsia. She was instructed to discontinue clomiphene citrate immediately. Two months later, her palinoptic symptoms moderately improved but did not completely resolve.

Clomiphene-citrate-induced visual palinopsia is a rare side effect but may occur in cases of higher prescribed or cumulative dosages. A thorough case history, including medications, is essential for ruling out potential ocular toxicity that may otherwise be overlooked if not asked. Drug induction should be a diagnosis of exclusion.

*Author*

*Breanne McGhee, O.D., MEd, FAAO*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**9-10 a.m.**

#### **OD-Ocular Disease**

#### **Obscurities and Peculiarities: Bilateral Posterior Subcapsular Cataracts, Vitritis and Optic Disc Drusen as Presenting Signs of Atypical Retinitis Pigmentosa**

Retinitis Pigmentosa (RP) is an inherited retinal condition affecting the photoreceptors and retinal

pigmented epithelium (RPE). Typically, RP presents as a clinical triad of bone spicule pigmentation, waxy optic nerve pallor and arteriolar attenuation with symptoms of nyctalopia and visual field constriction. Atypical, or variant forms of RP exist, where typical clinical signs are absent making the diagnosis difficult or delayed. We present a case of posterior subcapsular cataracts (PSC), vitritis, and optic disc drusen—all bilateral—as presenting signs of atypical RP.

A 27-year-old white female presented for evaluation of blurry vision at distance and near with her current glasses. She also reported difficulty driving at night due to glare and bilateral floaters. Medical history was unremarkable and the patient denied any current use of medications. Best corrected visual acuity was 20/40-2 OD and 20/40-2 OS. Automated perimetry was remarkable for peripheral constriction with a central island of vision bilaterally. All other entrance testing was unremarkable. Full color vision was noted OD, OS. Slit lamp exam was remarkable for 2+ PSC OU. Dilated examination was remarkable for 2+ vitritis OU, indistinct optic disc margins OU, arteriolar attenuation OU, and bone spicules in the mid-periphery OU. A B-scan ultrasound was performed bilaterally confirming the presence of optic disc drusen OU. Severely abnormal multifocal electroretinogram (ERG) with severely diminished central retinal cone dysfunction was found confirming the diagnosis of atypical RP. The patient was referred to a genetic counselor given her interest in having children. She has also been scheduled with low vision to help with mobility and maximizing her remaining vision. Her cataracts will be removed at a later time.

It is important that the eye care provider understand that variant forms of RP exist and can manifest differently than the clinical triad of findings. Additionally, diagnosis and referral for genetic counseling and low vision services are key to ensuring a complete understanding of the condition and to maximize remaining vision in those affected.

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## Poster Presentations

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*Author*

*Laine Higa, O.D., FAAO*

*Co-Author(s)*

*Tina Choe*

#### Scientific Abstract

Friday, June 21, 2019

9-10 a.m.

#### Reading Efficiency on Print vs. iPad Reading

The prevalence of technology has shifted how students study. Some studies have shown decreased reading speeds and accommodative lag on some digital devices compared to paper text. This study investigated reading comprehension, speed, and eye movement quality while reading on a digital device, specifically an iPad, compared to paper copies.

Thirty-one subjects completed a pre-exam survey about study materials. Near VAs and CT were taken for eligibility. To ensure consistency, the Harmon distance was utilized during the assessment. Subjects were randomly assigned to read the digital or paper copy first. Both passages were available in digital and paper forms and were also randomized. Two of the same passages were chosen, both of which were the highest grade level (10) available for the Visagraph. They then answered 10 yes or no comprehension questions. A post-exam survey was given asking which device they felt they performed better on. A paired t-test analysis was performed to compare digital versus paper copy reading efficiency between and within subjects.

Fixations and regressions per 100 words were not statistically different between the iPad and paper passages. Fixation duration was longer with the iPad compared to the paper ( $p=0.03$ ). Both reading rate ( $p=0.03$ ) and total reading time ( $p=0.01$ ) were statistically different between the iPad and paper. Subjects' reading rates were lower on the iPad (294wpm) than the paper (318wpm)

and overall time was slower on the iPad (31s vs. 28s). Eye movements during reading did not differ between the iPad and paper. Comprehension scores did not differ between the reading sources, but subjects that read on the iPad first had higher comprehension scores. According to the survey, all subjects that prefer paper felt they would perform better with paper.

There is a significant difference in reading rate and overall speed between paper and digital devices. There was no significant difference in reading comprehension. Eye movements were not significantly different, but fixation duration was significantly different. Further investigation is warranted to determine if this holds true for other digital devices and with longer passages.

*Author*

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#### Scientific Abstract

Friday, June 21, 2019

9-10 a.m.

#### Comparison of the Potential Acuity Meter, Interferometer, and Near Super-pinhole in Cataract Patients

Acuity achieved after cataract surgery may be lessened in the presence of macular disease or other comorbidities. Potential vision tests allow the surgeon to set reasonable expectations. Current research contains studies indicating reliability of a single instrument when used to predict outcome, or compares two instruments head to head. The purpose of this study was to assess the reliability of the potential acuity meter (PAM), laser interferometer (LI), and near pinhole (PH) as screening tests to predict postoperative acuity in

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cataract patients.

This prospective study used three potential vision tests to obtain preoperative acuity measurements from 245 eyes and compare their values with final best corrected acuity recorded one month post-cataract extraction. Testing necessitated some form of achievable Snellen acuity. Subjects with comorbidities were not excluded.

Each of the three predictive acuity tests significantly correlated with post op BVA. Each of the three methods is statistically similar.

Postoperative prediction of acuity in cataract patients is useful in setting an appropriate expectation of outcome for both patient and physician. Comorbidity including macular disease may need to be considered. Utilization of either PAM, LI, or PH in preoperative testing allows final acuity to be predicted with reliability.

*Author*

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#### **Case Report Abstract**

**Friday, June 21, 2019**

**9–9:30 a.m.**

#### **BV-Binocular Vision**

#### **Neuro-Optometric Rehabilitation in a Patient with Visual Perceptual Deficits Following an Acquired Brain Injury**

In America, someone has a stroke every 53 seconds. We see the effects of brain injuries often during vision evaluations at Encompass Health, an in-patient rehabilitation center in Jonesboro, Arkansas.

JF is a 41 year-old male who presented to Encompass Health for rehabilitation therapy. JF fell from a ladder and injured his back three weeks prior to our initial visit. During surgery, he

developed a blood clot that moved to his heart, lungs, and brain. He coded and was without oxygen for several minutes. Once his condition stabilized, he was transferred to Encompass for continued recovery and rehabilitation. During our initial vision consultation, with prompting from his wife, JF stated that during physical therapy the previous day, he had some trouble with copying images. He would often draw the mirror image of the shape he was instructed to draw, and other times he would be wildly inaccurate with his attempt at recreating the shape. Physical examination showed no abnormal anterior or posterior segment findings, with the exception of a pre-existing left exotropia. With initial midline shift testing, JF drew a diagonal line from the top of the line on the right to the bottom of the line on the left. He then drew well-planned and evenly spaced vertical lines. During clock dial testing, he initially showed good planning skills by appropriately placing the 3, 6, and 9, but then began to fill in the circle with evenly spaced lines. Even with encouragement to place the rest of the numbers on the clock, JF continued drawing lines and did not appear to understand the directions. We coordinated care with his physical therapist and occupational therapist to incorporate visual processing skills. At our 2nd assessment one week later, JF correctly drew a line down the center during midline shift testing. The same instructions were given as previously, but at this exam he was accurately able to interpret the test.

This case demonstrates the importance of early intervention and coordinating care among different health professionals and educating different types of practitioners about the importance of incorporating the visual system into recovery.

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*Co-Author(s)*

*Lydia Luther, O.D. Candidate 2019*

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#### Case Report Abstract

Friday, June 21, 2019

9–9:30 a.m.

#### OD-Ocular Disease

##### Is It, or Is It Not, Pellucid Marginal Degeneration? A Case Series.

Pellucid marginal degeneration (PMD) is a bilateral progressive ectatic corneal disorder characterized by an inferior peripheral band of thinning extending from the 4 o'clock to 8 o'clock position on the cornea with a 1- to 2-mm margin of normal cornea between the thinning and the limbus. Keratoconus is a condition in which the cornea assumes a conical shape due to thinning and protrusion. It is usually bilateral, non-inflammatory, and asymmetric. The apex of the cone is typically decentered below the apex of the cornea with thinning coincident to corneal protrusion. When the apex of the cone is significantly inferiorly decentered, as in inferior keratoconus, a crab claw pattern may be seen on axial map imaging which is possible to confuse with PMD. Prognosis and management of PMD and keratoconus are different, and thus should be distinguished from each other.

We report two patients referred to the Eye and Vision Center for scleral contact lens fittings with long-standing diagnoses of pellucid marginal degeneration. In both cases, the patients had been followed for many years with variable success in soft contact lenses. In both cases, Pentacam images were obtained revealing irregular astigmatism with a classic crab claw axial curvature appearance, inferior anterior and posterior corneal elevation, and coincident corneal thinning, but did not display the typical tomographic appearance diagnostic of PMD.

Many PMD cases reported in the literature actually have corneal topographies compatible with inferior keratoconus. These eyes do not show the

classic band-like inferior thinning which is a characteristic of pellucid marginal degeneration. In inferior keratoconus, the axial curvature map does not display the true corneal shape. It is important to determine whether a crab claw topographic axial map illustrates a "true" pellucid marginal degeneration or an inferior keratoconus. PMD is a rare disease and many patients who present with a crab claw display on an axial map may in fact have inferior keratoconus. The usage of Scheimpflug imaging technology, such as the Pentacam, enables the clinician to make the accurate diagnosis and consider which treatment option is most appropriate for the patient.

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#### Case Report Abstract

Friday, June 21, 2019

9–9:30 a.m.

#### CL-Contact Lens

##### Orthokeratology for Myopia Control

Orthokeratology (OK) is an effective technique for slowing myopia progression and reducing axial length elongation in myopic children. Higher degrees of myopia are associated with higher risk of retinal detachment, glaucoma, and cataracts due to increased axial length. Overnight OK lens wear utilizes reverse geometry design rigid gas permeable contact lenses that temporarily reshape the cornea to correct refractive error.

8-year-old South Asian female presents for a myopia evaluation and comprehensive eye examination. Patient complains of constant blurred vision in both eyes at distance with bifocals for the past two months and states worsening of symptoms. Patient was previously on atropine

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treatment and has a family history of high myopia. Corrected visual acuity is 20/200 in the right eye and 20/100-1 in the left eye at distance. Manifest refraction showed an increase of -1.50DS in the right eye and -0.75DS in the left eye from a four-month-old prescription at her last eye exam. WaveNight lenses were designed using the patient's topographical data. Patient returned with 20/30 in the right and left eye after one night of OK wear. Patient presented with 20/20-2 in the right eye and 20/25- in the left eye at the one-week follow-up. Patient's vision was stable at the one-month follow-up and improved to 20/20 at the four-month-follow-up. Topography images illustrated a defined bulls-eye and the lens exhibited good centration and movement on both eyes. The patient will continue with OK nightly wear and monitored for myopia progression through axial length, refraction, and corneal topography.

Orthokeratology is a safe and effective approach for myopia control and is designed to provide clear unaided visual acuity. Myopia progression has become a critical public health issue and eye care practitioners should become proficient in fitting orthokeratology lenses to improve patients' ocular health outcomes. This patient was able to achieve better visual acuity and myopia control with OK than spectacles and atropine. Long-term success of orthokeratology treatment warrants a proper lens fitting, conscientious compliance to contact lens hygiene and care regimen, and adherence to follow-up examinations.

*Author*

*Leanne Leung, O.D.;*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**9–9:30 a.m.**

#### **OD-Ocular Disease**

#### **Idiopathic Macular Hemorrhage**

Idiopathic Macular Hemorrhage (IMH) usually occurs in an otherwise healthy eye typically in female patients younger than 40 years old. The exact pathogenesis of IMH is unclear and is poorly understood as its name suggests and it is a diagnosis of exclusion.

A 25-year-old white female presented with a brown spot in her vision for the past three days. The patient reported no precipitating factors and only took notice of the spot as she was looking at a white screen on her phone. The patient's ocular history was unremarkable except for a small amount of astigmatism, for which the patient wore corrective lenses. The patient presented with no significant past medical history and no family history of eye diseases. Visual acuity was 20/20- in the right eye and 20/20 in the left eye. Supplementary testing of Amsler Grid revealed a discoloration inferior to center in a tear drop shape in the right eye with normal findings in the left eye. On dilated fundus exam, there was a dark fluid filled area superior to the macula matching the shape the patient described on Amsler Grid. She was initially diagnosed as having central serous retinopathy due to the location and fluid accumulation under the macula. However, on OCT the fluid in question was not serous but rather had a trace amount of blood, making the fluid on the OCT appear hazy. Additional testing with a red-free fundus revealed the area in question was hypo-fluorescent due to the blood that was present. Her blood pressure was normal, and further blood work showed no evidence of any underlying diseases that could cause hemorrhages.

The differential diagnosis for IMH is extensive

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and includes: diabetic retinopathy, hypertensive retinopathy, central serous retinopathy, valsalva retinopathy idiopathic telangiectasia type 1, sickle cell retinopathy, anemia, and Terson's syndrome. For a conclusive diagnosis of Idiopathic Macular Hemorrhage, all possible etiologies must be ruled out. IMH can have spontaneous resolution that can occur within weeks to months. Patients are advised to avoid strenuous activities and anticoagulants that could interfere with the resolution of the hemorrhage.

*Author*

*Kirsten Weitzel, Optometry Student;*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**9–9:30 a.m.**

#### **OD-Ocular Disease**

#### **Pellucid Marginal Degeneration**

Pellucid Marginal Degeneration is a progressive non-inflammatory disorder characterized by a peripheral band of thinning in the inferior cornea in a crescent shape. It is one of the corneal ectasias and has a similar case presentation to keratoconus. It is typically a bilateral condition, but can affect both eyes asymmetrically. Patients will typically show high amounts of against the rule astigmatism and a classic “kissing doves” pattern on topography imaging.

A 30-year-old black male presented with a complaint of distance blur OU. He denied any other ocular symptoms and his last eye exam was in 2015. He is unremarkable for any systemic or ocular conditions. Corrected visual acuities were 20/20 OD and 20/30 OS with a habitual prescription of -1.00sph OD and plano-0.75x110 OS. Entrance testing was unremarkable. Refraction resulted in a prescription of -1.25-0.75x092 OD and -1.25-3.00x112 OS, with a new corrected visual acuity of 20/20 in both eyes. Ocular health

was unremarkable, including dilated ocular health. Corneal topography revealed keratometry values of 44.34@129/43.87@039 OD, and 46.88@034/44.00X124 OS as well as a classic “kissing doves” pattern in the left eye. Due to the suspicion for pellucid marginal degeneration, the patient was referred to a corneal specialist for further evaluation and treatment. Glasses were ordered in order to correct the patient's vision.

Pellucid Marginal Degeneration, although rare, can be easily mistaken for keratoconus given similar clinical appearances. Therefore, a good topography image is necessary in order to properly differentiate between the two conditions and give the proper diagnosis. There are many treatment options available; however, patients with pellucid can often be difficult to fit with traditional gas-permeable contact lenses, so often patients will require scleral lenses or surgical intervention as the condition progresses. Some surgical options include penetrating keratoplasty and corneal cross-linking.

*Author*

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#### **Scientific Abstract**

**Friday, June 21, 2019**

**9–9:30 a.m.**

#### **Exploratory Data Analysis of Infant Patients Seen at an Academic-Based Urban Clinic from 2015 - 2018**

Vision disorders are the 4th most common disability in the U.S. and the most prevalent handicapping condition during childhood. Untreated pediatric ocular and visual dysfunction such as uncorrected refractive error, amblyopia, strabismus, and ocular disease can lead to difficulties in development, education, social interaction, and potential permanent vision loss. Early intervention and treatment improves treatment outcome and decreases treatment time

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and so early comprehensive evaluation is critical. Unfortunately, there is a lack of information in both parents and healthcare providers in the capacity to which an infant's ocular and visual system can be evaluated by trained eye care providers and the importance of a comprehensive ocular and visual evaluation in infant patients.

A retrospective record review was conducted on all infant patients presenting to the University Eye Center (UEC) during the period from January 2015 to June 2018. Patients were included based on age at initial examination (12 months or less). The following data was collected, where available, for each patient: age, sex, referral source, presenting complaint, birth and medical histories, family ocular history, entering visual acuity, binocularity, ocular motility, retinoscopy, anterior and posterior ocular health, need for follow up in less than six months, and if the patients returned for their follow up appointment.

A total of 88 infants were seen with 46 (52%) being male and 42 (48%) female with an average age of 6.25 months. Fifty-six (64%) were brought in by his or her parent without a referral from an outside provider, 15 (27%) of these patients presented with no chief complaint, 16 (29%) were concerned with strabismus, 11 (20%) had various ocular health concerns, six (11%) had a positive ocular family history, five (9%) had a suspected obstructed tear duct, and three (5%) had vision and tracking concerns. Only eight patients mentioned the InfantSEE program as their incentive for the visit. Thirty-two (36%) of the 88 total patients were referred to the UEC, with the majority (21 or 24%) referred by an ophthalmologist for scleral lens fitting following a congenital cataract extraction. Of the 67 phakic patients, 60 were evaluated for refractive error through retinoscopy with 21 showing myopic and 39 showing hyperopic refractive error with 38 instances of astigmatism. Ten (11%) patients were diagnosed with strabismus and 24 (36%) of the phakic patients had a positive ocular health finding. Of the 67 phakic patients, 29 were asked to return to

clinic within six months or less and one was referred to a neuro-ophthalmologist.

This exploratory study shows that a scant number of infant patients are presenting and being referred to optometrists for comprehensive evaluation and treatment. Evaluations in some of these infant patients lead to the diagnosis of ocular and visual dysfunctions that needed follow up, treatment, and/or referral. Public outreach and interdisciplinary education about the importance of eye exams in infants as well as the no cost InfantSEE program must be persistent.

*Author*

*Tamara Petrosyan, O.D.;*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**9-9:30 a.m.**

#### **OD-Ocular Disease**

#### **Posterior Polymorphous Corneal Dystrophy (PPMD)**

Posterior Polymorphous Corneal Dystrophy is a rare autosomal dominant disease that is a type of inherited endothelial corneal dystrophy. PPMD usually presents in the second to third decade of life. Patients can be asymptomatic and stable for many years, but this dystrophy may also be progressive, thereby making the patient symptomatic. PPMD presents in one of three main forms: vesicle-like lesions, band lesions, or diffuse opacities.

A 32-year-old male presented to the clinic for a comprehensive eye exam with complaint of blur at distance, especially at night in both eyes without correction. His last eye exam was two years ago and he was last dilated in 2012. He had no other ocular complaints. Medical and ocular history were unremarkable. Family medical and ocular history were also unremarkable. The patient's unaided visual acuities were 20/25 OD and 20/20-2 OS,

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but he corrected to 20/20 in each eye. Intraocular pressures were within normal limits at 12 mmHg OD and 13 mmHg OS. Slit lamp biomicroscopy revealed a horizontal band lesion consistent with PPMD in the right eye. The lesions spanned the entire horizontal length of the cornea OD; the OS cornea was unremarkable, as were all other anterior segment findings. A dilated fundus exam was also unremarkable.

This autosomal-dominant disorder was not present at the last eye exam two years ago, so monitoring of this condition periodically is important. This disease can be progressive, which results in corneal edema, decreased visual acuity, photophobia, foreign body sensation, and increased intraocular pressure leading to glaucoma. In severe cases, surgical intervention with penetrating keratoplasty may even be required. In this case, the patient was asymptomatic, the IOPs were normotensive, and the band lesion was not significantly impacting vision, so the patient did not require treatment. He was instructed to return to the clinic in one year for monitoring.

*Author*

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#### **Case Report Abstract**

**Friday, June 21, 2019**

**9–9:30 a.m.**

#### **OD-Ocular Disease**

#### **Symptoms Preceding Signs: Atypical Presentation of Central Retinal Artery Occlusion**

Central retinal artery occlusion (CRAO) is a well-recognized, relatively common ophthalmic and medical emergency requiring immediate attention as it is equivalent to a cerebral stroke. Patients usually present with sudden, painless unilateral

vision loss. The presence of CRAO should prompt immediate referral to a stroke center for evaluation. The visual prognosis is poor with no effective therapy to date that restores retinal function. The following is an atypical presentation of CRAO.

73-year-old male was referred by ER for acute visual disturbance in the left eye noted upon awakening. PMH: extensive coronary artery disease, atrial fibrillation, myocardial infarction, and mitral valve insufficiency with prosthetic valve on Warfarin and Plavix. Due to GI surgery 1 month prior, bridge anticoagulation resulted in sub-therapeutic INR. At the initial visit, BCVA was 20/25-1 OD, 20/150-1 OS. However, there was no APD, CVF were FTFC OD/OS, slit lamp, DFE and OCT were unremarkable OU. Given PMH and symptoms, stroke work-up was recommended. During his hospital admission for observation and work-up, there was further decrease in vision OS. This exam revealed CF at 5' OS, 3+ APD OS, cherry red spot on DFE OS and perimacular thickening on OCT OS. Anterior chamber paracentesis was performed same day by retinal specialist, but further reduction in vision was noted at 1-week follow-up (HM OS). The cherry red spot persisted until 3-month follow-up when DFE revealed vascular attenuation and OCT showed diffuse perimacular thinning, vision was mildly improved at the visit to CF at 3'.

Patients with CRAO typically present with acute painless decrease in vision accompanied by signs of retinal ischemia such as thromboembolus and cherry red spot. This case illustrates that visual symptoms of CRAO may precede retinal findings despite the retina's high sensitivity to ischemia. This case also highlights the significant effects of subtherapeutic anticoagulation therapy which may precipitate thromboembolic events such as CRAO in the case.

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#### Scientific Abstract

Friday, June 21, 2019

9-9:30 a.m.

#### Innovation in Education - OCTaVIA - OCT Visual Atlas iOS App

The widespread availability of Optical Coherence Tomography (OCT) has revolutionized diagnostic approaches to retinal pathology by allowing for microstructural characterization of disease processes, leading to improved differential diagnosis. While often extremely valuable in clinical practice, OCT imaging requires training and expertise in order to benefit diagnostic effectiveness and efficiency. Specifically, pathognomonic imaging patterns and findings must be recognized and placed in the correct clinical context in order to arrive at a diagnostic conclusion. Students who are approaching OCT imaging from a beginner's standpoint are often overwhelmed by the amount and complexities of data provided, and therefore turn to reference materials to support the diagnostic process. Currently available resources (textbooks, articles, web-based references), while comprehensive, are often too in-depth to be of immediate assistance. Furthermore, their use is often too logistically cumbersome for daily clinical teaching/ practice (e.g., requiring the physical availability of books or a computer to access digital material). A dedicated smartphone/tablet app presenting well-annotated OCT reference images by diagnosis in a clear, succinct manner would overcome these challenges. Although there is an abundance of smartphone/tablet apps, there is little in regards to OCT data review. Such an app would represent a valuable tool for learners familiarizing themselves with the clinical applications of OCT to retinal disorders. This proposal sought to clarify whether the novel smartphone/tablet app can assist learners (specifically optometry students) in diagnosing common retinal pathological

conditions, by increasing the effectiveness and efficiency of diagnosis.

With the support derived from the AOF/ Johnson & Johnson Vision Care, Inc. 2016 Innovation in Education Grant, we developed the first-of-its-kind OCT reference iOS app, named OCTaVIA (Optical Coherence Tomography Visual Atlas). The app was launched to the Apple Store on Nov. 1, 2018, and is currently available for free for iPhone and iPad. The app is intended to allow users to search for a specific ocular disease by name, or by keywords describing a specific OCT finding in ocular diseases. It also provides eye care professionals with normal OCT reference material and corresponding OCT with Fundus Photography images for multiple retinal disease conditions, as well as a brief disease-specific description of OCT images, high-yield key considerations and useful links to aid in the differential diagnosis.

Participants of the study were current OD4 students from New England College of Optometry (NECO) who successfully completed NECO's Clinical Ocular Imaging Topics course taught in the summer of their OD3 year (Summer 2017). Participants had to be able to use web-based computer programs (such as Moodle) and have electronic devices (such as iPhone), as well as own an iOS device (iPhone or iPad) that was used for the study. All communication and testing/surveys were done online. The study received IRB approval from NECO Institutional Review Board (IRB) in May 2018. The study consisted of two short online surveys (6 questions each) and one 20-question OCT image interpretation test, all available to the participants via the Moodle program 1. OCT Topic Familiarity Survey: a brief survey consisting of 6 questions aimed at quantifying OCT topic familiarity prior to testing with one additional question for intervention arm only representing a self-screen of ability to use the smartphone app; 2. OCT Image Interpretation Test: a 20-question OCT Image Interpretation test depicting retinal pathological conditions of clinical relevance; and 3. Satisfaction Survey: a 5-question satisfaction survey with one

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additional question about the type of sources used by a participant to answer OCT Image Interpretation Test. A total of 28 participants were randomized to answer the 20-question test using as diagnostic support either: 1) conventional reference material, including OCT books, internet references and personal notes (control group, n = 14); 2) the dedicated iPhone/iPad smartphone/tablet app OCTaVIA for personal use (intervention group, n = 14). After completion of OCT topic familiarity survey, students were asked to complete within 4 weeks the individual portion of the study to provide a diagnostic interpretation for 20 OCT images, depicting retinal pathological conditions of clinical relevance. These included (but were not limited to) (macular drusen, geographic atrophy, choroidal neovascularization, RPE migration, cystoid macular edema, central serous, RPE detachment, macular hole, pseudo-hole, vitreomacular traction, epiretinal membrane, exudates, cotton wool spot, Best's Vitelliform macular dystrophy, retinitis pigmentosa, cone dystrophy, solar maculopathy, choroidal nevus, crystalline maculopathy and plaquenil maculopathy). This web-based portal kept track of answers and time from initial viewing of images to diagnosis for each question individually. Students were able to complete the images' review over multiple sessions by saving their work progress, thus maximizing comfort.

We found no differences in age, gender and GPA when comparing students randomized to use of conventional reference material (control group) with those randomized to utilize the OCTaVIA app (test group), all p-values for comparison > 0.05. There were also no differences in OCT usage patterns, self-reported familiarity with OCT in general, or in performance in a three-question test of basic OCT knowledge (all p-values for comparison > 0.05) between the two groups. In univariable analysis participants randomized to use the app scored significantly higher on the 20-question diagnostic challenge test than those who used conventional reference material (70%

correct answers in the test group versus 50% correct in the control group). Multivariable analyses confirmed that this systematic difference in test performance was independent of age, gender, GPA, and self-reported familiarity on OCT. Basic OCT knowledge (as assessed by the OCT Topic Familiarity Survey) and daily use of OCT in clinical practice were also independently associated with performance on the diagnostic challenge test. We also found that participants using the OCTaVIA app demonstrated significantly higher level of satisfaction across all surveyed questions, compared to those who used conventional reference material (all p-values for comparison < 0.05). Satisfaction rate (on the scale of 1 to 5 with 5 being the most satisfied) amongst students in the control group averaged around 2.6 whereas satisfaction rate amongst students in the test group was 4.6 (all p-values for comparison < 0.05).

The support derived from the AOF/Johnson & Johnson Vision Care, Inc. 2016 Innovation in Education Grant was crucial to further the research into the application of new technologies to optometric education. The grant allowed us to develop the first-of-its-kind OCT reference iOS app, named OCTaVIA, that consisted of normal OCT reference material and corresponding OCT with Fundus Photography images for dozens of retinal disease conditions. This innovative teaching module resulted in higher satisfaction rates among NECO students, as well as 20% better test accuracy on diagnosing retinal pathological conditions. This study provides a clear example for creating tangible learning gains through the integration of educational technology in optometric education.

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#### Case Report Abstract

Friday, June 21, 2019

9:30–10 a.m.

#### OD-Ocular Disease

##### The Role of Imaging Techniques in the Case of Paracentral Acute Middle Maculopathy (PAMM)

Paracentral acute middle maculopathy (PAMM) is a relatively novel disease with a predilection for older men with systemic vascular disorders or retinal vascular disease, such as diabetes, hypertension, sickle cell anemia, and retinal vein and artery occlusions. While the exact etiology is unknown, it is often preceded by an event triggering retinal capillary vasospasm, which ultimately causes ischemic injury to the microvasculature at the level of the INL and OPL. Therefore, on acute presentation, a hyper-reflective band of OPL can be detected on spectral-domain optical coherence tomography (SD-OCT) with subsequent thinning of the INL upon resolution correlating with the area of ischemia.

This case explores a 75-year old male who experienced a retinal migraine in the right eye. Upon resolution of the migraine attack he was left with a dark spot in his vision. The patient did not seek any additional care until four months later when he presented to the eye clinic. Best corrected visual acuity was 20/20 in both eyes with unremarkable entrance testing and anterior segment evaluation. On fundus examination there was a small area of faint hypopigmentation nasal to the fovea in the right eye. With the use of SD-OCT an area of general retinal attenuation with moderate macular pucker was observed in the right eye. Optical coherence tomographic angiography (OCT-A) revealed normal arteriolar fill in the en face superficial inner retina scan (ILM-IPL) with one small area, approximately one-disc diameter, of non-perfusion superior nasal to the

macula OD in the deep inner retina scan (IPL-OPL). There was normal arteriolar fill with no signs of ischemia OS. Both eyes showed within normal outer retina (OPL-Bruchs) and choroid scans.

Because PAMM typically presents with paracentral scotoma and unremarkable or mild fundus findings on clinical examination, the use of SD-OCT and OCT-A are crucial. These ancillary tests have gained significant momentum in recent years in aiding clinicians with diagnosis, treatment, and management of many posterior segment conditions. This case explores the development of PAMM and how vital imaging techniques are in detecting a disease process that is often overlooked or misdiagnosed.

*Author*

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*Co-Author(s)*

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#### Case Report Abstract

Friday, June 21, 2019

9:30 – 10 a.m.

#### OD-Ocular Disease

##### PXE: A Complex Genetic Disorder

Pseudoexfoliation (PXE) is a generalized systemic disorder of elastin formation resulting in the deposition of fine, gray-white, dandruff-like material on the lens capsule, iris, and anterior segment structures. Ocular concerns of PXE include secondary glaucoma and complications during cataract surgery. PXE is a systemic condition, also involving the skin, heart and lungs. PXE can occur in all ethnicities but has a prevalence up to 25% in specific Scandinavian and South African populations. Patients generally present >50 years of age, women>men. The genetics of PXE have been mapped to chromosome 15q24 (LOXL1 gene). Research has

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linked PXE prevalence to genetics predispositions combined with environmental stresses such as oxidation, ischemia and mechanical stresses, making PXE a complex genetic disorder.

A 70-year-old male presents to clinic for a complete eye exam. The patient did not have a primary complaint at this visit as his vision was stable. The patient's ocular history was positive for cataracts, ERM OD and PXE OS. The patient's systemic health was positive for Hypertension, Dysrhythmia, Asthma, PTSD, Hyperlipidemia and Rheumatic Fever as a child. Visual acuity was 20/20-1 OD and 20/20-2 OS. Intraocular was 14mmHg OD and 12mmHg OS, similar to historical IOP's. Dilated exam revealed unilateral PXE OS, +1 Nuclear sclerotic cataracts OU, 0.3 CD ratio OU and otherwise unremarkable findings. Patient was previously considered a glaucoma suspect, hence performing historical OCT, IOP, VF and pachymetry testing. However, no glaucoma development has yet to present.

This patient's presentation of PXE is a red flag for systemic conditions. Additional examination would be necessary to determine if PXE could be correlated with this patients' systemic presentations of cardiac and lung issues. Some research suggests that there is no correlation between PXE and asthma. Genetic research suggests environment stresses take advantage of genetic deficiencies to spike inflammatory mediators affecting fibrotic assembly processes. This results in a dysregulated protein cross linking process eventually leading to degradation and aggregations. While this patient did not have any serious manifestations from his PXE, it remains possible for his disorder to progress under an influence from environmental stresses.

*Author*

*Kellen Plomski, O.D., MPH*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**9:30–10 a.m.**

#### **OD-Ocular Disease**

#### **A Case of Polypoidal Choroidal Vasculopathy - Utilizing Advanced Imaging Modalities to Appreciate the Pachychoroid Spectrum of Diseases**

Polypoidal choroidal vasculopathy (PCV) is a form of type 1 neovascularization characterized by multiple shallow irregular pigment epithelial detachments (PED) in the absence of drusen. The recently described pachychoroidal spectrum of diseases are macular conditions that share choroidal variations of increased thickness and dilated vasculature (often referred as pachyvessels). PCV, along with central serous chorioretinopathy (CSC), pachychoroid pigment epitheliopathy (PPE), and pachychoroid neovascularopathy (PNV) currently comprise the described pachychoroid spectrum. Imaging modalities such as enhanced depth imaging optical coherence tomography (EDI-OCT) and fundus autofluorescence (FAF) allow for precise choroidal thickness measurements and improved visualization of choroidal composition and assessments of RPE health.

A 55-year-old white male presented with a complaint of a bilateral decrease in vision worsening for one week. Health history was unremarkable and patient denied use of any topical, oral, or nasal steroids. Ocular health history included only refractive error and presbyopia. Best corrected visual acuities were OD 20/20 and OS 20/20- with no significant refractive change. Extraocular muscles were full and pupils were equal, round, and reactive to light with no APD. Anterior segment findings were all normal. Intraocular pressure measured via Goldmann were 16 mmHg OD and 17 mmHg OS. Dilated

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funduscopy exam revealed 0.25 C/D ratio OU. Subfoveal serous detachments were observed without evidence of a choroidal neovascular membrane. Multiple scattered shallow focal PEDs were observed in the posterior pole of both eyes and imaged with fundus photography. FAF imaging revealed irregular mottled hyperautofluorescence in both maculas. Peripheral retinal findings were unremarkable. Macular OCTs including EDI-OCT line scans were also obtained. OCT line scans confirmed serous fluid OU. Increased subfoveal choroidal thickness was measured at 426 microns OD and 462 microns OS and dilated outer choroidal vessels were present in both eyes. Patient was referred to retina for an indocyanine green angiography (ICG) for confirmation of PCV diagnosis.

Advancements in imaging such as EDI-OCT and FAF aid in the differentiation of PCV and other pachychoroid spectrum conditions. Distinction is critical to avoid mismanagement, as observation rather than surgical intervention is often indicated in pachychoroid cases.

*Author*

*Nathan Traxler, O.D.;*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**9:30–10 a.m.**

#### **PC-Primary Care**

#### **Macular Pattern Dystrophies in Two Sisters**

Dystrophies primarily involving the retinal pigment epithelium (RPE) often have a genetic origin. Pattern dystrophies specifically are often autosomal dominant and can present with a wide variety of appearances. Patients with pattern dystrophies are typically expected to have good vision, but in some cases, they experience a slow decline of their central vision. This group of diseases typically present in patients who are in

their forties and fifties.

Our first patient is a 36-year-old white female who presented for a routine eye exam with no complaints. During our patient's visual examination, we were unable to correct her vision to a crisp 20/20. On Amsler grid, she described a ¼ inch ring of distortion surrounding the center dot of the grid. Slit lamp examination was normal with the exception of her maculae. The macula of each eye demonstrated macular pigment changes in a ring-like pattern. There was no edema, hemorrhage or exudate OU. Peripheral retinal anatomy was normal OD. There were two small areas of lattice degeneration inferior OS, one with a small retinal hole unrelated to the macular condition. There were no bone spicules in either retina. Once this condition was observed in our patient a series of diagnostic tests were performed including ocular coherence tomography, fundus autofluorescence, electroretinography (ERG), multifocal ERG, and fundus photography. Then, a thorough eye assessment was performed on her immediate family. Neither her parents nor her 28-year-old brother exhibited any of the same characteristics. However, upon examination her 39-year-old sister demonstrated early macular RPE abnormalities in only her left eye. In the case of the 39-year-old, this was very mild with no other signs or symptoms.

Pattern dystrophies are often difficult to diagnose as they can masquerade as one another. Numerous advanced testing procedures can assist in the diagnosis of these diseases. Although these conditions are rare, it is vital that we determine how to stop the progression of these diseases and preserve the vision for these patients. Gene therapies, while they have many significant challenges, possess the best prognosis for these patients.

*Author*

*Lori Gray, O.D.;*

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#### Scientific Abstract

Friday, June 21, 2019

9:30–10 a.m.

#### Readability of Wayfinding Signage at Midwestern Eye Institute for the Low Vision Population

It is essential for low vision patients to have the ability to comfortably navigate the clinical setting and access their doctors. This is often accomplished by using common, wayfinding signage posted in and around the building; however, the requirements laid out by Americans With Disabilities Act (ADA) Standards fail to address factors that are fundamental to visual function, including contrast and illumination. The Low Vision Design Committee (LVDC) and the Illuminating Engineering Society (IES) have suggested values of contrast and illuminance for low vision individuals, but these are not incorporated as set standards. Midwestern University Eye Institute was surveyed to determine if ADA-approved signage is sufficient for the wayfinding ability of the low vision population.

Fourteen interior and exterior signs at the Midwestern University Eye Institute were assessed. A digital caliper was used to confirm that ADA Standards were met, including character width, height, stroke thickness, spacing, and font style. Luminance was measured using a portable photometer. From this, luminance contrast was calculated using the Michelson equation. Illuminance was measured using a portable digital illuminometer. Luminance and illuminance measurements for each sign were taken within a one-hour window of the same day. Measurements were compared to recommended contrast and illuminance values suggested by the LVDC and IES, respectively. Certain sign types, such as non-mounted signs, were not included in LVDC recommendations and, therefore, were not assessed for contrast.

Recommended low vision sign-to-background contrast values of the LVDC were met in 2 of 9 (22.2%) signs. Recommended low vision character contrast values of the LVDC were met in 1 of 11 (9.1%) signs. Recommended illuminance values of the IES for normal-sighted and for low vision populations were met in 11 of 14 (78.6%) and 7 of 14 (50.0%) signs, respectively.

Although signs may be approved by ADA Standards, they may not be sufficient for the low vision population to use in essential, daily wayfinding. Re-evaluating the parameters, such as contrast and illuminance, that are included in signage standards would facilitate improved navigation and healthcare accessibility.

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*Vladimir Yevseyenkov, O.D., Ph.D.*

*Nicole Putnam, Ph.D.;*

#### Case Report Abstract

Friday, June 21, 2019

9:30–10 a.m.

#### OD-Ocular Disease

#### Management of a Persistent Epithelial Defect in a Patient with Stevens-Johnson Syndromes/TENS

Stevens-Johnson Syndrome (SJS) is a reaction of the body to a drug, virus, bacteria, etc. which attacks the eyes and other mucous membranes. Toxic epidermal necrolysis (TENS) is considered when more than 30% of the skin is detached. One-third of SJS cases will develop early ocular involvement, leading to chronic ocular sequelae with lasting visual impairments. One ocular sequela that can occur is a persistent epithelial defect (PED). A PED is a corneal abrasion that has lasted more than two weeks. This occurs when there is a

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failure in the corneal mechanisms in order to promote healing. Typical treatments for this long-lasting abrasion include ointment, antibiotic drops, bandage contact lens, debridement, tarsorrhaphy, and amniotic membranes.

A 58-year-old Middle Eastern male with a history of SJS/TENS presents with a persistent epithelial defect (PED) OS since 12/2017. No improvement has been made with amniotic cytokine extract drops, autologous serum, artificial tears, ointment, bandage contact lens, and tarsorrhaphy. He is also experiencing constant severe dry eye OS with no relief with drops. He is interested in being treated with Prosthetic Replacement of the Ocular Surface Ecosystem (PROSE) OS after his tarsorrhaphy is removed. PROSE is a specialty scleral lens and was made with Boston XO2 material to optimize oxygen permeability. The PROSE device is indicated for support of the ocular surface in patients with SJS/TENS that have failed with other treatment modalities as well as to aid in the healing process of a PED. This patient was seen at the clinic every day regarding the abrasion. The patient was educated to sleep in the lens at nighttime to facilitate healing. In less than one month, the defect had healed.

Scleral lenses (including PROSE) are viable treatment options in order to heal a persistent epithelial defect.

*Author*

*Kathleen Prendergast, BS;*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**9:30–10 a.m.**

#### **OD-Ocular Disease**

#### **Scleral Lenses: Treatment Modality of Moderate to Severe Dry Eye Disease**

Dry eye disease is a multifactorial disorder of

the ocular surface and tears, characterized by insufficient tear production or impaired tear stability, ocular surface inflammation, and neurosensory abnormalities. Since dry eye is associated with various causes, treatment modalities differ depending on severity and form. Treatment is aimed at either restoring or maintaining the tear film and ocular surface health, ranging from supplemental lubrication to immunomodulating therapy. Another treatment modality that is proving to be successful for moderate to severe dry eye is scleral contact lenses.

In this case, a 48-year-old Hispanic female presented for contact lens examination and fitting, after no success with soft lenses due to chronic, moderate dry eye and having multiple unsuccessful dry eye treatments. Scleral contact lenses were selected as the treatment modality to provide dry eye relief and clear vision at distance and near. The patient was initially fit with a Custom Stable Elite diagnostic lens, with a base curve of 7.85, diameter of 15.8mm, central thickness of 400 microns and prescription of -2.00 SPH in both eyes. With adjustment to the prescription and fitting, the final lenses were Custom Stable Aurora multifocal lenses with a prescription of -6.00 SPH OD and -4.50 SPH OS and add power of +3.00; best corrected to 20/20 OD and 20/100 OS for distance, and 20/25 OD and 20/100 OS for near. Note that decreased acuity in the left eye is secondary to toxoplasmosis scars. The patient reported contact lens wear of nine to 10 hours per day for seven days per week, with significant improvement in dryness symptoms OU, using re-wetting drops about one to three times per day, as needed.

Scleral lenses are designed to have complete clearance of the cornea and a large diameter to allow vaulting of the lens across the entire corneal surface forming a fluid reservoir that continuously bathes and hydrates the corneal surface, hence providing optimal vision and comfort. These lenses are commonly used for the management of corneal ectasias, but the scope of treatment can be

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expanded to include ocular surface disease as well.

*Author*

*Herman Nijjar, Optometry Student*

*Co-Author(s)*

*Louis A. Frank, O.D., F.A.A.O.*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**9:30 –10 a.m.**

#### **OD-Ocular Disease**

#### **Orbital Capillary Hemangioma Removal in a Premature Infant Resulting in Dragged Optic Disc**

Capillary hemangiomas are the most common eyelid and orbit tumor in childhood with a prevalence of one in 10 births. These tumors are more prevalent in females and an increased incidence is seen in premature infants. The majority of capillary hemangiomas are benign lesions that often resolve on their own, however some may indicate a systemic syndrome or can cause amblyopia due to strabismus, visual deprivation or anisometropia. If the tumor is causing an obstruction of the visual axis, or large enough that it depresses the infant sclera, it can cause significant amblyopia and should be treated promptly. Lesions can be treated with oral medications, laser therapy, steroid injection or surgical excision.

A 24-year-old female presents complaining of blurry vision at distance with her glasses. Patient was born 2.5 months premature and had a capillary hemangioma behind her right eye removed at one month of age. The patient stated that she was patched as a child. Her BCVA was 20/30 OD and 20/20 OS with a refraction of -5.00-5.25x 008 OD and -4.00-3.00x 178 OS. All entrance testing was unremarkable. On dilated fundus examination the cup to disc OS was 0.3

and OD was unable to be determined due to the superior temporal dragging of the optic nerve head. The surgical procedure to remove the hemangioma resulted in a dragged optic nerve head that has caused a large anisometropic refractive error, resulting in amblyopia OD.

Amblyopia is the most common ocular complication of periocular and orbital capillary hemangiomas in infants. If it is suspected that amblyopia will occur secondary to the capillary hemangioma, removal via medication or surgery should be initiated. When the tumor is intraorbital, methods such as ultrasonography, CT, MRI, or angiography can be used to determine the location of the tumor. Ocular surgery in infants carries possible complications, including large amounts of blood loss and unintended excision of surrounding orbital structures. The risks and benefits of ocular surgery to remove the capillary hemangiomas is weighed in order to determine the proper treatment to decrease the risk of amblyopia.

*Author*

*Emily Crump, O.D. in May 2019;*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**9:30–10 a.m.**

#### **OD-Ocular Disease**

#### **Bilateral Papillitis Secondary to Neurosyphilis**

Syphilis is caused by spirochete bacterium *Treponema pallidum*. It is a sexually transmitted disease and is most often seen in homosexual males. Syphilis is difficult to diagnose due to multi-system symptoms. For this reason the disease is known as “the great pretender.” Syphilis is divided into different stages: primary, secondary, latent and tertiary. Tertiary stage is very serious and can present as neurosyphilis which means there is an invasion of nervous system by the spirochete. Neurosyphilis can cause variety of symptoms such

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as headaches, loss of coordination, paresis, dementia and ocular complications.

A 63-year-old homosexual male presents to clinic complaining of blurry vision in both eyes since he had an acute kidney failure about three weeks ago. Patient described vision as if he was looking through a plastic bag and seeing patches of black spots that move around. Patient denied flashes, pain, and diplopia. Patient's systemic health was positive for HIV, benign essential hypertension, nephrotic syndrome, fibromyalgia, and PTSD. Patient's ocular history was significant for epiretinal membrane in the left eye, double vision, and hemorrhagic posterior vitreous detachment. Patient's presenting visual acuity was 20/20-2 in the right eye and 20/40 with no improvement on pinhole in the left eye. Extraocular muscles, pupils, confrontational fields, and color testing was unremarkable. Anterior segment testing was also unremarkable. Upon dilated fundus exam, significant bilateral optic nerve swelling was seen. OCT of the optic nerve was performed which showed corresponding swelling of the retinal nerve fiber layer. Patient's initial sedimentation rate was extremely elevated. Lab testing came back positive for RPR and quantiferon gold. PPD testing and chest X-ray were negative. MRI was unremarkable. Patient was treated with IV Penicillin G for 14 days. Patient was already on Doluntegravir and Emtricitabine/tenofovir for HIV.

Papillitis can be caused by many conditions; however, there are diagnostic tests that can assist in finding the right etiology. In case of syphilis, tests such as RPR, VDRL, FTA-Abs, TP-PA, MHA-TP, dark field microscopy, EIA and MFI can be ordered. It is crucial to detect even mildest papillitis cases as they may be life threatening.

*Author*

*Maneh Gevorgyan, Optometry Student;*

### Case Report Abstract

**Friday, June 21, 2019 12–12:30 PM**

#### OD-Ocular Disease

#### Combating Dry Eye in a GP Lens Wearer with Ocular Rosacea

It has been shown that the number one reason for contact lens (CL) dropout is discomfort. Patients with symptomatic dry eye are even more susceptible to discomfort with CL wear. These patients also regularly experience burning, stinging, and blurred visual acuity (VA) secondary to poor CL wettability. In 2017, Tangible Science developed a hydrophilic compound called HydraPEG that bonded specifically to the surface gas permeable (GP) CLs to increase wettability and lubricity and decrease protein/lipid deposition. Intense pulsed light (IPL) was FDA approved in 1995 to dermatologically treat telangiectatic blood vessels in conditions such as acne rosacea. A few years later, studies were being published about the significant improvement of dry eye symptoms with IPL in patients with meibomian gland dysfunction secondary to ocular rosacea. This case highlights a corneal GP lens patient with a history of end-of-day CL discomfort experiencing a notable improvement in her CL comfort after coating her GP lenses with HydraPEG and completing four IPL treatments.

A 54-year-old white female presents with a history of significant dry eye wishing to return to full-time GP wear. She has been on a variety of dry eye disease (DED) treatments including Restasis, Lipiflow, fish oil tablets, warm compresses, and artificial tears. Her medical history was significant for a recent diagnosis of acne rosacea, for which it was recommended she undergo IPL treatments. She was diagnosed with concomitant ocular rosacea in-office. HydraPEG was applied to her GP CLs and the patient reported she was able to return to an eight-hour wear schedule. For further symptom relief and cosmetic reasons related to her

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ocular rosacea, she underwent the monthly IPL treatments. Following four sessions of IPL, her Standardized Patient Evaluation of Eye Dryness (SPEED) score improved from 9/28 to 13/28. Patient has also begun to downsize her dry eye management regimen.

Dry eye disease is a condition that affects a large population of patients to some degree. HydraPEG and IPL are both viable additions to your clinical arsenal to combat dry eye in contact lens wearers.

*Author*

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*Co-Author(s)*

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*Florencia Yeh, O.D., FAAO, FSLs*

#### **Case Report Abstract**

**Friday, June 21, 2019 12–12:30 p.m.**

#### **OD-Ocular Disease**

#### **Rethinking Risk for Hydroxychloroquine Maculopathy**

Hydroxychloroquine sulfate (HCQ) is an antimalarial agent often used for the treatment of autoimmune disease. It is well documented that use of HCQ can cause toxic maculopathy. The risk factors for maculopathy include daily dose >5.0mg/kg/d, cumulative dose, renal/liver disease, tamoxifen use, age, and underlying retinal disease. This type of toxic maculopathy is not reversible.

TG, a 62-year-old white female, presented with complaints of mildly blurred vision at all distances in her left eye. Her systemic history was positive for hypertension, hyperthyroidism, and systemic lupus erythematosus (SLE). Medications taken include HCQ (200mg BID; 20 years), tiroprium, levothyroxine, lisinopril, and simvastatin. Refraction yielded best corrected visual acuity of 20/20 in both eyes. Upon fundus examination, a granular depigmentation of the RPE of the macula was noted in both eyes, left slightly greater than right.

This finding, alongside central visual field loss on screening visual fields, warranted further testing. One week later, a macula OCT was performed showing a decreased foveal contour with a classic “flying saucer” appearance. A 10-2 Humphrey visual field revealed bilateral paracentral scotomas. Fundus autofluorescence confirmed a parafoveal ring of speckled hypoautofluorescence, left eye more progressed than right. Ishihara color testing revealed a decrease in sensitivity. TG’s PCP was promptly notified and the patient was taken off hydroxychloroquine. At a three-month and six-month follow-up examination, no evidence of progression was noted.

This case represents the importance of awareness of the changing guidelines of HCQ retinopathy management. Due to the finding that risk of toxicity of HCQ is greater than originally believed, the American Academy of Ophthalmology (AAO) updated the guidelines in 2016, which will be explored in this poster. TG, according to reported weight, was taking approximately 5.70 mg/kg/d of Plaquenil. The typical 400mg a day dosing may be inappropriate for patients of lower weight. Past studies show that progression of retinopathy typically occurs in moderate-severe cases rather than mild or subclinical ones. At this time, no progression after discontinuation has been noted despite the original maculopathy classified at a moderate-severe stage.

*Author*

*Nicole Ethridge, O.D.;*

#### **Case Report Abstract**

**Friday, June 21, 2019 12–12:30 p.m.**

#### **OD-Ocular Disease**

#### **Emergent Giant Cell Arteritis Presenting as Unresolving Unilateral Conjunctivitis**

Giant Cell Arteritis (GCA) is a vision-threatening vasculitis which affects medium to large arteries including the ophthalmic and ciliary arteries that

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supply the eye. Sudden vision loss due to arteritic ischemic optic neuropathy (AION) is a common initial manifestation of GCA. This, along with the high probability of permanent vision loss and the potentially life-threatening nature, makes the identification and diagnosis of GCA one of the most critical in the scope of optometry. Vision loss in GCA typically presents along with other classic symptoms including temporal headache, scalp tenderness, and jaw claudication. This is an atypical case of early GCA presenting as an unresolving unilateral conjunctivitis.

A 65-year-old white male was referred by his primary care physician for a presumed unresolving unilateral conjunctivitis, OS, after being unresponsive to Polytrim drops for two weeks. Upon presentation, he reported worsening redness, irritation, and pressure behind the eye which extended temporally. No vision loss, photophobia, jaw claudication, headache, or scalp tenderness were reported. VAs were pinholed to 20/40 OD and 20/25 OS. IOPs, confrontations, ocular motility and pupils were normal and slit lamp exam revealed only injection and chemosis. A DFE and fundus photo were then performed, revealing papillary edema, OS, at which point GCA became the principal differential diagnosis. Stat bloodwork revealed elevated ESR and CRP and the diagnosis of GCA was later confirmed through temporal artery biopsy. After a chain of referrals, the patient was started on oral prednisone which fully resolved the condition, with best-corrected VAs of 20/20 in both eyes.

This presentation of emerging GCA without the classic signs and symptoms of sudden vision loss, jaw claudication, or temporal headache is atypical. It was key in this case to identify a posterior segment problem although it presented like a simple conjunctivitis. This condition could have been sight- or even life-threatening had it not been for the referral to an optometrist. In addition, if the prescription of oral steroids was under the scope of practice of optometry in Washington state, this patient could have been treated sooner, decreasing

the likelihood of a negative outcome.

*Author*

*Kimberly Skyles, O.D.;*

#### Scientific Abstract

**Friday, June 21, 2019**

**12-12:30 p.m.**

#### **Four-year Outcomes of Micro-invasive Glaucoma Surgery with iStent Inject (2nd generation trabecular micro-bypass stent) Combined with Topical Prostaglandin**

Micro-invasive glaucoma surgery (MIGS) is gaining popularity as an effective treatment for patients with glaucoma. Combining trabecular micro-bypass stents and a prostaglandin targets two different outflow pathways, the conventional and the uveoscleral outflow pathways. This study evaluated the safety and IOP-lowering efficacy of iStent inject® (2nd generation trabecular micro-bypass stents) implanted as a standalone procedure in subjects with open-angle glaucoma (OAG) on two ocular hypotensive medications.

This prospective study enrolled 53 subjects with OAG on two ocular hypotensive medications and with IOP of 18-30 mmHg (medicated) and 22-38 mmHg (following medication washout). Two iStent inject devices were implanted as a standalone procedure, and topical travoprost was started on postoperative Day 1. Assessments performed over the course of the study included IOP, medication usage, adverse events, visual acuity, slit-lamp, gonioscopy, and fundus copy. Annual medication washout was performed. Postoperative safety and efficacy evaluation through five years is currently underway.

All 53 subjects enrolled in the study completed follow-up out to 49 months. Mean medicated IOP at M48 is 13.1 mmHg compared to 19.7 mmHg preoperative (34% reduction). Mean unmedicated IOP at M49 is 17.7 mmHg compared to 24.9 mmHg preoperative. Postoperative mean IOP on

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travoprost remained at or below 13.1 mmHg at all timepoints assessed through M48. 91% of subjects achieved IOP of  $\leq 18$  mmHg on 1 medication; 81% achieved IOP  $\leq 15$  mmHg. All eyes underwent uncomplicated implantation of iStent inject with no significant postoperative adverse events reported including no reports of hypotony, peripheral anterior synechiae or choroidal hemorrhage or effusion. Visual acuity, C/D ratio, and visual field remained stable through M48.

In this study, patients with OAG not controlled on two topical ocular hypotensive medications demonstrated safe and sustained clinically meaningful IOP and medication reduction through four years after standalone implantation of two iStent inject trabecular micro-bypass stents in conjunction with postoperative topical travoprost. The findings from this study demonstrated the beneficial outcomes of iStent inject implantation combined with a postoperative prostaglandin as a treatment for patients with OAG on more than a single medication.

*Author*

*Justin Schweitzer, O.D.;*

#### **Scientific Abstract**

**Friday, June 21, 2019**

**12-12:30 p.m.**

#### **A Randomized Pivotal Clinical Trial of iStent Inject (Second-generation Trabecular Micro-bypass Stents) Implanted in Conjunction with Cataract Surgery Compared to Cataract Surgery Alone**

Micro-invasive glaucoma surgery (MIGS) with trabecular micro-bypass stents is gaining popularity as an effective treatment for patients with open-angle glaucoma. This US IDE pivotal trial aimed to evaluate the effectiveness and safety of the second-generation trabecular micro-bypass stents (iStent inject®) implanted in conjunction with

cataract surgery compared to cataract surgery alone in subjects with mild to moderate open-angle glaucoma (OAG).

This was a two-year prospective, randomized, concurrently controlled, parallel groups, multicenter trial that enrolled subjects  $\geq 45$  years diagnosed with mild to moderate OAG on 1-3 medications with a cataract eligible for surgery. Baseline post-washout mean diurnal IOP of 21-36 mmHg was required in the study eye. Qualified subjects were randomized to implantation with 2 iStent inject devices in conjunction with cataract surgery (treatment group) or cataract surgery alone (control group). Annual medication washouts were performed. Key study assessments included: IOP, BCVA, pachymetry, VF, specular microscopy, biomicroscopy, gonioscopy, funduscopy, and adverse events.

A total of 505 subjects were randomized in a 1:3 ratio to either the control (N=118) or treatment (N=387) group. Subject accountability at Month 24 was 96%. At M24, 75.8% of treatment eyes vs. 61.9% of control eyes achieved  $\geq 20\%$  reduction from baseline in unmedicated IOP (difference = 13.9%;  $p = 0.003$ ). Mean reduction in unmedicated IOP from baseline was greater in treatment eyes ( $7.0 \pm 4.0$  mmHg) than control eyes ( $5.4 \pm 3.7$  mmHg;  $p < 0.001$ ). Eighty-four percent (84%) of iStent inject subjects were medication-free at postoperative Month 23. Overall the safety profile of the treatment group was favorable and similar to that of the control group throughout the 2-year follow-up. Notably there were no reports of choroidal hemorrhage or effusion, corneal decompensation, or significant hyphema.

Clinically and statistically greater reductions in IOP without medication were achieved after iStent inject implantation in combination with cataract surgery vs. cataract surgery alone, with excellent safety observed through 2 years.

*Author*

*Roberto Saenz, O.D., MS, FAAO*

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#### Scientific Abstract

Friday, June 21, 2019

12–12:30 PM

#### Review of a Digital Contact Lens Fitting Support Tool for Eye Care Professionals

Since the digital revolution, several apps have been developed to support eye care professionals (ECP) during contact lens (CL) practice. A multifunctional app and website tool, available since 2014 (OptiExpert, CooperVision), is one example, available in 79 countries and 15 languages worldwide, and provides multifocal and toric calculators to support their prescribing and fitting. The purpose of this study was to understand how ECPs use the tool.

Two months of data (November and December 2018) on usage of the app were collated on country, duration of visit, use of fitting calculators and other educational tools.

There were a total of 72,355 sessions by 36,542 users which was 1.98 sessions per user with an average session duration of three minutes. 61.1% of ECPs were returning users. The UK has the most sessions (16,384) and users (7,877) followed by Germany (9,701 sessions and 4,920 users) and the recently launched USA (6,982 sessions and 4,902 users). The app is accessed predominantly by desktop (53.6%) and mobile (40.0%). Globally, ECPs used both the toric calculators (60.3% by session, 68.2% by user) and multifocal calculators (36.0% by session and 46.8% by user) for fitting advice in addition to sourcing product information. U.S. practitioners demonstrated similar trends with both the toric (65.05% by session, 68.78% by user) and multifocal (31.63% by session and 39.47% by user) calculators. Considering U.S. prescribing trend data by CL design, the use of the multifocal calculator in comparison to that for torics is over indexed since toric CLs are prescribed nearly two-and-a-half times more than multifocals.

This novel analysis highlights that ECPs utilise the digital tool to support fitting of toric and multifocal CLs. Repeated use suggest that the app benefits their success in practice and that more support is needed when fitting multifocal compared to toric CLs. Further analysis of ECP satisfaction in using the OptiExpert tool is desired to understand how this can further help their needs.

*Author*

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*Co-Author(s)*

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*Dan Prest;*

#### Case Report Abstract

Friday, June 21, 2019 12–12:30 p.m.

#### OD-Ocular Disease

#### Roth Spots Secondary to Vitamin B-12 Deficiency

Roth spots are retinal hemorrhages with a characteristic white center—composed of fibrin—seen in conditions which cause retinal blood vessel damage typically due to endothelial cell dysfunction. Common causative conditions include, but are not limited to: bacterial endocarditis, diabetes, leukemia, and anemia. Despite occurring secondary to a systemic condition, patients with Roth spots may be asymptomatic.

A 65-year-old black male diagnosed with angle recession versus open angle glaucoma in the right eye, open angle glaucoma suspect in the left eye, presented for a six-month eye evaluation. His treatment regimen included: Travatan Z 1 gtt nightly and Simbrinza 1 gtt every 8 hours in both eyes. He had a medical history significant for chronic hepatitis C, interferon treatment, lung cancer, and cocaine/alcohol/opioid dependence. During the dilated fundus exam a Roth spot was noted in the right eye in addition to two cotton

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wool spots, and one cotton wool spot in the left eye. Fundus photos were taken to document the findings and the patient was questioned further about his medical history. The patient denied history of heart problems, autoimmune diseases, hypertension, diabetes, HIV, and intravenous drug use. He was referred to his primary care physician with the exam findings for further analysis. The primary care physician ordered updated blood testing and found that the B-12 deficiency, and history of alcohol abuse, caused an increase in PLT. He was treated with vitamin B-12 1,000 mcg intramuscular daily for one week, then once a month, then maintenance. The Roth spot and cotton wool spots resolved at the follow-up eye evaluation three months later.

Presence of Roth spots require further testing to evaluate the underlying condition which is causing the hemorrhage(s). Despite not affecting vision in most cases, Roth spots present a serious concern to systemic health and require coordination with the primary care physician for blood work and additional lab testing. Failure to do so can result in serious complications including death. Once the underlying condition is found and treated Roth spots will resolve without targeted treatment.

*Author*

*Adrian Kun, O.D.;*

#### **Scientific Abstract**

**Friday, June 21, 2019**

**12-12:30 p.m.**

#### **Primary Eye Care and Obstructive Sleep Apnea: An Objective Neurologic Test of Eye Movements Demonstrates Baseline Dysfunction And Improvement With Treatment**

There is long-standing evidence to support the association between sleep disorders and a variety of diseases and conditions including neurologic disorders, ophthalmic diseases, and other

comorbidities. One of the most common sleep disorders is obstructive sleep apnea, or OSA. Clinical evaluation of suspected OSA is reliant upon subjective reports of excessive daytime sleepiness, snoring or witnessed apnea. These require questioning of patient recognition or bed partner recall, either which may be inaccurate or unavailable. Although clinical guidelines suggest utilizing reports of excessive sleepiness as the preferred method to target OSA suspects for further evaluation, this does not always reliably differentiate those patients with or without OSA. In addition, existing OSA clinical guidelines do not take into account the visual system and associated risks from OSA to vision and overall health. Direct measurement of impaired brain function caused by sleep deprivation and hypoxia has the potential to augment clinicians' suspicion of disease and objectively assist in patient risk stratification and early intervention. The King-Devick Test (KDT) in association with Mayo Clinic is a rapid number naming test used in baseline assessments and remove from play decisions for concussion. It is an objective physical measure of neurologic function, allowing assessment in a quick, easily administered manner. Rapid number naming requires saccades, attention, and language, as well as other areas involved in reading. It evaluates function of the brainstem, cerebellum, and cerebral cortex. Abnormalities in saccadic eye movements have been shown to be associated with sleep deprivation, hypoxia and cognitive impairment-issues frequently found in OSA patients. Prior work has demonstrated significant KDT time differences related to neurologic conditions such as dementia and Parkinson disease. The test is effective at detecting acute hypoxic impairment, even at early pre-symptomatic stages, so has promise in OSA where patients may have with repeated hypoxic events. The KDT has been utilized in a few small studies of sleep restricted or deprived subjects but had not been utilized previously in OSA suspect patients. Our objective was to obtain baseline KDT times for patients suspected of OSA presenting to

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the Mayo Clinic Arizona Sleep Lab. We hypothesized correlation between slower KDT times (i.e. worse function) and greater severity of OSA. We also hypothesized that OSA patients who adhered to continuous positive airway pressure (CPAP) treatment would demonstrate improvement in brain function as measured by decreased KDT times compared to baseline.

Study dates January 30 to July 31, 2018. Subjects were referred for initial evaluation of Sleep Disordered Breathing concerns. OSA severities were defined by Apnea Hypopnea Index (AHI) results, with  $\geq 15$  considered at least moderate OSA. The KDT is an objective physical measure of brain function that assesses eye movement and was chosen due to ease of use and rapid administration. We estimated correlation between KDT time and AHI and compared mean KDT time between patients with and without moderate OSA. For the OSA subgroup, we evaluated for potential improvement in KDT after intervention with CPAP treatment.

Sixty subjects were enrolled. We found that 35 of 60 subjects (58.3%) had OSA with an AHI  $\geq 15$ . Initial analyses noted no significant KDT time differences between subjects based on OSA severity. However, after excluding three subjects who had baseline neurologic illness, adjusted analyses demonstrated that mean KDT time was significantly prolonged for patients with moderate or greater OSA (AHI  $\geq 15$ ) as compared to those with mild or no sleep apnea (AHI  $<15$ ); 63.4 seconds versus 55.7 seconds,  $p=0.03$ , 95%CI (58.9-67.8). CPAP treated subjects demonstrated significantly improved KDT test times; 63.5 seconds mean pretreatment vs. 55.6 posttreatment; -6.6 seconds mean difference,  $p=0.02$ , 95%CI (-12.0, -1.13).

Targeted assessment of eye movements is quickly emerging as an objective clinical measure of patient neurological function associated with a myriad of specific conditions and diseases. Doctors of optometry are well positioned to play a key role in reducing the negative health impacts of

OSA. Early detection of OSA can reduce the risk of associated health conditions including cardiovascular disease, hypertension, cognitive impairment, obesity, and metabolic abnormalities. From a visual system standpoint, OSA is associated with glaucoma, floppy eyelid syndrome (FES), dry eye syndrome, corneal ulceration, nonarthritic ischemic optic neuropathy (NAION), age-related macular degeneration (AMD), diabetic retinopathy, papilledema, central serous chorioretinopathy, and keratoconus. Administration of the KDT as a quick and objective physical measure of neurologic function using eye movements is shown to identify baseline abnormalities in patient with OSA. In addition, significant neurologic improvement is achieved after patients are treated with CPAP. Use of KDT is indicated to augment clinicians' risk stratification, clinical decision making, and timely primary care management decisions for patients with and/or at risk for OSA. Findings from this study also reinforce the 2016 National Academies of Sciences, Engineering, and Medicine report highlighting the value of primary eye care in health care and opportunity for doctors of optometry to further assist in improving population health outcomes.

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#### Case Report Abstract

Friday, June 21, 2019 12–12:30 p.m.

#### PC-Primary Care

##### Using OCT-Angiography to Evaluate Retinal Vein Occlusions

A 57-year-old black female patient presented for a chief complaint of blurry vision in the left eye which she could localize as being worse nasally. She thought she may have scratched her left eye at work doing construction about two weeks ago, which is when the blur started.

The patient explained that she was having 'cloudy' vision in the left eye which was worse in the morning. Her BCVA was 20/30 on examination. All anterior segment findings were normal and not indicative of any ocular trauma at work. A dilated fundus exam was performed, which revealed a branch retinal vein occlusion in the left eye with macular thickening visualized on OCT. An additional OCT-Angiography was accomplished which was able to localize the exact location of the occlusion. Consistent with the statistics which suggest that 80 % are temporal, this patient had a superior temporal BRVO. OCT Angiography was instructive to show the reduction in blood flow in the area of occlusion. It does have limitations too which include motion artifact and artifacts from the blood as well. The IS-OS Ellipsoid En Face image is particularly helpful at localizing the occlusion.

This case illustrates a classic example of a branch retinal vein occlusion, but includes a newer way of visualizing this disorder. OCT Angiography is being utilized in many settings, but is particularly helpful in detecting early macular degeneration, diabetic changes and occlusive events in the retina. This case specifically shows a recent BRVO, but comparison can be made in the setting of an old BRVO in which funduscopy may reveal a 'normal' appearing retina, but on further investigation, OCT-A reveals a much more complete history.

*Author*

*Pierce Kenworthy, O.D., FAAO;*

#### Case Report Abstract

Friday, June 21, 2019 12–12:30 p.m.

#### OD-Ocular Disease

##### Characteristic Imaging Findings in Acute Macular Neuroretinopathy

Acute Macular Neuroretinopathy results in the sudden onset of paracentral scotomas affecting one or both eyes. Fixation is spared, but the scotomas tend to persist indefinitely. Affected individuals tend to be generally healthy young women who often report a flu-like illness prior to the onset of symptoms. The etiology is unknown, though a vascular etiology is thought to be likely. There is no known disease-modifying intervention.

A systemically-healthy 30-year-old white female with a history of migraine aura and low myopia presented for evaluation of a paracentral blind spot in the vision of her left eye which she had noticed acutely 10 days earlier. The blind spot affected an area immediately below fixation, was persistent, and stable since first noted. She denied any other visual symptoms. Two weeks before noticing the blind spot she had experienced a few days of malaise, nausea, and vomiting. Upon examination, her vision was found to be 20/20 OD, OS. Her pupil evaluation, confrontation fields, extraocular motilities, and intraocular pressure were unremarkable. Amsler grid and Humphrey Visual Field testing revealed an inferior, paracentral scotoma. Slit lamp and fundus examination were unremarkable. OCT testing was performed and revealed minimal superior perifoveal thinning OS corresponding to the scotoma. The en face infrared image revealed dark petalloid lesions in the same retinal location. One month after presentation, her symptoms and exam were stable. At follow-up three, seven, and 13 mos after initial presentation her symptoms were stable with

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partial resolution of OCT findings.

Considering its rarity, there is much that remains unknown about Acute Macular Neuroretinopathy. The differential diagnosis for the condition includes Multiple Evanescent White Dot Syndrome and Acute Posterior Multifocal Placoid Pigment Epitheliopathy. Thankfully, the characteristic dark petaloid perifoveal lesions noted on infrared imaging (such as the en face imaging from OCT instrumentation) as well as the outer-retinal changes noted on OCT allow the practitioner to quickly and accurately make the diagnosis. While there is no viable treatment at this time, patients can be reassured that the condition is not progressive and practical visual limitation is uncommon.

*Author*

*Gabriel Fickett, O.D.;*

#### **Scientific Abstract**

**Friday, June 21, 2019**

**12-12:30 PM**

#### **Positive Predictive Value of Vision Screening Devices During Well-child Visits**

Photoscreening devices are widely used in primary care physician offices. Failed vision screenings result in referral for possible amblyogenic risk factors. The variety of photoscreening devices has raised concerns regarding reliability and positive predictive value. The purpose of this study is to assess the positive predictive value assessment of failed vision screenings referred from 2015 to current. This is a masked prospective cohort study of photoscreening referrals with known screening data.

Patients with a failed vision screening by a photoscreening device were referred to a pediatric eye care practice for comprehensive eye exam, extraocular motility assessment, and refraction measurements. All failed vision screenings received

a cycloplegic refraction. Based on visual acuity and AAPOS prescribing guidelines, glasses were given if visual acuity in the amblyopic eye was worse than 20/40, interocular difference was greater than 2 Snellen lines, > 1.00 D difference between eyes in spherical equivalent, >1.50 D difference between eyes in astigmatism in any meridian, or myopia or hyperopia > than 3 diopters. Subjective cycloplegic refractions were compared with Retinomax K plus 3 measurements. The devices for failed vision screenings were assessed for positive predictive value and confidence intervals. Devices utilized in this study were the Iscreen, SPOT, GoCheckKids application, and PlusOptiX. Outcomes were compared with the previous failed vision screening report.

There were 232 pediatric participants with referral to the practice as a result of a failed vision screening at a well-child exam. The positive predictive values (PPVs) of 69.5% for Iscreen, 40.5% for SPOT, 30.0% for PlusOptiX, and 7.7% for GoCheckkids were found. The overall confidence interval is 95%. The only screening device with a confidence interval greater than 50% was the Iscreen device.

In this study, it was determined certain photoscreening devices can reliably screen for refractive and strabismic risk factors that can lead to amblyopia. Certain devices are considerably more reliable and have a higher positive predictive value.

*Author*

*Brittney Morales, O.D.;*

#### **Scientific Abstract**

**Friday, June 21, 2019**

**12-12:30 p.m.**

#### **Establishing an Open Access Clinic to Increase Compliance with Annual Diabetic Eye Exams**

Diabetic retinopathy is the leading cause of

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blindness among working-age Americans. Annual diabetic eye exams are recommended to screen for diabetic retinopathy, but only about 30% are compliant with this nationally. The compliance rate within UMass Memorial Health Care, the largest health care system in Central Massachusetts, was 22% prior to the present pilot study. Previously patients were referred to Hahnemann Eye Center, an off-site campus, where no-show rate was high. Our goal was to establish a satellite eye clinic at the main university campus allowing same-day access to eye exams for diabetic patients, and to investigate whether increased access to care will have an impact on screening rates for diabetic retinopathy.

A new optometry clinic was established next to the Diabetes Center of Excellence at the university campus. Number of patients seen, types of pathologies discovered, no-show rates, number of scheduled visits versus walk-in visits, patient satisfaction and percentage of compliance with annual eye exams were measured.

The university campus optometry clinic has been operating full-time since 09/2018, accepting both scheduled and walk-in patients. From September to December 2018, 930 patients were examined. Walk-in patients comprised of 8% of all patients seen. No-show rate at this clinic was 8.5 %, markedly lower than that for the same providers at Hahnemann (~ 25% out of 710 total patients seen). A subset of 104 patients were referred to Hahnemann for management of diabetic retinopathy (34%), glaucoma (27%), cataract (18%), age-related macular degeneration (4%), and miscellaneous (21%). Preliminary surveys indicate patients seen at this clinic are highly satisfied, with 86 % preferring this location (and the rest showing no preference between the two locations). For some providers, the compliance with annual eye exams have increased to 95%, which reflected in an increase in Accountable Care Organization (ACO) profitability.

We have shown that an optometry clinic in the hospital setting may provide convenient access to

diabetic patients, improving compliance with annual diabetic eye exams, allowing early detection of diabetic eye disease, and increase in patient satisfaction.

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### Case Report Abstract

**Friday, June 21, 2019 12–12:30 p.m.**

### OD-Ocular Disease

#### Masquerades of Carotid Cavernous Fistula

Carotid cavernous fistula (CCF) results from an abnormal connection between the cavernous sinus and the carotid arterial system. CCFs are classified as direct or dural depending on where the abnormal communication lies. CCFs are caused by either trauma or are idiopathic. Clinical triad of conjunctival chemosis, pulsatile proptosis, and an ocular bruit. However, due to the subtle and varying presentation of signs and symptoms, they can often be misdiagnosed. Prompt diagnosis is important as early treatment has a high success rate and prevents vision loss.

A 65-year-old white female presented with lid swelling OU that started onemonth ago after a sinus infection. She finished oral antibiotics and used Maxitrol drops bid x one week with no improvement. She denied eye pain, itching, and injury. Systemic health is significant for hypertension, hyperlipidemia, depression, and arthritis. Ocular history of meibomian gland dysfunction, cataracts, and choroidal nevus OD. Family history of thyroid disease in her sister. Visual acuity of 20/20 OD, 20/30 OS. Entrance testing unremarkable. Slit lamp exam reveals conjunctival chemosis OS>OD, diagnosed with viral conjunctivitis. At two-week follow-up, presented with horizontal binocular diplopia and blur OS.

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Abduction deficit OS led to diagnosis of left cranial nerve 6 palsy. Ancillary testing revealed normal exophthalmometry and blood work for thyroid stimulating hormone, thyroxine, and triiodothyronine. Computed tomography (CT) scan revealed enlarged superior ophthalmic vein OS>OD. Based on clinical findings and labs, diagnosed with carotid cavernous fistula, confirmed with CT angiography. Coil embolization surgery performed OS. At 1-month follow-up, presented for new onset diplopia and cranial nerve 6 palsy OD. Coil embolization surgery performed OD, complete resolution of diplopia at 6-month follow-up.

In the early stages of CCF, it can often be misdiagnosed as conjunctivitis and asymmetric glaucoma due to the subtle presentation. CCF can mimic orbital diseases including thyroid eye disease and idiopathic orbital inflammatory syndrome. Prompt diagnosis is important as delayed diagnosis puts the vision at risk usually from glaucoma, ischemic optic neuropathy or chorioretinal dysfunction. Definitive diagnosis requires arteriography. Prognosis varies from complete to incomplete resolution after treatment.

*Author*

*Eun-Young Ko, BSc;*

#### **Case Report Abstract**

**Friday, June 21, 2019 12–12:30 p.m.**

#### **OD-Ocular Disease**

#### **Multiple Sclerosis: Making the Diagnosis when Atypical Findings are Present**

Optic neuritis is often a presenting manifestation of multiple sclerosis. When presented classically the link between optic neuritis and multiple sclerosis is quite clear. However, when atypical features are present a more investigative diagnostic workup is required. This case features typical and atypical clinical findings, diagnostic testing to rule out differential diagnosis, and co-management with neurology for a patient whose initial complaint of right sided headache, blurred

vision, and hearing loss lead to an early diagnosis of multiple sclerosis.

A 36-year-old black woman presented to the emergency department with complaints of right sided headache and right eye blurred vision for four days. She also reported muffled hearing in her right ear for over six months. A CT was performed and determined unremarkable. She was then referred to the optometry clinic to evaluate her complaint of worsening unilateral central vision loss and photophobia. Entering visual acuities were OD: 20/80 and OS: 20/20. Pupil, CVF, and EOM testing was normal. Anterior and posterior segment examination was unremarkable. Macular OCT and GCA were unremarkable. A large central scotoma was noted on Amsler grid testing. Medical history was significant for tinnitus, vertigo, vitamin D3 deficiency, generalized anxiety disorder, and PTSD. Two weeks later the unilateral vision loss persisted. Entering visual acuities were OD: 20/100+2 and OS: 20/20. New findings included a slow response to light OD on pupil testing and pain on right gaze on EOM testing. All other findings were stable from the initial exam. An MRI was ordered but found inconclusive. Neurology was consulted and a lumbar puncture was performed that returned positive for oligoclonal bands. Additional ocular testing performed at follow up included a visual field in which a nasal hemianopsia OD was noted, impaired color vision on Ishihara, and GCA with nasal thinning.

Benefits of early diagnosis and treatment of multiple sclerosis have been well documented. Unfortunately, diagnosis can be delayed or complicated by atypical features. This patients' unilateral complaints of headache, missing vision and difficulty hearing combined with absence of pain on eye movement prompted a thorough diagnostic evaluation that resulted in a diagnosis of multiple sclerosis.

*Author*

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*Co-Author(S)*

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#### Case Report Abstract

Friday, June 21, 2019 12–12:30 p.m.

#### OD-Ocular Disease

##### Stellate Nonhereditary Idiopathic Foveomacular Retinoschisis

Stellate nonhereditary idiopathic foveomacular retinoschisis (SNIFR) is a rare condition which is most commonly unilateral. Although bilateral presentation is possible, is it not as common. SNIFR is due to a separation of neurosensory retina at the level of the outer plexiform layer with lesser involvement of outer nuclear layer. Patients with SNIFR usually have little to no symptoms with mild reduction in visual acuity. Although infrequent, there have been some reported cases of subretinal fluid and subsequent retinal detachment with reduced visual acuity due to SNIFR.

A 61-year-old white male presents for cataract evaluation with blurry vision OD>OS which started 2+ years ago with constant presentation and gradual onset affecting both near and far vision. Patient's medical history include: type II diabetes, hypertension, anxiety, COPD, depression, acid reflux, and elevated lipids. Past ocular history includes: refractive error, vitreomacular adhesion OD, cataract OU. Patient's BCVA are 20/60 OD, 20/30 OS. EOMS, Pupils, CVF are all within normal limits. Anterior slit lamp examination is remarkable for 2+ nuclear sclerosis with 1-2+ cortical changes OU. Dilated fundus examination is remarkable for stellated appearance at the macular area OD otherwise unremarkable. OCT scans of the right macula reveals retinoschisis at the level of outer plexiform layer. A diagnosis of SNIFR was discussed with the patient. Patient was referred to a retina specialist for clearance prior to cataract surgery as patients with SNIFR are at risk for retinal detachment following surgery.

Patients with SNIFR require no active management. Pars plana vitrectomy with ILM peel has shown success in a limited sample size of

patients with reduced visual acuity. This is due to accelerated diffusion of serous fluid from the retina to the vitreous. Even though no active management is required, caution should be employed prior to cataract surgery since there has been reported cases of complications, including retinal detachment following cataract surgery.

*Author*

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*Kathryn Deliso, O.D.;*

#### Scientific Abstract

Friday, June 21, 2019

12:30-1 p.m.

##### Interim Results of a Prospective, Randomized Phase 2 Study Evaluating the Safety and Efficacy of Travoprost Intraocular Implants

The iDose is a novel sustained-release travoprost implant under development as a treatment option for glaucoma. This US IND phase 2 study evaluated the safety and efficacy of two Travoprost Intraocular Implants, one with a fast-elution rate and one with a slow-elution rate (referred to as iDose-slow and iDose-fast) compared to Timolol Ophthalmic Solution, 0.5%, in subjects with OAG or OHT, either on no ocular hypotensive medication or using up to 3 medications.

This is a prospective, randomized, double-masked, active-controlled, parallel-group, multicenter US IND phase 2 trial. The study enrolled phakic or pseudophakic subjects ages  $\geq 18$  years diagnosed with mild to moderate OAG or OHT on 0 to 3 medications, with a baseline mean diurnal IOP of 21-36 mmHg in the study eye (a washout was required for subjects on ocular hypotensive medication(s)). Qualified subjects were randomized (1:1:1) to implantation with iDose-fast or iDose-slow as a standalone procedure, or treatment with topical timolol BID. Key study

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assessments include: BCVA, pachymetry, VF, endothelial cell density, biomicroscopy, gonioscopy, funduscopy, and AEs.

A total of 154 subjects were randomized to the study: iDose-slow (n=54), iDose-fast (n=51), timolol (n=49). All subjects completed the 12-week follow-up visit (with a subset completing 1 year). Per study design, continued follow-up is planned through 3 years. Initial efficacy was demonstrated through Week 12 with all 3 study groups achieving at least 30% IOP reduction. An excellent safety profile was observed with no reports of hyperemia, intraoperative or serious ocular AEs in the iDose groups.

The interim results of this prospective randomized double-masked phase 2 trial demonstrate initial efficacy of both the iDose-fast and iDose-slow implants out to 12 weeks with at least 30% IOP reduction. An excellent safety profile was observed with no hyperemia, intraoperative or serious ocular AEs reported to date in either of the iDose groups. Travoprost Intraocular Implants (iDose) showed favorable initial efficacy and safety in this study. The iDose implant has the potential to change the treatment paradigm in glaucoma.

*Author*

*Mitch Ibach, O.D.*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**12:30- 1 p.m.**

#### **PC-Primary Care**

#### **Mild Vision Loss as the Sole Manifestation of a Meningioma**

Meningiomas are the most common primary brain tumors. Although usually benign, these tumors may cause significant morbidity due to their location in the central nervous system. The World Health Organization has generated a classification system in which meningiomas are assigned Grade

I, II, III based on characteristics of the tumor and it is this categorization which aids in determining the treatment plan. Visual changes may be a symptom of meningiomas, especially if the tumor affects the optic nerve sheath, the cavernous sinus, or the parasellar region.

A 61-year-old female presented with mild vision loss in the left eye and reported that she had been experiencing blur at all distances for the past 1-2 months. The patient denied any accompanying neurological symptoms. The patient's BCVA was 20/20 OD and 20/30-1 OS. The patient also reported metamorphopsia OS upon Amsler grid testing. Color vision testing, macula OCT, and RNFL OCT were performed. Moderate NFL thinning was present bilaterally. Upon return visit, stereoscopic fundus photos, fundus autofluorescence and threshold visual field testing was conducted which revealed a deep central scotoma with adjacent mid-peripheral reduction. An MRI of the brain and orbits was ordered. Neuroimaging revealed a meningioma in the left parasellar region, extending into the left optic canal and the cavernous sinus. Due to the size and location of the tumor, in addition to the patient's reduced visual function, the neurologist proceeded with a modified orbitozygomatic craniotomy for resection of the tumor. The pathology analysis of the tumor classified it as Grade I. Following the resection, the patient suffered from reduced vision in the left eye and diplopia upon left gaze which gradually improved.

In patients with unexplained vision loss, even if the loss is mild, a space-occupying lesion must be excluded. Visual symptoms may be the initial sign of a meningioma, and the degree of visual function loss may help determine the appropriate treatment course. Visual loss may also occur as a result of tumor resection, and optometrists may play an important role in detection and the post-operative management of these patients.

*Author*

*Brianne Hobbs, OD, FAAO*

*Co-Author(s)*

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*Grace Liao, OD*  
*Kaila M. Osmotherly, O.D.*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**12:30-1 p.m.**

#### **OD-Ocular Disease**

##### **Pediatric Orbital Floor Fracture with Symptoms Mimicking Inferior Rectus Entrapment**

As the structurally weakest area of the orbit, the orbital floor is the most likely area to sustain fractures due to trauma. Orbital floor fractures with entrapment of the inferior rectus muscle are more common in pediatric patients and typically cause symptoms of binocular diplopia, upward gaze restriction, pain on eye movement, nausea and vomiting. This is a case of orbital floor fracture in a pediatric patient presenting with the typical symptoms of, but without, muscle entrapment.

MP, a 9-year-old male on a soccer trip from Canada, presented with binocular diplopia, a restriction of upward eye movement, and pain on downward eye movement after being kicked in the left eye the previous day. The diplopia was present directly following the incident while pain, photophobia, nausea and vomiting presented later. VAs were 20/20 OD/OS, pupil response was normal. EOMs were restricted OS in all superior gazes with pain on inferior gaze. All structures on DFE were normal. An orbital floor fracture with muscle involvement was highly suspected. Photos were taken and the patient was referred for an orbital CT scan at the nearest hospital. The patient had a CT done in Canada the next day, which revealed a left orbital floor fracture without muscle entrapment. After follow-up by email one month later, all symptoms had improved except upward motion, which had not fully recovered.

It is our responsibility as optometrists to plan

the course of action that will result in the best outcome for our patients. In the case of a possible inferior rectus entrapment in a pediatric patient, a decision on whether surgical treatment is warranted should be made quickly. As the presenting history and symptoms have a high positive predictive value for inferior rectus entrapment, it was important that I recommend an immediate CT scan to then determine if surgery was needed. This is an unusual case as the CT scan ruled out muscle entrapment, though it presented with the typical signs. This patient did not have to undergo surgery as treatment and, at last follow-up, continues to improve.

*Author*  
*Kimberly Skyles, O.D.*

#### **Case Report Abstract**

**Friday, June 21, 2019 12:30-1 p.m.**

#### **OD-Ocular Disease**

##### **Toric Implantable Collamer Lens (ICL) Implants in Eyes Contraindicated for LASIK**

Traditionally, corneal conditions such, as keratoconus, corneal scarring, or histories of herpes simplex were contraindications for LASIK. With the Visian Toric Implantable Collamer Lens (toric ICL, STAAR surgical) gaining FDA approval in 2018, patients with myopic astigmatism and corneal abnormalities potentially have an option to improve their uncorrected visual acuity (UCVA) with toric ICLs. Three patients with myopic astigmatism ranging in age from 33 to 36 years old were implanted with toric ICL from November 2018 to January 2019. Each patient had previously been told they were not candidates for LASIK. Pre-operative best corrected visual acuity, mean spherical equivalent, sphere, and cylinder were measured preoperatively, and at one day and one month visits.

TH had stable keratoconus with a pre-operative manifest of -5.50-2.00x001 in the right eye and

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-5.00-1.25x 147 in the left eye with BCVA of 20/20 in both eyes. One-day status post toric ICLs, UCVA was 20/25 in the right eye and 20/20- in the left eye. The UCVA in both eyes was unchanged at one-month post-operatively. The BCVA one-month post-operative was 20/20 in both eyes. TH, who elected to have implantation of a toric ICL, had a corneal scar in the left eye and had a preoperative BCVA of 20/80 with a manifest refraction of -4.00-4.00x 166. At one-day post-operative, the UCVA and BCVA was 20/50 and at one-month post-operative, the UCVA and BCVA was 20/25. CV had a history of herpes simplex keratitis and was correctable to 20/15-2 pre-operative in the right eye with a manifest refraction of -3.50-3.75x175. The left eye was also correctable to 20/15-2 with a manifest refraction of -3.25-4.00x006. One-day post-operatively the patient had UCVA of 20/15 in the right eye and 20/25 in the left eye. At the one-month post-operative visit, the UCVA and BCVA was 20/15-2 and 20/15-2 OU.

Implantation of the Visian Toric ICL can be an effective option for improving uncorrected visual acuity in patients who were previously non-candidates for LASIK.

*Author*

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#### **Scientific Abstract**

**Friday, June 21, 2019**

**12:30-1 p.m.**

#### **Modern Approach to Assist Toric Lens-fitting Using a Web Application**

To optimize patient chair time, online apps are available to recommend contact lens prescriptions based on the subjective refraction. This study is comparing fitting results with toric daily disposable silicone hydrogel (DDSH) lenses using traditional fitting guides to the prescriptions recommended by

the OptiExpert online lens-fitting app.

Two DDSH toric lenses; stenfilcon A and somofilcon A (both from CooperVision) were fit to 54 and 37 habitual lens wearers, respectively. The investigator followed the manufacturer's fitting guides and the final lens prescription (Investigator-Rx) was determined based on the over-refraction and lens rotation. Participants wore these lenses for approximately one week. In a retro-analysis the subjective refraction data and back vertex distance were entered in the online app to determine the recommended Rx (App-Rx). Fitting results from both approaches were compared using Pearson correlation analysis. To determine how closely the results matched for each lens type, different criteria for sph ( $\pm 0.25$ ,  $\pm 0.50D$ ), cyl ( $\pm 0.00DC$ ) and axis ( $\pm 10$ ,  $\pm 20$ degrees) were applied to calculate the percentage of matching fitting results.

A high correlation was found for both toric lens types in respect to sph, cyl and axis between the Investigator-Rx and the App-Rx (stenfilcon A  $r > 0.92$ , somofilcon A  $r > 0.97$ ). For criteria sph  $\hat{A} \pm 0.25D$ , cyl  $\hat{A} \pm 0.00DC$ , axis  $\hat{A} \pm 10$ , the lens prescriptions from both methods matched in 82% of eyes with stenfilcon A and 75% of eyes in somofilcon A. For criteria sph  $\hat{A} \pm 0.50D$ , cyl  $\hat{A} \pm 0.00DC$ , axis  $\hat{A} \pm 20$  the Investigator-Rx and the App-Rx matched in 91% (stenfilcon A) and 92% (somofilcon A) of eyes respectively. The lens cylinder power was correctly calculated by the App in all eyes, except for three eyes when fitted with somofilcon A and one eye when fitted stenfilcon A.

The performance of the toric DDSH lenses was very predictable, resulting in a high level of agreement between the fitting app and the investigator dispensed lens. The OptiExpert app can confidently be used as a clinical tool to aid toric lens-fitting success.

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#### Scientific Abstract

Friday, June 21, 2019

12:30-1 p.m.

#### Perception of Earliest Recommended Pediatric Eye Exam Age by Health Professional Students

Health care is moving toward an increase in interprofessional collaborative practice (ICP) as a goal of enhancing quality of care. One method of improving quality of care is for other health care professionals to understand some of the fundamentals of other professions. For example, parents may ask other health care professionals when pediatric patients should have their first eye examination. To our knowledge, there are no studies examining the understanding of the earliest age of eye examinations by other health care professional students (HPS). The purpose of this study was to determine various HPS with no formal education on optometry at what earliest age they believe the first eye examination should occur.

A total of 441 students ages 20 to 45 ( $M=24.25$ ,  $SD=\pm 3.35$ ) years completed an optional paper survey. The survey was distributed in a single course given to first-year osteopathic medicine, dental medicine, and pharmacy students in the winter quarter of 2015 at Midwestern University at Downers Grove, Illinois. Without external aids, HPS were given 5 minutes to answer questions including: "What is the earliest recommended age for an eye examination for an asymptomatic/risk-free pediatric patient?" followed by 5 items to choose from.

A total of 13.83% of students believed at birth was the earliest recommended age with 22% at 6 months, 22.9% at 12 months, 23.36% at 24 months, and 17.91% at 36 months.

The American Optometric Association's evidence-based clinical practice guideline, Comprehensive Pediatric Eye and Vision Examination, recommends the first eye exam of

asymptomatic/low-risk pediatric patients to occur at 6 to 12 months of age. Only 22% of all HPS surveyed chose the appropriate earliest age of 6 months with 22.9% choosing 12 months. As future health care providers who may have significant interactions with families and patients of infants, it is important that we educate them on the appropriate age for the first eye examination as well as the no-cost public service program, InfantSEE, that is available to all.

*Author*  
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#### Scientific Abstract

Friday, June 21, 2019

12:30-1 p.m.

#### Improvement in Batting Performance through the Use of Stroboscopic Glasses

Stroboscopic technology is commonly used in sports-vision-therapy protocols to help athletes improve their performance in competition. However, minimal research has been performed to determine the impact that stroboscopic technology has on athletic ability alone. This pilot study explored the direct effect of stroboscopic glasses on batting performance with increasing pitch speeds.

Sixteen athletes capable of hitting pitches at speeds greater than 60 mph were selected to participate in two sessions separated by one week at a batting cage. Participants were randomized into a control and study group. Each session consisted of 25 pitches at a simulated 45 mph speed for warm-up, followed by a 15-minute break to simulate the time between at-bats. Pitch speeds began at a simulated speed of 60 mph, with a 5 mph increase after two consecutive hits and a 5 mph decrease with every miss until a total of five misses were recorded. The first session served as a baseline for both groups in order to account for a learning curve. During the second session, the

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participants in the study group were asked to wear Senaptex Strobe Glasses during the 25-pitch warm-up.

Of the 16 participants, 15 completed the study. When comparing sessions 1 and 2 in the strobe glasses group, significant differences were noted in the number of hits during warm-up (-3.71,  $p=0.0293$ ), maximum speed hit (7.86mph,  $p=0.0333$ ), and average speed (5.05mph,  $p=0.0323$ ). There was no significant difference in the total number of hits in those wearing the strobe glasses (3.20,  $p=0.1489$ ). There was no significant difference in these same four categories as measured in the control group, suggesting that no learning curve was present (0,  $p=1$ ; 4.38mph,  $p=0.0639$ ; 2.65mph,  $p=0.0982$ ; 1.63,  $p=0.3348$ , respectively).

Our results in this pilot study suggest that using stroboscopic glasses during batting warm-up may result in an improved ability to hit faster pitches. However, further research with more participants is necessary to determine if strobe glasses consistently improve performance.

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#### **Case Report Abstract**

**Friday, June 21, 2019**

**12:30–1 p.m.**

#### **CL-Contact Lens**

#### **Custom Scleral Lens Designs for Protection of Type I Boston Keratoprosthesis**

The type I Boston Keratoprosthesis (BKPro) is indicated for patients with refractory corneal blindness and poor prognosis for penetrating keratoplasty (PKP). Postoperative care traditionally requires a protective soft bandage contact lens

over the keratoprosthesis. The bandage contact lens provides hydration and enhances device retention by preventing complications such as dellen, epithelial defects, and corneal melt. High postoperative astigmatism is common after corneal transplantation. Depending on how the BKPro transplant is sutured, irregular scleral astigmatism may also result, making it difficult to fit standard soft lenses. In such cases, custom scleral contact lenses should be considered as an alternative choice for protection.

This case report refers to two patients who underwent unilateral BKPro transplantation. The first patient had a history of multiple failed PKP transplants from Mooren's ulcer. The second patient had multiple failed PKP transplants from glaucoma. A traditional soft bandage contact lens was not successful due to large amounts of residual irregular scleral astigmatism after BKPro transplantation. Instead, a custom scleral lens prosthetic cover shell was created in order to protect the BKPro transplant. This custom scleral lens was designed using impression and software-based technology in order to align with the highly irregular scleral shape. The follow-up period was six months for all patients. Both BKPro transplants experienced no complications at this time.

Custom scleral designs should be considered for protective bandage contact lenses in cases of high irregular scleral astigmatism after BKPro transplantation.

*Author*

*Melanie Frogozo, O.D.;*

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#### Case Report Abstract

Friday, June 21, 2019

12:30-1 p.m.

#### OD-Ocular Disease

##### Management and Treatment of Chronic Central Serous Chorioretinopathy with Eplerenone

Central serous chorioretinopathy (CSCR) is an idiopathic condition in which the fluid from the choroid leaks into subretinal space causing fluid build-up between neurosensory retina and the retinal pigment epithelium. This accumulation of fluid can cause changes to the vision manifesting as metamorphopsia, hyperopic shifts, and scotomas. The pathophysiology of CSCR has not been definitely identified, but there are theories that RPE dysfunction may be the underlying etiology.

A 58-year-old male presented to the clinic complaining of a distortion of his vision in the left eye that started about two weeks ago. The patient's ocular history was significant for moderate primary open-angle glaucoma status post selective laser trabeculoplasty in both eyes. In addition, the patient reported a history of long-term inhaled steroid use, but mentioned he discontinued the steroid about a year ago. Upon examination, the visual acuity was 20/20 in the right eye and 20/30 in the left eye. On dilated fundus examination, the left eye was significant for subretinal elevation in the macula. Ancillary testing was performed and the optical coherence tomography revealed shallow subneurosensory fluid in the macula of the left eye. To further support the diagnosis of central serous chorioretinopathy, fluorescein angiography was performed and demonstrated a smokestack leakage in the left eye. The patient was observed for six weeks and upon follow-up was found to have no improvement structurally or functionally. He was then prescribed 25 mg of oral Eplerenone twice a day and found to have a progressive

improvement in the structure of his retina after multiple follow-up visits.

Central serous chorioretinopathy is a condition that is not fully understood, which can make it difficult to treat. Current treatment for CSCR includes observation, stress reduction, discontinuation of steroids, and laser photocoagulation. Eplerenone is a mineralocorticoid receptor antagonist that has been found to be a potential treatment choice for chronic cases of CSCR. Eplerenone is beneficial because it is a less invasive mode of treatment while still providing a faster resolution of central serous chorioretinopathy.

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#### Scientific Abstract

Friday, June 21, 2019

12:30-1 p.m.

##### The Effects of Over-the-Counter Topical Allergy Eye Drops on Soft Contact Lens Densitometry

Widespread availability of over-the-counter (OTC) ophthalmic medications allow patients to self-treat certain conditions without consulting an eyecare provider, but many may not follow guidelines provided on the label. Patients who continue contact lens wear may experience visual changes due to the absorptive properties of soft lenses. This study examines the effects of five OTC allergy drops on the optical clarity of soft contact lenses using the OCULUS Pentacam®.

Five OTC ophthalmic allergy medications and saline control (Nortech Labs isotonic eye-wash) were included in the study: Alaway, Visine-A, Equate Eye Allergy Relief, Similasan Allergy Eye Relief, and Natural Ophthalmics Allergy Desensitization. The lenses used for all trials were

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Alcon's Dailies AquaComfort Plus Toric (-4.25-1.75x180). Lenses were assigned to a solution and divided into 1-minute, 5-minute, or 10-minute subgroups for a total of five trials. Each lens was placed in a well with solution, soaked for the required time, then mounted on a calibration arm in front of the Pentacam to measure its optical density via densitometry. Each lens received three scans in succession. Statistical analysis was performed using ANOVA with SPSS to compare two individual variables: densitometry and time.

While no statistical significance was found across time domains, statistically significant differences between average densitometry values were found for the following: Alaway vs Visine-A ( $p=0.025$ ), Alaway vs Equate ( $p=0.01$ ), Alaway vs. Control ( $p=0.007$ ), Visine-A vs. Similasan ( $p=0.028$ ), Equate vs. Similasan ( $p=0.001$ ), Equate vs. Natural Ophthalmics ( $p=0.009$ ), Similasan vs. Control ( $p=0.008$ ), and Natural Ophthalmics vs. Control ( $p=0.059$ ). Alaway, Similasan, and Natural Ophthalmics averaged lower values between 11.4 and 12.27, while Visine-A and Equate averaged higher values between 12.3 and 13.53. The control's average densitometry was 12.97.

Previous studies have explored densitometry as a function of corneal clarity. In this study, ophthalmic allergy medications absorbed by soft lenses have varying effects on optical density: Alaway, Similasan, and Natural Ophthalmics were associated with lower optical densities, while Visine-A and Equate were associated with higher optical densities.

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### Case Report Abstract

**Friday, June 21, 2019**

**12:30-1 p.m.**

### OD-Ocular Disease

#### Role of Supplements in Exacerbation of Central Serous Chorioretinopathy

This case report will overview potential causes of central serous chorioretinopathy (CSCR). All the reviewed compounds are supplements, which may have caused them to be overlooked when managing central serous retinopathy.

A 44-year-old Asian man had been complaining of metamorphopsia in the right eye for the past week. OCHx: "Fluid" in the left eye 3 years ago, treated with eye drops and laser therapy. Medical History: unremarkable. Meds: creatine supplements beginning 2 weeks prior. Pertinent findings: Clinical VA sc: 20/25 OD. 20/20 OS (-) APD, OU. All other clinical testing unremarkable. Physical OD: 1 DD central elevation with pigmentary changes in the macula, inferior temporal chorioretinal scar. All other physical findings unremarkable. Laboratory studies OCT 5 Line Raster: neurosensory retina detachment. Photos: pigmentary changes surrounding central elevation. Treatment: Discontinue all supplements, Monitor in 6 weeks.

Case reports reveal an association between CSCR with deer antler spray and Ephedra, supplements that increase testosterone. Ephedra is an alpha and beta adrenergic agonist, which also increases norepinephrine release. Deer antler supplements are believed to have high levels of testosterone, though not fully studied. Creatine is linked to increased testosterone, which raises cortisol in the body, which has been linked to CSCR. Sudden changes in hormones may elicit CSCR in individuals who are already susceptible to the condition. Increased cortisol secondary to testosterone may be the driving force behind

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CSCR. Supplements should not be taken without considering overall health. Further studies are needed to determine the association between common OTC supplements and the retina. Specific questioning about supplements can assist in pinpointing factors that can lead to development of CSCR in patients. It is also important to remember that patients don't always tell a full story. With America becoming more health conscience, supplements are being utilized more with unknown potential side effects. It is our role as optometrists to consider this in our practice. More studies should be performed to outline safety profile.

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#### **Case Report Abstract**

**Friday, June 21, 2019**

**12:30-1 p.m.**

#### **PC-Primary Care**

#### **Continuous Observation on Chinese Children's Ocular Axial Length Growth with the Relationship to Myopia Development**

To observe the Chinese children's myopic development with ocular axial length growth and other relevant factors.

Patients with refractive errors visited our clinic since 2009. A total of 547 patients under 20 years old were enrolled in sequence, including 298 boys (54.5%) and 247 girls (45.2%). And their bio-parameters were recorded, including visual acuity, intraocular pressure, ocular axial length, height, etc. Of 562 had taken more than twice exams, with the average 3 times, at 8 months average interval. We followed them up and recorded their bio-parameters up to 9.9 years. Among 547 cases, 238 (43.5%) revisited our office within one year, 170 (31.1%) followed up for 2 years, 101(18.5%)

for 3 years and 38 (6.9%) more than 4 years. A total of 22.5% had no increase of axial length, 19.7% with AL increase about 0.1-0.2mm, 17.3% with 0.2-0.3mm, 16.8% with 0.3-0.4mm and 21.0% with 0.4-0.5mm increase. Only 2.6% had AL increase more than 0.5mm.

Before 7 years old they had no hyperopic buffering, showing the about -0.50D mild minus refractive status while their axial length elongating to over 23mm. With the 0.26mm average increase of the axial length, their myopic progression kept adding at -1.00D speed. Chinese children' ocular elongation speed is faster than the average speed (0.26mm per year to 0.1mm) under 15 years old, correspondingly with their myopic refraction deteriorating before 13 years (-1.00D per year to -0.25D). Their ocular axial length reached to over 25mm. Corneal flattening to 42D in average compensated for their refractive error lower 1 to 2D diopter, that is latent myopia.

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#### **Case Report Abstract**

**Friday, June 21, 2019**

**12:30-1 p.m.**

#### **OD-Ocular Disease**

#### **Atypical Presentation of Idiopathic Intracranial Hypertension**

Idiopathic Intracranial Hypertension (IIH), or Pseudotumor Cerebri, is an intracranial process that can lead to edema of the optic nerve, diplopia, transient obstructions of vision, visual field defects and loss of color vision. General symptoms include headaches, nausea, and tinnitus. IIH has been associated with obesity, women of child-bearing years and use of certain medications but cannot be excluded when a patient without associated

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risks presents with bilateral optic nerve edema.

A 62-year-old male of normal weight presents complaining of transient visual disturbances for the past few months described as a darkening of vision in the left eye for about five minutes. He denied headaches, weight loss, jaw claudication, scalp tenderness or fatigue. He denied floaters and flashes of light. His best corrected acuity was OD 20/25 and OS 20/20. Visual field showed overall depression without specific neurological loss. Anterior segment evaluation was noncontributory. Posterior segment evaluation revealed asymmetric bilateral disc edema OS>OD. Blood pressure measured 165/94, but vascular changes and/or macular edema associated with hypertensive retinopathy were not present on evaluation. Urgent imaging and blood work including investigation of neuroretinitis due to Bartonella, Syphilis, Lyme, Tuberculosis were ordered and returned within normative values. After all other possible causes were exhausted, a lumbar puncture was performed to rule out meningitis and to investigate the possibility of elevated intracranial pressure. CSF evaluation revealed an elevated opening pressure of 290mm and the patient was diagnosed with IIH. Treatment was initiated with oral Diamox 250 mg twice a day PO with co-management with neurology.

IIH is a diagnosis of exclusion. Although certain medication such as tetracyclines, contraceptives, Synthroid and Accutane have shown associations with IIH, the etiology is unknown. Those with disc edema should first be evaluated for life-threatening conditions such as malignant hypertension and compressive lesions, but patients with IIH may present with asymmetric disc edema and may not fit textbook descriptions of being overweight, female or of child bearing years.

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#### **Case Report Abstract**

**Friday, June 21, 2019**

**12:30-1 p.m.**

#### **OD-Ocular Disease**

#### **West Nile Viral Retinitis vs. APMPE**

West Nile Virus is a mosquito-borne, single-stranded RNA flavivirus, belonging to the Japanese encephalitis virus antigenic complex. Side effects of the virus can include fever, headache, fatigue, skin rash and retro-orbital pain, and in severe cases meningitis, encephalitis or poliomyelitis. Ocular involvement can include unique patterns of multifocal chorioretinal lesions, and cause complaints of floaters or decreased vision. Unfortunately, there is currently no established treatment for the virus. Acute Posterior Multifocal Placoid Pigment Epitheliopathy (APMPPE) typically affects young to middle-age men, and causes a sudden onset of bilateral, sometimes asymmetric, blurred vision. Clinical signs include anterior uveitis, mild vitreous infiltration and one-half disc diameter lesions (possibly swollen RPE cells) that are pale, focal and deep within the neuroretina.

A 51-year-old Hispanic male presents for sudden onset blurred vision and spots seen in both eyes. The patient was previously hospitalized for West Nile Virus encephalitis 3 weeks prior to examination. The patient's ocular and medical history are otherwise unremarkable. Uncorrected visual acuities are 20/30 in both eyes, with no improvement on PH in the right eye, and PH improvement to 20/20- in the left eye. Examination revealed an anterior chamber reaction in both eyes, mild vitritis of both eyes, and multifocal retinitis of the right eye. The patient was prescribed Pred Forte ophthalmic suspension 1 gtt QID OU, and instructed to RTC in 1 week for follow up.

It is undetermined whether the patient's panuveitis was secondary to the previous encounter with West Nile Virus, or caused by

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APMPPE. Both potential etiologies are self-limiting, though an ophthalmic steroid can improve symptoms and vision more rapidly. When it comes to white dot syndromes, it is important to consider the demographics, systemic symptoms, laterality, dilated fundus findings, and additional testing (OCT, ICG, FA, Photos) to aid in diagnosis and management plans.

*Author*

*Kristin Kosch, B.S.*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**3-3:30 p.m.**

#### **BV-Biocular Vision**

##### **Improving Stereopsis of an Adult with Intermittent Suppression**

Adult patients can appreciate significant improvement in their binocularity with proper instructional guidance during structured in-office vision therapy. A 28-year-old white male was referred for evaluation and was diagnosed with a non-comitant V-syndrome left exotropia with suppression worse at distance than near. He wanted to improve suppression in the left eye and overall stereopsis. Magnitude of intermittent left exotropia with 9 gaze cover test ranged from 10 to 20 prism diopters at near. Stereopsis with Randot measured 50 seconds in primary gaze, 140 seconds in up gaze, and 30 seconds in down gaze. Vergence ranges were unreliable due to suppression.

In-office vision therapy began focusing on anti-suppression in the left eye. Initially, the patient could not fuse the Quoi's vectogram target. With a combination of weekly in-office and home vision therapy exercises, on the third week, the patient could successfully fuse the quois vectogram without suppression or diplopia. However, he was unable to keep the target fused when vergence

demand was changed. After 10 in-office vision therapy visits, the patient was able to perform prism bar vergences without suppression and measurements were taken for the first time. Randot local stereopsis measured at 40 seconds. The Howard-Dolman stereopsis instrument found approximately 40 seconds at distance. At the end of the 17th vision therapy session, no exotropia was elicited at distance or near and in no position of gazes during 9 gaze cover test. Randot local stereopsis at near was 25 seconds and global stereopsis was 40 seconds at near. The patient achieved 5.8 seconds of arc at distance with the Howard-Dolman instrument. Convergence ranges before diplopia were 28 prism diopters at distance and 36 prism diopters at near.

The patient was extremely satisfied and pleased with the results of his therapy. He has great control of his ocular alignment and noted significant improvement with binocularity, thus contributing to improved visual comfort and function. He was able to meet his goal and exceeded it, and his case is a testament to what can be accomplished, even with adult patients, with proper motivation.

*Author*

*Patrick Stark, O.D.*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**3-3:30 p.m.**

#### **OD-Ocular Disease**

##### **Lamellar Hole-associated Epiretinal Proliferation**

Lamellar hole-associated epiretinal proliferation (LHEP) is characterized as a thick, mound-like, homogenous layer of medium reflectivity on SD-OCT, that lies on the epiretinal surface at the margins of lamellar macular holes (LMH). LHEP is reportedly present in 20-44% of all eyes with LMH.

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The etiology of LHEP is controversial. Many theorize that it originates from Muller cell migration and proliferation; while others propose the vitreous cortex as its origin. Unlike conventional epiretinal membranes (ERM), LHEP does not exert traction on the retinal surface.

A 93-year-old white male presented with a chief complaint of blurry vision. Ocular history was significant for dry age-related macular degeneration (AMD) OU, glaucoma suspect OU, pseudophakia OU, and strabismic amblyopia OS. Medical history included diabetes, hypertension and cardiovascular disease. BCVA was 20/50 OD and CF at 2 ft OS. Macular examination showed scattered confluent drusen OD and large geographic atrophy OS. In addition to the AMD findings, OCT revealed a partial thickness foveal defect with disruption of the ellipsoid zone and a thick, mound like material at the retinal surface OD. Based on these findings, the patient was diagnosed with LHEP OD. After discussion with the patient, it was decided that surgery was not indicated and he will be monitored periodically.

LHEP is a newly described entity and is frequently mistaken for ERM, hence it is important for optometrists to be familiar with the condition and its implications. Generally, LMH with LHEP have significantly lower mean BCVA, greater external LMH diameter, thinner center foveal thickness, and greater disruption of ellipsoid zone, compared to LMH without LHEP. Management includes monitoring or surgical treatment, the latter being somewhat controversial. Most studies have found that LHEP does not influence the natural progression or visual prognosis of LMH with or without surgery. However, a few studies have reported worsening of anatomic features and post-operative BCVA. Therefore, surgery should be limited to visually symptomatic patients who report significant visual decline.

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#### **Case Report Abstract**

**Friday, June 21, 2019**

**3-3:30 p.m.**

#### **OD-Ocular Disease**

#### **Recurrent Non-arteritic Anterior Ischemic Optic Neuropathy**

Non-arteritic anterior ischemic optic neuropathy (NAAION) is characterized by swelling of the optic nerve head due to underlying systemic vascular disease, such as hypertension, diabetes or hypercholesterolemia. Other controversial contributory factors are obstructive sleep apnea, smoking and use of phosphodiesterase inhibitors. NAAION represents an infarction of the anterior portion of the optic nerve involving branches of the posterior ciliary arteries leaving the optic nerve head edematous and hyperemic.

A 53-year-old white male presented with a complaint of sudden and painless visual field loss of the left eye. The patient denied: jaw claudication, temporal pain, fatigue and malaise. Entrance testing was remarkable for positive afferent pupillary defect (APD) and constriction of the inferior nasal visual field by confrontation left eye. Dilated examination revealed an edematous and hyperemic disc superior nasally with splinter hemorrhages. Less than two months later the patient returned with complaints of field loss now involving the superior portion of the left eye. Again, entrance testing was remarkable for positive APD and constriction of the superior and inferior nasal visual fields by confrontation of the left eye. Dilated examination revealed a similar appearance to the previous exam but now involving the inferior aspect of the optic nerve.

Because NAAION is not inflammatory in nature,

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it is not treated with corticosteroids like the arteritic presentation. There is no widely accepted treatment for NAAION, therefore managing the patient's underlying systemic conditions with the patient's primary care provider is essential. Once NAAION has occurred in one eye, there is a 15-24% chance of involvement of the fellow eye over five years. It is rare for it to reoccur in the same eye, and in this unfortunate case the patient was subject to this unusual circumstance despite best efforts to manage his systemic risk factors by adjusting his blood pressure medication to avoid nighttime dosing and having him re-evaluated for his CPAP machine. It is important to understand that a diagnosis of NAAION is not only about the patient's vision, but also the overall health of the patient due to the vasculopathic risk factors that underlie the etiology.

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#### **Scientific Abstract**

**Friday, June 21, 2019**

**3-3:30 p.m.**

#### **Evaluation of Two Toric Designs and Lens Stability Performance**

Contact lens manufacturers incorporate different stabilization designs in toric soft contact lenses that affect orientation stability and rotation in dynamic situations and subsequent vision performance. This study sought to investigate the clinical performance and subjective acceptance of two silicone hydrogel toric contact lenses with different stabilization designs (design A: uniform horizontal ISO thickness, fanfilcon A, and design B: eyelid stabilized design, senofilcon A).

A 2-week crossover, randomized, double-masked dispensing study was conducted at a single site. Visual acuity, lens orientation and

rotational recovery, (measured 1 minute after rotating the lens 450 temporally), were evaluated at dispensing and 2 weeks. Subjective responses were collected using a 0-10 scale.

A total of 44 subjects completed the study, ages 18 to 40 (mean  $\pm$  SD, 25.0  $\pm$  7.2 years). No statistical difference was found between lenses for logMAR distance visual acuity on dispensing and after 2 weeks' wear ( $p > 0.05$  both). Comfort on insertion was similar at dispensing ( $p > 0.05$ ) but design A was rated significantly higher than design B for initial comfort at 2 weeks (9.0  $\pm$  1.0 vs. 8.3  $\pm$  1.6,  $p = 0.033$ ). At 2 weeks, design A ratings were significantly higher than design B for lens stability (9.2  $\pm$  1.1 vs. 8.7  $\pm$  1.0,  $p < 0.05$ ), and vision satisfaction (9.1  $\pm$  1.1 vs. 8.5  $\pm$  1.1,  $p < 0.05$ ). Orientation position was similar between lenses on dispensing (1.30  $\pm$  3.10 vs. 2.60  $\pm$  3.10,  $p = 0.083$ ), but a significant difference was found at 2 weeks with design A lenses showing better orientation than design B (1.40  $\pm$  2.90 vs. 2.80  $\pm$  3.50,  $p = 0.026$ ). A higher proportion of design A than design B lenses returned to within 100 of primary gaze orientation, after manually displacing the lens 450 temporally, at dispensing (97.7% vs. 11.4%,  $p < 0.001$ ) and after 2 weeks wear (95.5% vs. 20.5%,  $p < 0.001$ ).

Lens stabilization design of soft toric contact lenses is important for fitting success and to provide optimum vision satisfaction specially in patients with astigmatism.

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## Poster Presentations

### Optometry's Meeting® • St. Louis, MO • June 19-23, 2019

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#### Case Report Abstract

Friday, June 21, 2019

3-3:30 p.m.

#### LV-Low Vision

#### CNS Lymphoma

Lymphoma of the central nervous system accounts for about 3% of primary brain tumors. Recently, it has been attributed in part to the increase of human immunodeficiency virus. It arises from B lymphocytes and commonly growth occurs adjacent to ventricles. Chemotherapy and radiation therapy is effective in controlling growth of tumor for several years. Radiation therapy may have ocular side effects that resemble diabetic retinopathy.

A 46-year-old white male presented to the clinic for an acquired brain-injury-specific eye exam. He is wheelchair bound and accompanied by his caregiver. Patient has a history of CNS lymphoma diagnosed in 2016. He was treated with several rounds of IV steroids with some improvements for masses in pons, midbrain and cerebellum. He had biopsy and is currently undergoing chemotherapy and radiation therapy. His systemic health is significant for hypertension, hyperlipidemia, and PTSD. Patient had complaints of photophobia, diplopia and postural dizziness. He reported that the diplopia has decreased over time. His last eye exam was in 2011. His visual acuity was 20/40+2 in the right eye and 20/30-1 in the left eye. Patient had dysconjugate gaze and difficulty with left gaze fixation with large overshoots. He is exophoric with a slight right hypertropia. On DFE, the retina had scattered dot blot hemorrhages and cotton wool spots in both eyes. The macula had edema and hard exudates in both eyes. He does not have history of diabetes. His last HbA1C was 5% in 2017. The differentials are either diabetic or radiation retinopathy. The patient was referred to a retinal specialist for further evaluation.

Lymphoma in the brainstem will cause oculomotor dysfunction. The circuits for supranuclear control of eye movements will be affected. Functions such as horizontal eye movements, vertical eye movements, and vergence eye movements will be abnormal. A lesion to the MLF will affect the nerve signals to the medial rectus and cause internuclear ophthalmoplegia. Because the lymphoma was in the pons, midbrain and cerebellum, multiple pathways are affected. Currently, the median survival rate of a CNS lymphoma is 4 years.

*Author*

*Maria Nguyen, O.D.*

#### Information Abstract

Friday, June 21, 2019

3-3:30 p.m.

#### P.A.N.D.A. Scopic Vision: The Optometrist's Role in Identifying Pediatric Autoimmune Neuropsychiatric Syndrome

This presentation will educate doctors of optometry about their role in PANS/PANDAS (Pediatric Autoimmune Neuropsychiatric Syndrome). Optometrists are potentially 'first responders' in the identification and early diagnosis of this condition. This treatable disorder is estimated to affect 1 in 200 children. In a poll taken of parents whose children were later diagnosed, an overwhelming majority responded that their eye care professional either dismissed or overlooked the ocular signs and symptoms involved. This informational poster will demonstrate the neuro-ocular manifestations of the disorder and provide clinical guidance to the practitioner in specialized testing. A greater understanding by the optometrist will hopefully lead to a proper, prompt diagnosis that will provide a more favorable outcome for the child. Recovery is possible if treated early and appropriately. Optometrists must be aware of their role as a 'first responder'.

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## Poster Presentations

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*Author*

*Megan Meus, O.D.*

#### **Information Abstract**

**Friday, June 21, 2019**

**3-3:30 p.m.**

#### **Lessons of Successful Provision of Ophthalmic Equipment and Supplies to Optometry Schools and Sustainable Clinics in Developing Countries: VOSH/International's Technology Transfer Program (TTP)**

VOSH (Volunteer Optometric Services to Humanity) recognizes that functional equipment and supplies must be available for a student to be properly trained, and for a clinic to properly examine and care for patients. Our mission to bring vision to all is achieved by supporting sustainable eye clinics, optometry schools and optometric educators wherever there is insufficient or unaffordable eye care. Ophthalmic instruments and equipment play an essential role in achieving this. The VOSH TTP Program collects, repairs and refurbishes donated ophthalmic instruments and equipment, and then sends them to schools and clinics in need. Important lessons on eye health technology management are summarized here.

Donated equipment is solicited on our website and at various optometric meetings. Details about the donated equipment are gathered through an on-line system. In our warehouse, accepted items are repaired or refurbished, and then inventoried.

Response to equipment requests prioritize those affiliated with a VOSH chapter or a developing school or university. The TTP Committee monthly meetings evaluate donations and requests and consider where the items will be used, maintenance, customs and transportation.

VOSH TTP has seen an increasing number of donated items of optometric equipment, new frames and lenses. This has allowed VOSH TTP to provide equipment and supplies to VOSH-affiliated

clinics, and developing optometry schools in many countries including Peru, Nicaragua, Trinidad and Tobago, Haiti, Guatemala, Mexico, Colombia, El Salvador, Argentina, Malawi, Dominican Republic, Nepal and Ghana. Since 2005, the VOSH TTP data management system, network of recipients and criteria of impact keeps evolving and important lessons can be drawn on the value delivered by these donations.

The mission of VOSH TTP is to collect, repair and refurbish donated, used optometric equipment in the United States, and place it at schools of optometry and clinics in developing countries. VOSH TTP has seen a growth in the donation of and request for good, usable optometric examination equipment. There are important lessons of success and impact generated by the program such as better training of optometry students and better equipped VOSH-affiliated clinics worldwide, but also challenges to consider for its growth.

*Author*

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#### **Scientific Abstract**

**Friday, June 21, 2019**

**3-3:30 p.m.**

#### **Evaluating the Visual Performance of a Daily Disposable Multifocal Lens, Designed with Two Differently Powered Intermediate Zones**

Visual performance with multifocal contact lenses (MFCL) can vary with add-power and lens design. The modern digital-device lifestyle demands the ability to see at various intermediate distances. This study evaluated the visual performance of a daily disposable, silicone hydrogel (somofilcon A), multifocal lens (DDMF) with a centre near design, which incorporates two

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differently powered intermediate zones.

This study refitted habitual MFCL wearers, who were wearing lenses as prescribed by their eye care professionals, with a DDMF. Subjects were masked to lens brand and wore the DDMF for 2 weeks. After 2 weeks, logMAR acuity was measured at four working distances (WDs) - distance (DV), long-intermediate (LI=1.5m), short-intermediate (SI=0.75m), and near (NV= 0.4m). Subjects also rated their experience by grading the vision clarity for specific tasks as one of three options: exceeded expectations, met expectations or fell short of expectations.

Forty-eight subjects completed the study. Habitual MFCLs spanned market-representative brands of reusable and DDMF lenses. At the 2-week visit, mean binocular logMAR acuities at the four WDs were good with the DDMF: DV  $-0.04\bar{i}, \pm 0.09$ , LI  $-0.11\bar{i}, \pm 0.11$ , SI  $-0.10\bar{i}, \pm 0.09$  and NV  $0.02\bar{i}, \pm 0.09$ . Ratings of vision clarity were significantly better for DDMF than with habitual lenses for tasks conducted at LI (91.7% vs. 87.5% reported exceeded or met expectations (E/M),  $p=0.013$ ), SI (85.4% vs. 77.1% reported E/M,  $p=0.042$ ), NV (83.3% vs. 56.2%, reported E/M  $p=0.001$ ), but not statistically different at DV (81.2% vs. 72.9% reported E/M,  $p=0.068$ ). Significantly more subjects preferred the DDMF over habitual lenses for vision clarity at LI (43.7% vs. 12.5%,  $p=0.040$ ) and for SI (43.7% vs. 12.5%,  $p=0.040$ ), whereas the differences for DV and NV were not significant (DV: 39.6% vs. 33.4%,  $p=0.771$ ; NV: 41.6% vs. 16.7%,  $p=0.111$ ).

This design of multifocal lens provided good vision, both for acuity measured in-office, as well as in real-world experience. In particular, subjective ratings and preferences for long-intermediate and short-intermediate distances were all better than subjects' habitual MFCLs. These results suggest the somofilcon A multifocal lens provides a range of focus suited to a modern digital lifestyle.

*Author*

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#### Case Report Abstract

**Friday, June 21, 2019**

**3-3:30 p.m.**

#### LV-Low Vision

#### Prescribing Pelli Prism for a Stroke Patient with a Bilateral Homonymous Visual Field Defect

A bilateral homonymous visual field defect can be detrimental to a patient's quality of life. Although rehabilitation and therapy techniques may help improve a visual field defect, it is unlikely to result in a full recovery. A Pelli prism is an optical method of providing a patient with awareness of objects in their missing peripheral field for increased safety and quality of life. In this case, a Pelli prism was used to help a patient with a bilateral left homonymous visual field defect.

A 61-year-old male presented for his annual eye exam three months after having had a stroke that resulted in the complete loss of his left visual field. He reported a significant decrease in his quality of life since then and was looking for anything that could improve his functionality despite the assertion from other doctors that nothing could be done. At his exam, the patient was educated on the use and benefits of Pelli prisms. The patient returned for an evaluation and after a Fresnel prism trial over his current glasses, single-vision lenses with Pelli prisms on the left eye were ordered. 4Forty prism diopter base out prisms were placed above and below the line of sight 12mm apart over the left eye, the eye on the side of the deficient visual field. The placement and orientation of the prisms brings images from the missing left visual field into the patient's field of view. The patient then has awareness of any

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objects to his left and he can direct his attention to them if needed by turning his head and bringing them into his functional field of vision. After some adaptation, the patient reported greater functionality and a great improvement in his quality of life.

This is an important case in which optometry was able to help improve this patient's life after other doctors asserted there was nothing that could be done to improve his situation. Using Pelli prisms, we were able to increase this patient's functional range of vision and help him get the most of his remaining visual field.

*Author*

*Kimberly Skyles, O.D.*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**3-3:30 p.m.**

#### **OD-Ocular Disease**

##### **Bilateral Peri-papillary Choroidal Neovascularization Membranes Secondary to Optic Nerve Head Drusen in a Young Patient**

Optic nerve head drusen (ONHD) are congenital multi-lobed calcific protein deposits that are thought to be secondary to a disturbance in axonal metabolism with slowed axoplasmic flow. Buried early in life, they become more superficial and visible as the patient ages. Although most patients are asymptomatic, visual acuity and visual field loss can occur. Rare complications, especially in younger patients, can include choroidal neovascular membranes (CNVM), which can lead to visual acuity and visual field loss. This case highlights the development of bilateral CNVM in a young patient with SD-OCT and FAF aiding in the diagnosis.

A 19-year-old female presented with reduced vision in both eyes. Best-corrected distance visual acuity was 20/360 OD and 20/450 OS with a

Feinbloom chart. External examination, entrance testing, and slit lamp examination were unremarkable. Intraocular pressures were 12 mmHg OD/OS. Fundus examination revealed bilateral disc drusen with RPE hyperplasia and intraretinal fluid extending into the macula OU. Fundus auto-fluorescence imaging (FAF) revealed large amounts of hypo-AF surrounded by hyper AF extending from the fovea to the peripapillary area OU. SD-OCT scans OD/OS revealed elevation of the optic nerve head confirming optic nerve head drusen. The scans also revealed bilateral choroidal neo-vascular membranes with adjacent intraretinal fluid temporal to the optic nerve head OD/OS. Anti-VEGF treatments were initiated with only minor improvement in the patient's acuity.

Although very rare, this case report demonstrates the importance of considering CNVM in younger patients who present with disc drusen and reduced vision. For unknown reasons, many of the patients in the literature who are diagnosed with this condition are children or young adults. Clinicians should be cognizant of these findings as an early diagnosis can allow for prompt treatment and possible visual recovery.

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#### **Case Report Abstract**

**Friday, June 21, 2019**

**3-3:30 p.m.**

#### **LV-Low Vision**

##### **Diagnosis and Low Vision Management of Occult Macular Dystrophy**

Occult macular dystrophy (OMD) has a broad range of age onset and was first reported in the literature in 1989. While the genetics of OMD is complex, heterozygous 'retinitis pigmentosa 1-like

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1' (RP1L1) missense variants have been linked to this retinal dystrophy. OMD is characterized by visual acuity reduction from macular dysfunction. It is named occult because the dysfunction is hidden by normal funduscopic examination, full-field electroretinograms (ERG), and fluorescein angiograms (FA). However, focal macular, multifocal ERG, and optical coherence tomography (OCT) can reveal the dysfunction. This case report describes the diagnosis, genetic testing, and low-vision management of OMD.

VG, a 42-year-old Hispanic female, presented to clinic due to failing her driver's license renewal. Her chief complaint was unexplained progressive central vision reduction for the right eye (OD) and left eye (OS) over the past two years. Her ocular and medical history were unremarkable and her family history was non-contributory. Her visual acuity was 20/60 OD, OS at distance with a minimal prescription and 20/50 OD, OS at near with +1.50 effective ADD. The fundus and full field ERG were within normal limits (WNL) in both eyes (OU). A multifocal ERG showed borderline amplitudes foveally OU. The fundus autofluorescence (FAF) showed a mottled appearance with small areas of granular hyperfluorescence and OCT macular thinning OU. OCT angiography of the posterior pole showed 1 vessel loop with a few areas of nonperfusion and a microaneurysm. A visual field (VF) demonstrated scattered central defects and a psychogenic component was ruled out with the tangent field. The genetic testing revealed a heterozygous pathogenic missense mutation in RP1L1. This genetic change is known to cause OMD with reduced penetrance and variable expressivity. Through a visual functioning questionnaire, we anticipated that she may benefit from telescopes, microscopes, magnifiers, filters and driving rehabilitation services.

OMD is rare and difficult to diagnose without rigorous testing. Nonetheless, there is no standard treatment for OMD. Our next step in management is to perform an extended functional, low-vision

evaluation. This will aid to enhance her quality of life, maintain her independence, and assist her with interprofessional referrals.

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### **Case Report Abstract**

**Friday, June 21, 2019**

**3-3:30 p.m.**

### **LV-Low Vision**

### **Spectacle Prescribing Recommendations for Visually Impaired Patients**

There is great importance in proper spectacle prescribing and lens design recommendations for all populations, particularly those with low vision or other visual impairments. As with any patient, a thorough refraction is the first step in spectacle prescribing. Many practitioners, however, do not understand the impact improper lens design recommendations can have on the field of view and usable vision of patients with impairments.

Case 1: A 65-year-old male presents with left homonymous hemianopia secondary to cerebellar stroke. At last visit, patient had press-on Peli prisms placed on existing pair of distance glasses. His prescription was updated, and he was to trial prisms with current prescription and return with new distance and near-only glasses to have Peli prisms placed. Patient presented to clinic with progressive lenses in a small frame, complaining of worsening symptoms and expecting to have the Peli prisms placed on the new glasses. Unfortunately, the prisms are not compatible with a progressive lens design, and the patient had to

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exchange the glasses and return with a new pair for placement. Case 2: A 67-year-old white female presents with a complaint of decreased vision for one year secondary to wet ARMD. Entering acuities OD:20/160 OS: 20/40, with OD:+2.00 -0.50 x100 OS:+2.25 -0.50 x100. Retinoscopy and trial frame refraction resulted in acuities of OD:20/32 OS:20/32 with a prescription of OD:+1.25 -0.75 x035 OS:+1.75 -0.50 x135.

Careful retinoscopy, and trial frame refraction should be implemented in all patients with visual impairments. It is important to trial frame any updated spectacle prescriptions in order to determine if the visually impaired patient can appreciate an improvement in their usable vision. The trial frame prescription can also help determine if the changes impact the patient's mobility or spatial orientation. Additionally, certain lens designs can decrease vision further in patients with visual impairments. It is important to specify lens design on the prescription of patients who may be impacted by such variations.

*Author*

*Tyla Girouard, fourth-year optometry student*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**3-3:30 p.m.**

#### **OD-Ocular Disease**

#### **Questionable Idiopathic Roth Spot in a Pediatric Patient**

Roth spots are small intraretinal flame hemorrhages with a pale white or yellow center most likely composed of coagulated fibrin or platelets at the site of the vessel rupture due to underlying vessel endothelial dysfunction. Originally considered pathognomonic for bacterial endocarditis, Roth spots are now a non-specific finding associated with several underlying systemic causes including leukemia, diabetes, anemia,

Behcet's disease, hypertension, lupus and HIV. It is nearly exclusively an incidental finding and is only associated with visual symptoms when there is macular involvement. Due to its underlying systemic causes, a binocular presentation is most common.

A 13-year-old black male presented for an annual eye exam, denying any visual or ocular complaints or changes. The patient's systemic history was unremarkable except for seasonal allergies. His entering uncorrected visual acuity was 20/20 in both eyes. All other entrance testing was unremarkable. The patient had a minimal refractive error and spectacle correction was not recommended. His anterior segment was remarkable for mild racial melanosis of both eyes but otherwise noncontributory. The patient and parent initially deferred dilation, and during undilated fundus examination a single Roth spot was observed in the left eye nasal to the optic nerve. Upon this finding, the patient was dilated, fundus photos were taken and an extensive fundus examination was performed. The patient was immediately scheduled for a complete blood count with his pediatrician to investigate the possibility of a systemic correlation or diagnosis of Leukemia. The blood work results returned within normal range and the pediatrician referred the patient to ophthalmology for a second opinion where he reported no Roth spots on fundus examination, approximately two months after our initial examination.

While it is possible this patient had an isolated, idiopathic Roth spot there is little literature detailing an idiopathic cause. For this reason it is extremely important to rule out all systemic associations. While the patient's initial blood work ruled out all systemic associations, it is still unwise to assume an idiopathic cause and careful follow-up is recommended.

*Author*

*Jared Reinert,*

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#### Case Report Abstract

Friday, June 21, 2019

3:30-4 p.m.

#### OD-Ocular Disease

##### Presumed Ocular Ischemic Syndrome Diagnosis with Coronary Computed Tomography Angiogram

Ocular Ischemic Syndrome (OIS) is a set of findings observed in patients with severe vascular stenosis, specifically of the internal carotid artery. Characterized by stenosis >80%, OIS has many manifestations within the eye. Most notably, unilateral mid-peripheral hemorrhages are hallmarks of this condition.

A 71-year-old white male presented to the clinic for an annual eye exam, with his only complaint being new floaters in the left eye. His last eye exam was 2 years ago, where he was diagnosed a glaucoma suspect due to an increased cup to disc ratio. Systemic medical history included hypertension and type II diabetes with a recent A1c of 6.1. Best corrected visual acuity was 20/25 in the right eye and 20/20- in the left eye. Entrance testing and Biomicroscopy were unremarkable. IOP was 16/19 via applanation and gonioscopy was open and unremarkable. Dilated fundus exam revealed moderate cupping with minimal asymmetry between optic discs. The retina of the right eye was without hemorrhages or exudates. Fundus examination of the left eye revealed numerous mid-peripheral intraretinal hemorrhages extending into posterior pole, with one perifoveal hemorrhage. The macula was flat without macular edema. A referral was made to the vascular surgical department for a carotid artery imaging. The carotid Doppler was determined inconclusive due to a significant amount of plaque blocking the scan. A coronary computed tomography angiogram (CTA) was also ordered to determine the amount of stenosis. The vascular surgical team

determined stenosis of the left internal carotid artery to be greater than 80%, and a carotid endarterectomy surgical consult was scheduled.

Ocular ischemic syndrome is an ocular manifestation of severe vascular stenosis and requires follow-up with a vascular specialist. A carotid Doppler is standard of care in presumed ocular ischemic cases to determine the amount of stenosis of the internal carotid artery. When Doppler is unavailable or inconclusive, CTA may be used to evaluate carotid occlusion. Treatment for OIS often requires a carotid endarterectomy to restore blood flow to the carotid, and urgent referral is mandated when OIS is suspected.

*Author*

*Justin Schaefer, BS*

#### Case Report Abstract

Friday, June 21, 2019

3:30-4 p.m.

#### OD-Ocular Disease

##### Differentiation Between Herpes Zoster and Herpes Simplex Viruses

The patient had mixed symptoms of variable pain with foreign body sensation in one eye, which correlated more with herpes simplex, plus a prodrome of fever, headache and malaise, which was usually associated more often with herpes zoster. There was no macupapular skin eruption and no Hutchinson's sign. Positive signs involved corneal staining and grade 3 cells in the anterior chamber. Corneal vesicles found in early simplex infections have similar appearance to pseudodendrites in zoster infections. The patient was already taking Valcyclovir 400mg twice a day directed by the PCP for long-term management. The addition of Ganciclovir five times a day for 21 days was to treat the corneal involvement. Once the cornea was healed, the introduction of prednisolone acetate 1% four times a day was to

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treat the anterior chamber reaction. After 2 weeks, signs and symptoms resolved.

If this presentation was herpes simplex infection, vesicles would eventually develop into dendritic or geographical ulcers without additional topical anti-viral drops. Topical steroid for concurrent anterior chamber reaction is contraindicated unless the corneal surface is healed. In contrast, if this presentation was herpes zoster infection, vesicular ulceration and crusting or Hutchinson's sign would develop without further intervention. The later the onset of treatment, the greater the prevalence and severity of post-herpetic neuralgia. Therefore, prompt initiation of treatment was important even though it was difficult to definitively determine whether this was a herpes simplex or zoster infection.

*Author*

*Nhi Phan, O.D.*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**3:30-4 p.m.**

#### **OD-Ocular Disease**

#### **Vision Loss and Sensory Exotropia due to Untreated Ocular Toxoplasmosis**

Ocular toxoplasmosis occurs as a consequence of the obligate intracellular parasite *Toxoplasma gondii* and is most often acquired by consuming undercooked meat. Infection can cause floaters, decreased vision, photophobia, uveitis and retinochoroiditis. Poorer prognosis is associated with larger lesions, recurrence, and proximity to the fovea. It is estimated that about one-third of humans are chronically infected with *T. gondii*, however manifestation of disease varies. Epidemiologic data show that risk of infection is significantly greater in people with compromised immune systems; patients with advanced age, HIV/AIDS, or during pregnancy.

A 65-year-old Liberian female presents for her first eye exam. The patient complains of eye irritation and states that the left eye has a fleshy growth over the nasal aspect of the cornea, which has caused the eye to turn outward and has significantly reduced her vision. The patient states that she only developed an eye turn in her late thirties after head trauma, which made her eye red and painful, progressing to vision loss and eye turn. Ocular examination is significant for dry eye of both eyes, a three-millimeter nasal pterygium left eye, a constant large angle left exotropia and extensive chorioretinal atrophy of the left eye. The chorioretinal atrophy in the left eye extends from the superior border of the optic nerve head, through the superior arcade out to the periphery, with a linear band of fibrosis. The atrophy of the macular and paramacular region is circular. These fundus findings are consistent with untreated, inactive toxoplasmosis.

Pain, decreased vision, or the appearance of a red eye associated with ocular toxoplasmosis often prompts a person to seek medical attention. With proper diagnosis, treatment can be initiated to treat the infection, relieve symptoms and prevent vision loss. Medical consult for systemic evaluation is also necessary. For this patient, the undiagnosed toxoplasmosis caused extensive retinal damage, resulting in a sensory exotropia and permanent vision loss. The visual outcome for this patient could have been very different with optometric intervention during initial active infection.

*Author*

*Abby Small, Optometry Student*

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## Poster Presentations

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#### Case Report Abstract

Friday, June 21, 2019

3:30-4 p.m.

#### LV-Low Vision

##### Beauty Parlor Syndrome: Beauty is Pain

An 85-year-old white female with complaint of "not being able to see well or walk properly".

- Initial symptoms April 2018 while at the hair salon.
- After shampoo became extremely dizzy and unable to walk. She had to bend down and crawl over the curb and into her car.
- Reports change in vision, numbness, tingling in feet, vertigo, loss of balance and coordination.
- Presented to ENT for vertigo and proceeded to see 10 additional doctors within different specialties without a diagnosis to her knowledge.
- Ocular history: Pseudophakic OU. Scleral buckle with vitrectomy due to a rhegmatogenous retinal detachment with a secondary macular hole OS (1990s). Peripheral retinal laser for tear OD (1990s). Meibomian gland dysfunction. Medical history: Hypertension, dyslipidemia, carotid disease with stent. Medications: losartan, rosuvastatin, vitamin D, low-dose aspirin. NKDA. Social history: retired librarian, married with four children.
- Best corrected acuity: OD 20/20 OS 20/500
- EOM: -1 underaction LLR, LMR. -3 underaction LSR
- Cover test (Krimsky): 25pd CLXT; 20pd CLHypoT
- Visual field: full OD, grossly full OS
- Pupils: Round, normal reactivity OD. Irregular surgical pupil, (+)RAPD OS.
- Intraocular pressure: 13mmHg OD, 7mmHg OS
- Posterior segment: 0.4R OD normal rnl, 0.7R OS diffuse optic atrophy, scleral buckle with chorioretinal scarring OS. (-) ptosis OU.
- MRI with and without contrast: Infarction of

right posterior inferior cerebellar artery distribution (PICA). MRA neck and CTA head neck: Irregularity preforaminal right vertebral artery, no flow-limiting stenosis, right artery terminates in PICA.

- ESR and CRP: within normal limits

Management:

- Occlusion of left eye for "diplopia" relief.

Current occlusion via opaque contact lens. Option to try Bangerter foil/eye patch.

- Suspect combination of sensory, mechanical, and neurological (oculomotor nerve palsy). Defer to strabismus surgeon regarding surgery.
- Continue care with PCP and Cardiologist
- Refer to OT/PT for rehabilitation

The vertebrobasilar arterial system is located within the posterior circulation of the brain and supplies blood, oxygen and nutrients to the brainstem, occipital lobe, and cerebellum. Vertebrobasilar insufficiency results from an interruption blood flow due to mechanical compression of the vertebral artery during prolonged hyperextension. Most importantly, don't ignore acute stroke symptoms and know when to admit.

*Author*

*Ashton Ehlers, O.D.*

#### Case Report Abstract

Friday, June 21, 2019

3:30-4 p.m.

#### OD-Ocular Disease

##### Management of an Acute Traumatic Hyphema After Being Hit in the Eye with a Padlock

A hyphema is the presence of blood in the anterior chamber (AC), typically present after blunt trauma has occurred, following intraocular surgery, or spontaneously in persons on blood thinners. Long-term complications of hyphemas include elevated intraocular pressure (IOP), peripheral anterior synechiae, optic atrophy, corneal blood

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staining, secondary glaucoma, and impairment to accommodative function. Common presentation may include a history of blunt trauma, use of blood thinners, genetic predisposition to platelet or thrombin disorders. The management of traumatic hyphemas are time-sensitive. It is imperative to have the patient elevate their head during the healing process in addition to prescribing a cycloplegic for comfort and a steroid to reduce inflammation and manage any secondary iritis that may manifest. In the instance of an acutely elevated IOP, a beta-blocker is the appropriate management of choice as it will not promote inflammation like a prostaglandin analog.

A 16-year-old male presented with a history of blunt trauma: a lock bounced off the ground and hit him in the eye. He complained of pain, watering and photophobia. The patient's systemic health was unremarkable, he denied any possibility of Sickle-Cell trait or clotting disorders, and his medication list was unremarkable. Entrance testing was unremarkable and uncorrected visual acuity was 20/20- in both eyes. Anterior segment exam of the left eye was remarkable for moderate bulbar injection, mild endothelial blood staining from the AC, 3-4+ red blood cells in the AC in addition to a 1.5mm hyphema. IOP via Goldmann applanation tonometry was measured at 18 mm Hg OD and 28 mm Hg OS. 4-mirror gonioscopy revealed a superior temporal angle bleed. With daily follow-up the hyphema had been reducing in size and IOP was under good control until day 7 post-injury where IOP spiked to 48 mm Hg OS. Combigan TID OS was started for IOP management until the hyphema had resolved completely 2 weeks following initial presentation.

Prompt management of a traumatic hyphema is essential in procuring optimal visual outcome in patients. With the use of a cycloplegic, steroid, and IOP-lowering agent, long-term visual reduction can be avoided.

*Author*

*Inrava Khasnabish, B.Sc., O.D.*

#### **Case Report Abstract**

**Friday, June 21, 2019**

**3:30-4 p.m.**

#### **PC-Primary Care**

#### **Life-saving Paradigm Shift in Central Retinal Artery Occlusion Management**

Central retinal artery occlusions (CRAO) are rare; they occur in approximately 1-2 of every 100,000 patients with increasing incidence with age. Data from 2016 revealed that only one-third of practitioners referred patients with an acute CRAO for immediate stroke evaluation at the emergency department. Recent literature has shown that the risk of having a subsequent cerebrovascular accident (CVA) or myocardial infarction (MI) following a CRAO is equivalent to having had a previous MI or transient ischemic attack. Furthermore, the highest risk period for a CVA or MI following an ischemic event occurs during the first 1-2 weeks after the incident. This poster highlights the importance of the updated recommendations for patients who present with an acute CRAO.

A 74-year-old Hispanic female presented with sudden decreased vision of the left eye that occurred 3 days prior. The patient's last eye examination was 5 years ago. Pertinent ocular history included cataract extraction with PCIOL in the left eye 5 years ago. Pertinent medical history included hypertension, insulin-dependent type 2 diabetes, congestive heart failure, and hyperlipidemia. All systemic conditions were controlled with medications, with the exception of hyperlipidemia, which was being monitored. Pertinent examination findings included visual acuity of HM (PHNI) and retinal "whitening" with a "cherry-red spot" on funduscopy OS. Our patient was sent and admitted to the ER on the same day, and underwent a full stroke evaluation. Her testing revealed no evidence of giant cell arteritis, an acute

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MI or CVA; however, she was found to have coronary artery disease and worsening left ventricular hypertrophy with a severely reduced ejection fraction. The patient underwent surgical implantation of a loop recording device and was prescribed dual antiplatelet therapy as well as cholesterol medication with close follow-up in cardiology. Her ocular health continues to be monitored by optometry for neovascularization of the iris, angle and retina.

Patient education and proper follow-up care to monitor overall systemic and ocular health are of critical importance for patients with central retinal artery occlusions. Timely referral of these patients to the emergency department for a stroke evaluation can be a life-saving endeavor.

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#### **Case Report Abstract**

**Friday, June 21, 2019**

**3:30-4 p.m.**

#### **CL-Contact Lens**

#### **Scleral Lens and Prism Management of Chronic Progressive External Ophthalmoplegia**

RJ, a 50-year-old female, was referred for a dry eye and medical contact lens evaluation by Neuro-Ophthalmology for severe exposure keratoconjunctivitis OU secondary to chronic progressive external ophthalmoplegia (CPEO) due to mitochondrial myopathy, diagnosed at age 18. Her ocular history was significant for ptosis OU, which improved after undergoing frontalis sling repair OU but resulted in lagophthalmos OU. She was very symptomatic for dryness despite frequent artificial tears and taping her eyelids at night. She reported longstanding vertical and horizontal

diplopia, which required differing amount of prism correction in spectacles for various distances. Her medications included amitriptyline, albuterol and vitamin B supplements. Palate paralysis, pharyngeal dysphagia, and sleep-related hypoventilation were some of her systemic comorbidities.

Her spectacle-corrected distance visual acuities were 20/40 OD and OS. Anterior segment exam revealed inferior corneal scarring with superficial inferonasal neovascularization OU with marked epithelial irregularity OS>OD. Due to her incomplete blink and lid closure, scleral lenses were indicated to protect her corneas from further breakdown with continued exposure. Custom Stable scleral lenses (Valley Contax, Springfield, OR) were successfully fit OU with BCVA of 20/30 OD and OS. RJ reported excellent comfort and superior vision in the lenses OU; however, wear time was limited by the diplopia. Plano-powered spectacles with prism correction over her scleral lenses were recommended. The diplopia at distance was fully resolved with a total of 3BO and 2BU OS but could not be fully resolved in any prism amount at near. Consequently, RJ declined prism correction at near, instead opting to continue reading monocularly as she had been doing in her habitual spectacles.

Patients with CPEO suffer from diplopia and constant ocular surface exposure due to lagophthalmos secondary to orbicularis muscle weakness and iatrogenic causes like ptosis repair. Scleral lens therapy provides all-day ocular protection and optimizes vision by masking corneal irregularities from exposure-related scarring. Over-spectacles with prism correction are advised to most accurately treat the evolving degrees and directions of ocular misalignment induced by this progressive condition.

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#### Case Report Abstract

Friday, June 21, 2019

3:30-4 p.m.

#### PC-Primary Care

#### Optic Nerve Coloboma

Optic nerve coloboma is a category of dysplasia in which the optic disc appears abnormal due to incomplete closure of the embryonic fissure. It is usually located inferonasally and often associated with other ocular colobomas. It may be associated with fatal systemic defects including basal encephalocele, congenital heart defects, double aortic arch, transposition of the great vessels, coarctation of the aorta, and intracranial carotid anomalies.

An 8-year-old Hispanic female presents with father to the eye clinic due to unsatisfactory performance during eye screening evaluation at the school. Father reports patient has had trouble seeing the board at the school. Father reports the child was full-term and no complication with birth. Patient's entrance DVA was 20/20 OD and OS. Medical, surgical histories as well as medications and allergies were noncontributory and unremarkable. Aside from the slight reduction in stereo examination, all other entrance testing was unremarkable. Refractory status was minimal at -0.50DS for each eye. Dilated anterior segment and posterior segment for right eye was unremarkable. Anterior segment for left eye was unremarkable. Dilated posterior segment for left eye showed optic nerve coloboma. The coloboma of the left optic nerve was encroaching upon macula area sparing of fovea. Due to congenital dysplasia, education to family members was the most important part of assuring them about risk and prognosis of this condition. It was also encouraged to have all family members receive a comprehensive eye exam along with genetic testing.

Most congenital optic disc anomalies are not associated with progressive vision loss. Hence, no treatment is usually required. However, in cases of amblyopia or with decreased vision, polycarbonate protective lenses may be required. Furthermore, basal encephalocele can occur in any of the dysplasia thus proper education, monitoring, genetic testing, and evaluation are essential with optic nerve colobomas.

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#### Scientific Abstract

Friday, June 21, 2019

3:30-4 p.m.

#### The Effect of Social Support and Visual Function on Perceived Stress

Age-related macular degeneration (AMD) has been found to be associated with psychological stress. Previous investigation has found that social support as measured by the Enriched Social Support Inventory (ESSI) and self-reported visual function as measured by the Impact of Vision Impairment survey (IVI), separately, are significant indicators of perceived stress (as measured by the Perceived Stress Scale). However, these two surveys share some common themes (e.g., the ability to get common tasks completed). The purpose of this study was to determine whether both social support and self-reported visual function each contribute to the ability to predict perceived stress when included in the same predictive model.

Participants were recruited from The Ohio State University Department of Ophthalmology retina service. A correlation analysis was used to investigate whether social support and visual function were strongly related to each other. Additionally, multiple regression analysis was used to investigate whether both social support and self-reported visual function are significant indicators of

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stress when analyzed together. Rasch analysis was used to score surveys and generate summary scores for each person.

There were a total of 163 subjects with AMD (mean age  $\hat{A}\pm$ SD of  $81\hat{A}\pm 9$  years) participated. Fifty-three percent were female. Mean better-eye visual ETDRS letter score acuity was  $61\hat{A}\pm 19$  (approximately 20/60). Social support and self-reported visual function were weakly but significantly correlated with one another (Pearson correlation coefficient=0.22,  $P=0.006$ ). Both measures were significantly related to perceived stress ( $P<0.001$  for the ESSI and  $P=0.049$  for the IVI) when included together in a multiple regression model that also accounted for age, sex and whether the patient was alone while completing the surveys, indicating that each construct provides unique information about perceived stress levels in patients with AMD.

Social support and self-reported visual function were both shown to be related to perceived stress levels in patients with AMD. These findings may be useful in clinical practice in the planning of interventions to improve psychological and other outcomes in low-vision rehabilitation by addressing deficits in social support or ability to complete visual tasks.

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### Case Report Abstract

**Friday, June 21, 2019**

**3-3:30 p.m.**

### LV-Low Vision

#### Diagnosis and Low Vision Management of Occult Macular Dystrophy

Occult macular dystrophy (OMD) has a broad range of age onset and was first reported in the literature in 1989. While the genetics of OMD is complex, heterozygous 'retinitis pigmentosa 1-like 1' (RP1L1) missense variants have been linked to this retinal dystrophy. OMD is characterized by visual acuity reduction from macular dysfunction. It is named occult because the dysfunction is hidden by normal funduscopic examination, full-field electroretinograms (ERG), and fluorescein angiograms (FA). However, focal macular, multifocal ERG, and optical coherence tomography (OCT) can reveal the dysfunction. This case report describes the diagnosis, genetic testing, and low-vision management of OMD.

VG, a 42-year-old Hispanic female, presented to clinic due to failing her driver's license renewal. Her chief complaint was unexplained progressive central vision reduction for the right eye (OD) and left eye (OS) over the past two years. Her ocular and medical history were unremarkable and her family history was non-contributory. Her visual acuity was 20/60 OD, OS at distance with a minimal prescription and 20/50 OD, OS at near with +1.50 effective ADD. The fundus and full field ERG were within normal limits (WNL) in both eyes (OU). A multifocal ERG showed borderline amplitudes foveally OU. The fundus autofluorescence (FAF) showed a mottled appearance with small areas of granular hyperfluorescence and OCT macular thinning OU. OCT angiography of the posterior pole showed 1 vessel loop with a few areas of nonperfusion and a microaneurysm. A visual field (VF) demonstrated

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scattered central defects and a psychogenic component was ruled out with the tangent field. The genetic testing revealed a heterozygous pathogenic missense mutation in RP1L1. This genetic change is known to cause OMD with reduced penetrance and variable expressivity. Through a visual functioning questionnaire, we anticipated that she may benefit from telescopes, microscopes, magnifiers, filters and driving rehabilitation services.

OMD is rare and difficult to diagnose without rigorous testing. Nonetheless, there is no standard treatment for OMD. Our next step in management is to perform an extended functional, low-vision evaluation. This will aid to enhance her quality of life, maintain her independence, and assist her with interprofessional referrals.

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#### **Case Report Abstract**

**Friday, June 21, 2019**

**3:30-4 p.m.**

#### **OD-Ocular Disease**

#### **Malignant or Benign? But Not a Tumor**

The case: A 57-year-old white male reported to the clinic for an ocular health exam and evaluation for candidacy of vision therapy. He had suffered from a stroke 3 weeks prior that affected his left visual field, the visual acuity in his left eye, and resulted in visual hallucinations. His medical history was significant for hypertension, diabetes and hypercholesterolemia, for which he was appropriately medicated at this time. Examination

revealed mildly elevated blood pressure of 158/81, a left homonymous hemianopia—denser below, limited pupil reactivity OS, and stage 4 hypertensive retinopathy characterized by bilateral disc edema, retinal hemorrhages, and cotton wool spots. Management: With the current presentation, it was important for the patient's health to stabilize prior to evaluation for vision therapy. Coordination of care with the neurologist gave the consensus that there were no indications of increased intracranial pressure and the disc edema was likely the result of hypertensive crisis. The patient was seen 1 month after the initial visit for repeat visual field testing and an Optomap retinal exam. At this visit the field defect was stable but the retinopathy had worsened, despite improved blood pressure and blood glucose levels. Further discussion with the neurologist led to a repeat neurological study that demonstrated a second, silent stroke. Appropriate adjustments were made to the patient's medications, and at a 1-month follow-up the retinal evaluation showed improvements in the retinal appearance.

It is not currently known which medications are most effective against MHT due to the low incidence of cases. Retinal evaluation allows insight into the state of microvascular changes and end organ damage. Therefore, it is likely a good indicator of if the systemic medications are working properly. The purpose of the case report is to suggest close follow-up of MHT patients in order to ensure that systemic medical treatment is having the desired effects.

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