



Jan 1st, 12:00 AM

## 14. Optometry

University of Central Oklahoma

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University of Central Oklahoma, "14. Optometry" (2014). *Oklahoma Research Day Abstracts*. 13.  
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## **Abstracts from the 2014 Oklahoma Research Day**

**Held at the University of Central Oklahoma**

### **05. Mathematics and Science**

#### **14. Optometry**

##### **05.14.01 Meibomian Gland Expression in Patients without Dry Eye Symptoms**

**Amy, Dang , Latricia Pack, Shabree Nichols**

*Northeastern State University*

Purpose: Non-obvious obstructive Meibomian Gland Dysfunction (NOMGD) is the most common form of MGD and patients with it have no noticeable signs or symptoms. This pilot study analyzed meibum quality of subjects without dry eye symptoms or signs of MGD to determine if routine glandular expression is warranted in these patients. Methods: Subjects were > 18 years of age, had no dry eye complaints, and had not used eye drops including artificial tears within the last month. Subjects completed the Ocular Surface Disease Index (OSDI) questionnaire and underwent meibomian gland expression. Meibum expressed from the left lower eyelid of each subject was analyzed using a Laserex Super Q slit lamp with TelScreen video camera and graded using the scale developed by the International Workshop on MGD. Results: 40 subjects participated and results were separated into 4 categories: gender, age, number of glands expressed, and meibum quality. There were no statistically significant differences found for gender, age or number of glands expressed with chi-square statistical testing. Using binomial statistical testing, a trend of Grade 1 to Grade 2 quality was found with  $p < 0.001$ , showing statistical significance. The average meibum quality was 1.7125, demonstrating that most subjects in our study have cloudy meibum. Conclusion: The results of this study indicate that MGD is under-diagnosed. Early diagnosis and treatment of MGD could prevent subsequent damage to ocular structures.

## **05.14.02 Selective Laser Trabeculoplasty Long-Term Outcomes in Native American Glaucoma Patients**

**Trent, Ott , Drew Heide**

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Purpose. The purpose of this study is to examine the long-term efficacy of selective laser trabeculoplasty (SLT) treatment in the Native American population. The short-term efficacy has been previously studied but no long-term data has been collected and recorded. Methods. This is a retrospective, observational, longitudinal, cohort study that included 47 Native American patients selected from the Northeastern State University Oklahoma College of Optometry electronic medical health records. The intra-ocular pressure (IOP) prior to surgery, 2-4 weeks post-surgery, six months post surgery, three years post surgery, and most recent IOP readings after three years post surgery were recorded. Results. The mean IOP percentage decrease found in the Native American population three years post SLT treatment OD was  $11.18 \pm 16.25\%$  ( $p=0.00032$ ) and OS was  $4.65 \pm 14.98\%$  ( $p=0.014$ ). The mean IOP decrease in the three to six year range post SLT OD was  $11.96 \pm 17.89\%$  ( $p=0.00075$ ) and OS was  $6.18 \pm 17.19\%$  ( $p=0.02$ ). Conclusions. SLT treatment of the Native American population is shown to be effective long-term at decreasing IOP but there is decreased reliability due to it being a retrospective study.

## **05.14.03 Curriculum across Schools and Colleges of Optometry**

**Courtney, Bloodgood**

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ABSTRACT Purpose. The goal of this research project was to compare and contrast the curricula of the schools and colleges of optometry across the United States. Methods. Using the curriculum from each program, we created categories and assigned each course to the category which best represented it. With these categories, we analyzed the percentage that each category represents of the total credit hours for each school and college. Results. The total credit hours in each program range from 144 to 330.5 credit hours. The largest range for percentage of credit hours in a category was in Clinical Education, with a range of 30.4%, followed by Basic Biomedical Science, with a range of 15.55%. The smallest range was in Pediatrics, with a range of 2.32%, followed closely by Practice Management, with a range of 2.88%. All but four of the categories have a range of less than 7.5%. Discussion. Our analysis showed some variability between the programs. We found it interesting that the specialty categories hardly varied between programs in the percentage of credit hours spent in a category. It was also noted that the curricula appeared to be driven by the material covered on National Boards Part I, II, and III.

#### **05.14.04 Vault and Curvature Change of Jupiter Scleral Lenses using OCT**

**Kelly, McLain , Thomas Salmon**

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Purpose. To measure vault as curvature changed in 15.6-mm Jupiter scleral contact lenses using the Cirrus HD-OCT and to measure central thickness with the OCT and center thickness gauge. Methods. All 20 participants were over 19 years old, did not have refractive surgery or corneal abnormalities. Vault measurements were taken with the OCT. Three different lens vaults were measured on the right eye of each participant. Thickness measurements were taken with a center thickness gauge and OCT. Results. Fitting 1D flatter than the suggested lens reduced the mean vault by 76.8  $\mu\text{m}$  (SD 28.9  $\mu\text{m}$ ). Steepening 1D increased the mean vault by 43.2  $\mu\text{m}$  (SD 24.4  $\mu\text{m}$ ). The change was not symmetric 1D on either side of the suggested lens by paired t-testing ( $p = 0.002$ ). Paired t-testing of the two methods of measuring lens thickness revealed a significant difference of the means ( $p = 0.0047$ ). Conclusion. The OCT did not consistently predict vault change with a 1D steeper or flatter change. The OCT may not be able to find a standard value for vault change with a 1D change in base curve. For lower power lenses the OCT and the thickness gauge gave similar thicknesses. Key Words: scleral contact lenses, contact lens fitting, optical coherence tomography

#### **05.14.05 The Effect of Automated Auditory Cues on Humphrey Visual Field Performance**

**Jamie, Rodriguez**

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Purpose. The Humphrey Visual Field Analyzer (HVFA) plays an essential part in the diagnosis and management of patients with visual field loss due to retinal disease, neurological disease, and particularly glaucoma. The goal of this study was to determine if intermittent automated verbal cues played during a visual field test improves test reliability indices. Methods. Fifty-seven subjects were divided into two groups. Group 1 took a 24-2 Humphrey Visual Field with general directions given at the beginning of the test with no additional instruction. Group 2 took a 24-2 Humphrey Visual Field test with general directions given at the beginning of the test as well as an intermittent automated voice prompt instructing the patient to maintain fixation. Test components analyzed were: fixation losses, false positives, false negatives, and test duration. Results. The Mann-Whitney U test shows that there was no significant difference between the two groups reliability indices. Conclusion. Based on the Mann-Whitney U test, we cannot accept our hypothesis that reliability indices would improve with the accompaniment of automated verbal cues. Further research with a more diverse group of subjects, greater number of participants, and an automated voice prompt with shorter time intervals would be necessary for a more thorough experimental set-up.

## **05.14.06 The Effect of Elastic Modulus of Soft Contact Lenses on Goldmann Applanation Tonometry**

**Lauren, Claborn**

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Intraocular pressure (IOP) is an important measurement to consider in the diagnosis and treatment of ocular conditions. Aqueous humor is the fluid measured and it circulates from the ciliary body, through the pupil, into the anterior chamber, and out the trabecular meshwork through Schlemm's canal. Several factors affect IOP including temperature, smoking, drug and alcohol use, posture, exertion, eye movement, intraocular conditions, and systemic conditions. IOP can affect and be affected by corneal hysteresis, elasticity, and thickness. Measuring IOP over contact lenses is a technique that is gaining popularity in practices in an attempt to speed exam times and also for diseased eyes fit with bandage lenses. Measuring IOP over contact lenses induces some error in measurement. This study seeks to quantify the error induced when measuring IOP over silicon hydrogel contact lenses with the Goldmann tonometer. The affects of lens center thickness (CT), due to dioptric power difference, and elastic modulus on IOP measurement will be evaluated. A group of lenses with varying dioptric powers and elastic modulus will be tested against each other on eyes with known IOP. The results should show that thicker stiffer lenses give artificially higher IOP measurement than thinner softer lenses.

## **05.14.07 Studying the Effect of Binasal Occlusion on Visual Function Using the DEM**

**Anthony, Battese**

*Northeastern State University*

Oklahoma Research Day 1/29/14 Studying the Effect of Binasal Occlusion on Visual Function Using the DEM Anthony Battese BS, David Hackett BS, Skylar Williams BS, Wes DeRosier OD, FAAO Northeastern State University Oklahoma College of Optometry ABSTRACT Purpose. To investigate how BNO affects oculomotility skills and automaticity measured with the DEM. Then to compare the subject's standardized academic test scores to their DEM score with BNO. Methods. Sixty-five 3rd, 4th and 5th grade subjects were recruited to take the DEM test with three variations on their habitual spectacles: limbal binasal occlusion, canthal binasal occlusion, and superior occlusion (control). Plano spectacles were provided for subjects without corrective lenses. Scores were then compared to standardized test scores for correlation to school performance. Results. A general linear trend exists between the DEM test age based percentiles for horizontal adjusted time, total errors and calculated ratio for all three test groups and the standardized test scores of the subjects. The station with limbal occlusion was found to perform the DEM horizontal reading test slightly faster on average than the station with control occlusion while the station with canthal occlusion performed the test slightly slower than the control. The difference between the groups DEM horizontal adjusted reading times was not statistically significant. Conclusion. While BNO did not show statistically s

## **05.14.08 Comparison of the Pacific Acuity Test to the Gold Standard Teller Acuity Card**

**Leslie, Faulkner**

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**ABSTRACT Purpose.** To determine if there is a difference between the gold standard Teller Acuity Cards and a new form of preferential looking, Pacific Acuity Test, containing a facial stimulus as the target. Both tests are currently available to test infant visual acuity. **Methods.** We presented each acuity test, one at a time, in descending order to 24 infant subjects who ranged in age from 6-24 months (9 males, 15 females). Half were tested first with the Teller Acuity Cards while the other half was tested first with the Pacific Acuity Test to eliminate any erroneous results from fatigue or bias. An observer was seated directly opposite the subject and caregiver. As the cards were presented the observer noted the subject's direction of gaze. The results were recorded and accuracy was checked by the other researcher. **Results.** We found that there was a clinically significant difference between the Teller Acuity Cards and Pacific Acuity Test when compared by statistical analysis methods. The two tests were not clinically comparable using the Bland-Altman statistical method. **Conclusion.** We concluded that in a clinical setting it cannot be assumed that the Teller Acuity Cards and Pacific Acuity Test can be used interchangeably. The results between the tests were inconsistent. The difference in test design could have contributed to the inconsistent results.

## **05.14.09 Comparison of Vertical Cup-to-Disc Ratio and Optic Nerve Head Size Using Fundus Photography vs. Cirrus SD-OCT**

**Jason, Dobson , Derek Wills, Leland Carr**

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. To compare vertical cup-to-disc (VCD) ratio grading and optic nerve head size (ONH) grading between fundus photographs as judged by clinicians and the Cirrus Optical Coherence Tomographer (OCT). The secondary purpose was to gather repeatability statistics for the clinicians' evaluations of the vertical cup-to-disc ratio and optic nerve head size. The study was composed of 50 eyes from the Oklahoma College of Optometry. The fundus photos were presented to 10 clinicians for grading of the VCD ratio and ONH size. Pearson's continuous correlation was used to compare the results of the VCD while Spearman's Rho was used to compare ONH size grading. OCT compared to clinicians' VCD grading showed an excellent correlation (0.800) while ONH size grading showed a fair correlation (0.490). Intrauser ICC of VCD ratio measurements among all participants was excellent at 0.820 while interuser VCD ICC was 0.850. Intrauser ICC of optic nerve head size estimations among all participants was good at 0.700 and interuser ONH ICC was fair at 0.550. OCT correlated well with clinicians' assessments for VCD and ONH. However, OCT was larger (79% of the time) when grading the VCD (average of 0.09). There was no significant difference in OCT and clinicians' ONH size measurements. Clinicians were consistent when grading the same VCDs multiple times and even more consistent when compared with their peers. Intrauser and Interuser ONH repeatability was lower but sti