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TEACHING PROFESSOR CONFERENCE
INTRODUCTION
A patient encounter log (PEL) is one tool used to assess a student’s clinical educational experience. Previous studies in the medical education literature show that no more than 83% of patient encounters are recorded in medical student logbooks. Diverse documentation strategies have been used to track students’ clinical encounters.

- Paper
- Hand-held devices
- Web-based logging systems.

Each system has limitations since all rely upon students’ willingness to accurately document the information. Students may not report all encounters, may carelessly or erroneously recall information, and may even falsify data.

Question: Does linking student feedback and the student evaluation process to a patient encounter logging system improve the accuracy of student patient encounter logs?

BACKGROUND
Third year students at the Illinois College of Optometry (ICO) are assigned two-weekly sessions in the Primary Care Clinic of the Illinois Eye Institute (IEI) each academic quarter. Students are assigned to two faculty preceptors, one for each session for the duration of the quarter. Historically, students received feedback from their preceptors for each individual patient encounter via an NCR two-part evaluation form. One copy of the evaluation was provided to the student and the second copy was retained for grading purposes at the end of each quarter.

In 2009 ICO students began using the Meditrek on-line system to log their patient encounters, replacing a system that used hand-written logs. During spring quarter 2013 ICO implemented a trial period in which an on-line student feedback process and the electronic logging system were linked with one another.

METHODS
Pretrial Period: May 2012 – February 2013
- Preceptors document student feedback on NCR paper form
- Students record patient encounters on-line via Meditrek®
- Logs reviewed at the end of each academic Quarter.
- Number of patient encounters for each student identified
- Number of dates saved identified
- Students classified as having Low, Medium, and High frequency logging characteristics

Trial Period: February 2013 – May 2013
- Patient encounter log launched within EHR (NextGen O)
- Student records patient encounter. “Submit” generates evaluation for attending faculty member.
- Student must complete chart and log encounter the same day.

RESULTS

**Student Log**

- Student must complete chart and log encounter the same day.

**Pretrial**

- Faculty completed the evaluation and the student can review feedback

**DOE** - student logged the patient and an evaluation available to the attending faculty

**High Frequency Logging**

- Average number of patient encounters/session

**Low Frequency Logging**

- Average number of patient encounters/session

**Student Frequency**

- Number of logging dates

<table>
<thead>
<tr>
<th>Frequency Type</th>
<th>Average Patient Encounters/session</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretrial</td>
<td>1.4</td>
</tr>
<tr>
<td>Trial</td>
<td>1.4</td>
</tr>
</tbody>
</table>

**Average Patient Encounters/session**

<table>
<thead>
<tr>
<th>Frequency Type</th>
<th># of Students</th>
<th>Average Patient Encounters/session</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretrial</td>
<td>48</td>
<td>1.33</td>
</tr>
<tr>
<td>Trial</td>
<td>48</td>
<td>1.39</td>
</tr>
</tbody>
</table>

CONCLUSIONS

- High frequency loggers report a statistically higher average number of patient encounters/session than both medium and low frequency loggers when logs are not linked to the evaluation and feedback process.

- Low and medium frequency loggers may under-report the number of patients seen when evaluations and logs are not linked.

- Linking the patient encounter logging system to the student feedback process resulted in an increased number of encounters logged by previously identified low and medium frequency loggers, with no statistical differences between all three groups. This may be due to improved accuracy of logging, but potentially could be due to an increased patient census during the trial period.

While it appears that linking these processes may result in more robust logging, further study is needed to determine its full impact.

REFERENCES


Special thanks to Dr. Yi Fang for her assistance with the statistical analysis.

CONTACT INFORMATION

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**BACKGROUND**

- The anatomical variations of the optic chiasm and the size and shape of pituitary adenomas can elicit visual field defects that deviate from the classical bitemporal hemianopia.
- The majority of the normal population have optic chiasms that lie directly above the diaphragma sellae, but a minority have post-fixed optic chiasms in which the chiasmas are displaced posterior and lie over the dorsum sellae. A pre-fixed optic chiasm is an anterior displacement of the chiasm overlying the tuberculum sellae and is present in 10-15% of the normal population.
- A patient presents with an incongruous left hemianopsia secondary to a pituitary macroadenoma in a likely pre-fixed optic chiasm.

**CASE HISTORY**

- A 79-year-old white male presented with complaints of reduced vision and loss of peripheral visual field.
- The veteran was diagnosed with a pituitary adenoma after work-up was performed following visual field defects detected by an outside eye doctor.
- The patient’s medical history includes pituitary adenoma, schizophrenia, auditory loss, Barrett’s esophagus, snuffles, benign prostate hyperplasia, and osteoarthritis.

**FINDINGS**

- The BCVA OD and OS were 20/400 and 20/25, respectively. There was a 1+ RAPD OD. Ishihara color vision was reduced with 0/14 plates OD and 5/14 plates OS.
- The right optic nerve had 1+ diffuse and 3+ temporal pallor; the left optic nerve head was pink without pallor.
- Goldmann visual fields, which were reliable with good fixation, showed complete loss of nasal field OD and mild temporal visual field depression OS (Figures 1 and 2).

**TREATMENT**

- Asymptomatic non-secreting pituitary adenomas may not require treatment and can be closely monitored. Secreting adenomas can alter hormone levels and may shrink with medical therapy such as dopamine agonists. Symptomatic adenomas and those that fail to respond to medical intervention or radiotherapy can be removed surgically, often through a transphenoidal route.
- This patient’s non-secreting macroadenoma did not warrant medical therapy. However, the patient has repeatedly refused surgical intervention against medical advice. Follow-up visits showed stable decreased vision. Goldmann visual fields revealed slow, progressive overall constriction of right and left visual fields. Unfortunately, the patient’s mental status limits his ability to perform visual field testing.

**CONCLUSIONS**

- Pituitary adenomas are found to be present in approximately 17% of the population and are the most common intrasellar tumor in adults.
- Visual field defects and optic atrophy are ocular findings that may be present. Invasion of the cavernous sinus can cause cranial nerve palsy.
- Pituitary apoplexy is hemorrhaging or infarct within a pituitary adenoma. It is a rare occurrence but can be life-threatening if untreated.
- Post- or pre-fixed chiasmas are present in 30% of the population so one must keep in mind that visual field defects can be highly variable in patients with pituitary adenomas and should be correlated with imaging.
- Pituitary adenomas may grow to a large size with varying morphologies that can invade different structures causing systemic and ocular problems that should be correlated with imaging.

**REFERENCES**


**ACKNOWLEDGEMENTS**

Thank you to everyone who reviewed and assisted with the contents of this poster.

There was no conflict of interest.

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Corneal epithelium defect due to rheumatoid arthritis and staphylococcal marginal keratitis

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BACKGROUND

Rheumatoid arthritis (RA) is a common inflammatory condition that often affects small joints throughout the body especially the hands and wrists.

Common ocular manifestations of RA are keratoconjunctivitis sicca, episceritis, scleritis, and peripheral ulcerative keratitis. The diagnosis of RA includes four of the following criteria: morning stiffness lasting greater than 1 hour, swelling of the soft tissue of three or more joints, swelling of the soft tissue of three or more hand joints, symmetrical soft tissue swelling and subcutaneous nodules. Staphylococcal marginal keratitis begins with an infiltrate that has an intact epithelium but may ulcerate with prolonged inflammation. Staphylococcal marginal keratitis is a hypersensitivity reaction to staphylococcal antigens. It is mostly occur bilateral and occurs adjacent to the limbus with a clear zone of cornea between the lesion and the limbus. The presence of chronic staphylococcal bacteria on the lid margins is thought to trigger an immune response in a sensitized cornea. The immune response is most likely a type III hypersensitivity reaction in complex deposition in the peripheral cornea.

Keratoconjunctivitis sicca also known as dry eye syndrome is divided into two categories based on etiology, which are aqueous deficient and evaporative dry eye. There are many causes of evaporative dry eye including but not limited to meibomian gland dysfunction/posterior lid margins is thought to trigger an immune response in a sensitized cornea. The immune response is most likely a type III hypersensitivity reaction in complex deposition in the peripheral cornea.

CASE DETAILS

A 61-year-old Hispanic female presented to the Urgent care clinic with complaints of severe burning, pain, redness, and irritation in both eyes, with the right eye more affected than the left eye for the past three days. The patient’s medical history is positive for hypertension, diabetes, and rheumatoid arthritis.

EXAMINATION

<table>
<thead>
<tr>
<th>Meibomian Gland Dysfunction</th>
<th>Lid/Lashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1+ injection</td>
<td>Conjunctiva</td>
</tr>
<tr>
<td>2+ injection</td>
<td>Sclera</td>
</tr>
</tbody>
</table>

1.5 sar/nasal epithelium defect 0.5 mm infiltrate sup/inf supalosal Microorganism and neovascularization with scarring 360 Large diffuse confluent SPK

Keratoconjunctivitis Sicca

CONNECTIVE TISSUE DISEASE, IE RHEUMATOID ARTHRITIS

CASE DETAILS

A 61-year-old Hispanic female presented to the Urgent care clinic with complaints of severe burning, pain, redness, and irritation in both eyes, with the right eye more affected than the left eye for the past three days. The patient’s medical history is positive for hypertension, diabetes, and rheumatoid arthritis.

DIAGNOSIS

Due to right eye’s superior corneal epithelium defect, the patient was diagnosed as having Sclerosing keratitis with a concomitant keratoconjunctivitis sicca and staphylococcal marginal keratitis which was secondary to her rheumatoid arthritis. Once the corneal epithelium defect healed with the mentioned management plan, the patient has been followed for several weeks in order to successfully treat the concomitant keratoconjunctivitis sicca and staphylococcal marginal keratitis. The pathogens of chronic staphylococcal hypersensitivity can lead to ulceration is shown in Figure 2. As in the case of this patient there are several concomitant diagnoses, as Figure 3 shows there is a long list of differential diagnoses of a patient that presents with peripheral corneal thinning. However, all the patient’s ocular diagnoses are pragmatic and immune mediated, so the route of the case must be controlled in order to adequately provide relief for the patient.

RESULTS

Patient’s with staphylococcal marginal keratitis often present with redness, pain, foreign body sensation, and photophobia. It is important to rule out potentially devastating vision causing disorders such as peripheral ulcerative keratitis and Mooren’s ulcer. Copious patient education is important because ocular manifestations will wax and wane based on the systemic condition. A scleral lens is a long term treatment plan for this patient in order to insure comfort. Overall, the goal is to increase patient comfort throughout the day. It is imperative to thoroughly educate each patient about their ongoing condition, while tailoring treatment options based on signs observed.

REFERENCES

Lieser, D.J., Abraham, B.B. Sclerosing keratitis associated with peripheral corneal ulceration. Cor

CONTACT INFORMATION

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Special thank you to Dr. Jennifer Naylor
PURPOSE

During observation of student exams at the Illinois College of Optometry (ICO), various levels of room lighting were being utilized during the manifest refraction, ranging from full brightness to total darkness. The purpose of our study was to determine if illumination significantly affected manifest refraction. Subjective preference on the illumination condition was also investigated.

METHODS

Seventy-one subjects free of any significant ocular disease were recruited from the staff, student and faculty of ICO and refracted by two doctors in adjoining exam rooms. One exam room was brightly illuminated (overhead room lights on) while the other room was moderately lit (overhead room lights off, dimmable pocket lights on behind the exam chair). Illuminance was measured prior to each examination with a Sekonic L-758Cine DigitalMaster Light Meter. The brightly lit room was set to 320 lux, and the dim room to 3.5 lux. Subjective manifest refractions were performed in both rooms with an M & S Smart System 2020 computerized visual acuity chart. The identical refractive procedure was performed by each examiner. Nidek autorefraction measurements were used as the starting point for both refractions. Pupil sizes were measured prior to each refraction with an infrared Colvard pupillometer. All subjects were asked to complete a 3-question survey post-examination to evaluate subjective preference. Paired T-test was performed to compare the spherical equivalent (SE) refraction and pupil sizes of right and left eyes in the bright illumination to the SE refraction and pupil sizes in the moderate illumination.

RESULTS

No significant difference was found in the SE refraction between the two illuminations for either eye (OD: p=0.40 and OS: p=0.92). Average SE was -3.04 in bright illumination and -3.06 in moderate illumination, OD: and -2.99 in bright illumination and -2.96 in moderate illumination, OS. As expected, pupil size in the two illuminations was significantly different (p<0.001). There was no patient preference for light level when evaluated for comfort (29% preferred bright, 36% preferred moderate, 36% had no preference), or clarity of vision (29% preferred bright, 39% preferred moderate, 33% had no preference).

CONCLUSION

The results indicate that subjective manifest refractions do not significantly differ whether they are obtained in bright or moderate room illumination. In addition, patients have no preference for one lighting condition over the other. These findings may impact how this procedure is taught in an optometric curriculum or performed in daily clinical practice.
INTRODUCTION

Approximately one third of patients with systemic lupus erythematosus (SLE) have ocular manifestations ranging from dry eyes to optic neuropathies. Of these, optic neuropathy is a rare finding and includes optic neuritis and ischemic optic neuropathy. A case of progressive ischemic optic neuropathy presents in a patient with work-up and symptoms indicating an active autoimmune disease process.

CASE HISTORY

A 65-year-old African American male presented with complaints of recurrent painless, gradual vision loss OS. His ocular history consisted of optic neuropathy OS with previously decreased vision of 20/70, reduced red green color vision, and trac RAPD. A work-up was performed at the initial presentation in 2010 with the results summarized in Table 1. The positive autoimmune lab results led to a rheumatology referral where the patient was deemed likely to have undiagnosed and subclinical SLE. He had no other clinical symptoms of SLE. He was treated with Cellcept, an undiagnosed and subclinical SLE. He had no other clinical symptoms of SLE. He was treated with Cellcept, an anemia, multiple aortic dissection surgeries with complications resulting in a St. Jude aortic valve replacement, COPD, BPH, and renal disease.

Table 1. Original Lab and Imaging Work-Up

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood work-up</td>
<td>Elevated/Positive: ANA, anti-SSA, anti-SSB, anti-Sm, anti-RNP, CRP, MHA-P7, polyclonal hypergammaglobulinemia, hyperlipidemia, and hyperproteinemia Nephritis, anti-cardiolipin antibodies, anti-dsDNA, TSR, ACE, RPR, lysozyme, RF</td>
</tr>
<tr>
<td>CT head/orbits</td>
<td>No mass effect or evidence of MS</td>
</tr>
<tr>
<td>Carotid duplex</td>
<td>No evidence of hemodynamic carotid or vertebral disease</td>
</tr>
</tbody>
</table>

ACKNOWLEDGEMENTS

Thank you to everyone who helped review and edit the contents of this poster. There were no conflicts of interest.

CONTACT INFORMATION

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DISCUSSION

Optic neuropathy as the first presenting sign of SLE is a rare finding. It is estimated that 1-2% of SLE patients will have optic neuropathy. Its presentation can vary greatly and in the case of ischemic optic neuropathy, can present with painless vision loss, optic disc edema, arcuate visual field defects, and have unilateral or bilateral presentations. Visual acuities can also range with studies indicating 37-61% of patients having VA of 20/200 or worse. SLE ischemic optic neuropathy can occur when immune complexes deposit in the small vessels supplying the optic nerve, which leads to focal thrombotic changes and optic nerve head ischemia. This ischemic event is believed to cause subsequent demyelination and axonal necrosis. A unique feature of this case is the association between the elevated levels of anti-Sm antibodies and optic neuropathy progression. Anti-Sm antibody levels along with a positive ANA plays an important role in diagnosing SLE and indicating disease activity. Anti-Sm antibodies are seen in 5-30% of SLE patients and have high specificity for SLE, making it one of the diagnostic criteria for the disease. Our patient had elevated levels of anti-Sm antibodies and new skin rashes at the time of his optic neuropathy presentation, likely correlating with an active systemic and ocular disease process. Typical management of ischemic optic neuropathy involves monitoring and reducing risk factors that can cause recurrences. In our case, this required co-management with rheumatology in treating the patient. During an acute phase, systemic corticosteroids, and even IV steroids in severe cases, may be used in addition to immunosuppressant therapy.

CONCLUSION

- Optic neuropathy in SLE is a rare finding and can occur in 1-2% of patients with SLE.
- The visual prognosis can vary with up to 61% of patients ending with VA of 20/200 or worse.
- Positive ANA and Anti-Sm antibody levels have a large role in diagnosing SLE and may be contributing to active ocular disease in our patient.
- Co-management with different medical subspecialties in maintaining a patient’s overall systemic health is crucial in preventing vision loss.

REFERENCES

BACKGROUND
Bardet-Biedl syndrome is a rare, genetically heterogeneous condition occurring in between 1:100 K and 1:160 K people. The autosomal recessive ciliopathy causes retinitis pigmentosa, obesity, post-axial polydactyly, renal and cardiac abnormalities, learning disabilities, and hypogonadism, among other systemic manifestations.

CASE SUMMARY
An 11 year-old African-American male who received a diagnosis of retinitis pigmentosa two years prior by another ophthalmologist presented for a comprehensive eye examination. He had subjective complaints of worsening nyctalopia and peripheral field constriction but otherwise reported having normal central and color vision. His medical history included his 5 week prematurity with no other renal or cardiac history.

Upon gross observation, the patient was overweight and presented with scars on the ulnar side of each hand and also post-axially on his left foot. The patient revealed he had a history of polydactyly with subsequent removal of the additional digits. His ocular history was significant for bilateral isometropic amblyopia. His best corrected visual acuity was 20/60 in each eye. No other individuals in his family pedigree were affected with retinal disease, and any history of consanguinity was denied. Upon dilated fundus examination, the patient showed typical signs of retinitis pigmentosa including 360 degrees of bone spicule hyperpigmentation and clumps of hypopigmentation, waxy optic disc pallor, and mild vessel attenuation in each eye. There was relative foveal sparing without any sign of a large atrophic macular lesion in either eye. Electrophysiologic testing revealed a non-detectable rod and cone response on the full-field electroretinogram of each eye.

After being referred back to his internist to rule out any other systemic abnormalities, the patient was found to show signs of hypogonadism. No other significant findings were confirmed after being referred for a cardiology and nephrology consult. Based on the patient’s retinal findings, polydactyly, obesity, and hypogonadism, a diagnosis of Bardet-Biedl syndrome was made. The patient was educated on the diagnosis, prognosis, and option for genetic testing for BBS mutations. He was sent for a low vision rehabilitation consultation.

CONCLUSION
This case represents the importance of completing a thorough review of systems and medical history with pediatric populations presenting with inherited retinal disease, as to not overlook syndromes like Bardet-Biedl in obese pediatric patients. Signs of obesity and post-axial polydactyly presenting with retinitis pigmentosa are key signs for making the diagnosis.

REFERENCES
Ring scotomas often result in well preserved subjective visual acuity with disproportionate visual field loss. They are reportedly objective visual acuity with disproportionate Ring scotomas often result in well preserved paracentral scotomas and/or evaluate fixation. Several tests are available to map central and peripheral field defect, however these strategies often fail to improve functionality in patients with ring scotoma. Failing to diagnose a ring scotoma can result in frustrated patients and clinicians. Other devices include the Nidek MP-1 and the OPKO OCT SLO OD confirms complete central scotoma and poor fixation without a preferred retinal locus (PRL). OPKO OS shows a response to a 2dB stimulus with paracentral fixation and surrounding absolute scotoma.

LOW VISION DEVICE & MANAGEMENT PLAN

Figure 5a: Education and scotoma awareness - We demonstrated the scotoma and reviewed risk of visual deterioration. Ring scotomas are reported to progressively deteriorate in up to 50% of patients. Ring scotoma should be considered as a differential diagnosis and management plan.

Figure 5b: Lighting - A clip on spectacle light for portable increased luminaire was prescribed in addition to continued use of stand lamp. A yellow typoscope/bar magnifier was also used for scotoma management and functional contrast enhancement.

At follow up the patient reported a moderate decrease in frustration and much greater acceptance of her vision loss.

CONCLUSIONS

- Given its prevalence, when subjective complaints of ADL difficulty are disproportionate to measured acuity ring scotoma should be considered as a differential diagnosis.
- Appropriate initial diagnosis of ring scotoma is imperative to rehabilitation success.
- Microperimetry is useful in correlating retinal structural and function when mapping scotomas. The CCVFT is clinically useful and helpful in practices where access to microperimetric studies is limited.
- Measurements of acuity, contrast sensitivity and saccades are important in the assessment and management of ring scotoma.
- Rehabilitation strategies for a ring scotoma should include education, scotoma awareness training, increased lighting and low magnification.

REFERENCES


CONCLUSIONS

- Given its prevalence, when subjective complaints of ADL difficulty are disproportionate to measured acuity ring scotoma should be considered as a differential diagnosis.
- Appropriate initial diagnosis of ring scotoma is imperative to rehabilitation success.
- Microperimetry is useful in correlating retinal structural and function when mapping scotomas. The CCVFT is clinically useful and helpful in practices where access to microperimetric studies is limited.
- Measurements of acuity, contrast sensitivity and saccades are important in the assessment and management of ring scotoma.
- Rehabilitation strategies for a ring scotoma should include education, scotoma awareness training, increased lighting and low magnification.

REFERENCES

INTRODUCTION

Stickler Syndrome (hereditary arthro-ophthalmopathy) is an autosomal dominant genetic disorder that affects connective tissue, specifically collagen tissue. There are three main classifications to the syndrome. Types 1 and 2 present with the classic ocular and systemic features. Type 1 is the most common. Type 3 demonstrates only systemic findings and no ocular manifestations. Systemically this disease causes facial, oral and skeletal anomalies as well as deafness. Ocular findings include high myopia (non-progressive), cataracts (pre-senile), glaucoma and retinal detachment.

CASE REPORT

A 9-year-old Hispanic female presents with complaints of blurry vision in her left eye at distance and near since she experienced a non-traumatic retinal detachment one year ago. Her medical and ocular history is significant for Stickler Syndrome and a retinal detachment in her left eye. Her spectacle prescription is -9.75-0.75x175 and -9.75-1.25x177. Entering visual acuities are 20/30-1 in the right eye and counting fingers improving to 20/800 with pinhole in the left eye. Pupil is slow to react in the left eye and there is a superior defect on confrontation fields. Retinoscopy and auto-fraction with trial frame refraction was performed. Her best corrected visual acuities are 20/25-2 in the right eye with -9.50-1.25x180 and 20/150 in the left eye. The final contact lens prescription is -7.50D for the right eye and -6.00D for the left eye with Air Optix Night and Day lenses. The remaining refractive error, 2.25-1.25x180 and +2.25-0.75x180 is placed in polycarbonate spectacles. This will encourage her to wear the glasses for protection. Occlusion therapy of the right eye is a future option to promote improved vision in her left eye. The patient will return for a three month follow-up, then yearly dilated fundus evaluations. She was educated on the signs and symptoms of retinal detachments.

RESULTS

The amount of anisometropia present is too large for spectacle correction, thus contact lenses are the first line of treatment. At the contact lens fitting, extended wear silicone hydrogel lenses were chosen. With a -8.00D lens, visual acuity is 20/30- in the right eye. With a +4.50D lens and a +3.50D over-refraction, visual acuity is 20/125 in the left eye. The final contact lens prescription is -7.50D for the right eye and +6.00D for the left eye with Air Optix Night and Day lenses. The remaining refractive error, 2.25-1.25x180 and +2.25-0.75x180 is placed in polycarbonate spectacles. This will encourage her to wear the glasses for protection. Occlusion therapy of the right eye is a future option to promote improved vision in her left eye. The patient will return for a three month follow-up, then yearly dilated fundus evaluations. She was educated on the signs and symptoms of retinal detachments.

CONCLUSION

Stickler Syndrome is the most common inherited disorder to cause rhegmatogenous retinal detachments in children, most occurring within the first decade of life. The detachments result from giant retinal tears presenting as a circumferential break at the pars plana from the splitting of the posterior hyaloid membrane. Over 50% of patients with this syndrome will suffer from a retinal detachment and almost 70% of those will be affected bilaterally. It is imperative for children of family members with this syndrome to have a comprehensive eye exam at an early age due to the gene’s strong penetrance. Affected parents have a 50% chance of passing it to their offspring. Patients with this disease should have annual dilated eye examinations. Early and even prophylactic treatment along with education is the key for managing this syndrome.

Table 1: Classifications of Stickler Syndrome

<table>
<thead>
<tr>
<th>Type</th>
<th>Gene</th>
<th>Clinical Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>COL2A1</td>
<td>Vitreoretinal degeneration (optically empty vitreous), retinal detachment, cataracts, myopia, mid-facial hypoplasia, cleft palate, deafness, osteoarthritis (early onset), hypermobility of joints and mitral valve prolapse</td>
</tr>
<tr>
<td>Type 2</td>
<td>COL11A1</td>
<td>Vitreoretinal degeneration (fibrillary and beaded appearance), retinal detachment, cataracts, myopia, cranial abnormalities, cleft palate, deafness, osteoarthritis (early onset) and hypermobility of joints</td>
</tr>
<tr>
<td>Type 3</td>
<td>COL11A2</td>
<td>Mid-facial hypoplasia, cleft palate, deafness, osteoarthritis (early onset) and short stature</td>
</tr>
</tbody>
</table>

Table 2: Clinical Findings of Stickler Syndrome

<table>
<thead>
<tr>
<th>Ocular Findings</th>
<th>Systemic Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>High myopia</td>
<td>Facial anomalies</td>
</tr>
<tr>
<td>-non-progressive</td>
<td>-mid-facial hypoplasia</td>
</tr>
<tr>
<td>Vitreoretinal degeneration</td>
<td>-depressed nose bridge</td>
</tr>
<tr>
<td>Presirile cataracts</td>
<td>-short nose</td>
</tr>
<tr>
<td>-wedge or fleck opacities, non-progressive</td>
<td>Oral anomalies</td>
</tr>
<tr>
<td>Retinal detachment</td>
<td>-cleft and high-arched palate</td>
</tr>
<tr>
<td>-50% within first decade</td>
<td>-bifid uvula</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>Skeletal anomalies</td>
</tr>
<tr>
<td>-angle anomaly, 5-10% of cases</td>
<td>-spondyloepiphyseal dysplasia</td>
</tr>
<tr>
<td>Ectopia lenses</td>
<td>-joint hypermobility</td>
</tr>
<tr>
<td>-uncommon</td>
<td>-osteoarthrits</td>
</tr>
<tr>
<td>Deafness</td>
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</tr>
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</table>

CONTACT INFORMATION

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BACKGROUND

Binocular vision, accommodative and oculomotor dysfunctions are frequently encountered in optometric practice, second only to that of refractive error.1 These disorders have been associated with a decreased quality of life and academic performance in a performance. Symptoms noted by those with the disorders range from asthenopia and headaches to diplopia and decreased reading comprehension.2 Given their prevalence and the impact they may have on daily living and learning, it is important to accurately and efficiently assess these functional disorders in optometric practice and vision screenings so patients can seek appropriate care. Binocular Vision Assessment software (BVA) by Home Therapy Solutions is used by optometrists in-office to screen for and identify binocular vision, accommodative and oculomotor disorders. BVA claims it is an excellent pass/fail assessment tool so patients can seek appropriate care.

METHODS

Binocular, oculomotor and accommodative functions were measured in 39 optometry students between the ages of 18 and 30 using both the BVA and a standard VEE. Exclusion criteria included any history of strabismus, amblyopia or extra ocular muscle palsy. The BVA program was configured using a 13 inch MacBook Pro monitor with brightness set to full and subjects positioned 40 cm from screen for consistency. The BVA measured heterophorias, vergences, monocular accommodative facility, Worth 4 dot, fixation disparity, saddles, and pursuits (Fig 1a-g). The VEE also included tests for these seven functions. Data was assessed using Pearson correlations and Bland Altman analysis for heterophorias, vergences and monocular accommodative facility. The data for saddles, pursuits, Worth 4 Dot and fixation disparity was evaluated using the Fisher’s exact test.

RESULTS

The BVA showed fair to excellent correlation for assessing horizontal heterophorias as compared to objective and subjective phoria measurements (Figures 2a-3a) but only fair to poor correlation (Figures 2b-3b). There is fair correlation between BVA and prism bar/ Risley Prism methods for measuring negative fusional vergence (NFV) and positive fusional vergence (PFV) break/recovery (Figures 3a-4a) with the exception of positive fusional prism bar vergences, showing poor correlation.

Overall, the high mean difference and broad limit of agreement on Bland Altman plots indicates poor agreement between the BVA and VEE on NFV and PFV break/recovery (Figures 3b-4b). Monocular accommodative facility measured by the BVA has fair correlation and agreement (Figure 7a-b) with the fisher’s exact test indicated no significant difference between the VEE and the BVA. Bland-Altman Plots for horizontal heterophorias, vergences and negative fusional vergence (NFV) and positive fusional vergence (PFV) break/recovery shows poor agreement between Prism Bar and BVA, but fair agreement between Risley Prism and BVA. Prism Bar methods for measuring negative fusional vergence showing poor correlation. However, caution should be used when assessing numerical values for heterophorias, vergences and monocular accommodative facility collected from the BVA. These values are not directly comparable with those found during a standard clinical assessment.

CONCLUSION

This study demonstrated that non-eye care professionals might be able to use the Binocular Vision Assessment as a screening tool to determine the presence of binocular, accommodative and oculomotor disorders in a young adult population. In general, if they failed the BVA program, a functional vision program is present and should be referred for further diagnosis and treatment.

REFERENCES

Case History/Introduction

A 34 year old African American female presents to the urgent care clinic complaining of pain and decreased vision in the right eye more than the left. Ocular history is significant for a previous diagnosis of Avellino dystrophy in both eyes. Family history indicates that three of the patient’s children also have Avellino dystrophy.

Ocular Examination

On clinical examination, the patient had decreased acuity in both eyes, right greater than left (20/100 OD, 20/60 OS). Slit lamp examination revealed corneal amyloid and hyaline deposits OU (Figures 1 and 2). Sodium fluorescein staining of the cornea showed central epithelial erosions OU with adjacent areas of negative staining (Figures 3 and 4). The epithelium was noted as loose and irregular with underlying stromal haze. Also noted was 1+ conjunctival injection. The posterior segment was not assessed.

Results

The previous diagnosis along with the clinical examination led to a presumed diagnosis of recurrent corneal erosion secondary to a congenital corneal dystrophy. The acute corneal condition was treated with antibiotic drops QID OU, artificial tears OU, and bandage soft contact lenses OU. At follow-up, the patient had developed severe corneal edema and a mild anterior chamber reaction secondary to bandage soft lens-induced hypoxia. The lenses were removed, and a cycloplegic, steroid (Q3H) and oral doxycycline were added to the treatment regimen. With improvement the following day, the patient began a steroid taper (5 days) continued the topical antibiotic for 5 days then stopped, and oral doxycycline was continued QD indefinitely. With complete resolution of the acute corneal condition (1 month), the patient was fit with scleral lenses OU (Figures 5 and 6) to improve vision (20/25 OD, OS) and decrease likelihood of future recurrent erosions.

Conclusion

Avellino corneal dystrophy displays features of both granular and lattice dystrophy. Anterior stromal discrete gray-white opacities and lattice lesions in mid- and posterior stroma are pathognomonic for the condition. Anterior stromal haze is also often noted in these patients. The condition has an autosomal dominant inheritance pattern with very high penetrance, and has been linked to a mutation in the Big-h3 gene. Current treatments include PTK and PKP, with frequent recurrence after these interventions. Soft bandage lenses are often useful in preventing episodes of erosion in these patients, though erosions are seen more rarely than in either of the contributory corneal degenerations in isolation. Scleral lenses can also be useful both in preventing recurrences of erosions as well as improving vision. While the patient failed in a soft bandage lens, the liquid bandage and high Dk afforded by a rigid bandage lens has improved the patient’s vision and comfort and delayed the need for surgical intervention.

Special thanks to Elyse L. Chaglasian, OD, FAAO

Bibliography

Ferry AP, Benson VH, Wensberg RS. Combined granule lattice (Avellino’s) corneal dystrophy. Tr Am Ophth Soc 1997; 95: 61-77
BACKGROUND

In most communities, lifeguards do not have a required minimal visual acuity (VA) in order to be certified. Various agencies have attempted to define the visual acuity requirements needed for effective lifeguarding; some have advocated a 20/30 threshold. Others have advocated a more rigorous requirement of 20/20 visual acuity. There are no data available as to what the average visual acuity is in a cohort of lifeguards. Without this data, it is difficult to predict the number of lifeguards that would be excluded from duty if various visual acuity requirements were initiated. The purpose of this study was to determine the prevalence of usual-corrected distance binocular visual acuity among a group of lifeguards.

METHODS

The GuardVision™ Self Testing Vision Screening Program provides distance VA screening materials that aquatic facilities can administer to their lifeguards. The program is the singular commercial product available for this purpose. The program uses a LogMAR-based distance VA chart to assess the lifeguard’s usual-corrected binocular VA at ten feet. In addition to identifying the smallest chart line read, the screening program also involves participants completing a self-report survey to identify age, gender, race, and usual-corrected refractive correction.

Analysis of variants (ANOVA) was used to identify any VA differences among race. Pearson correlation was used to determine any correlations between age and VA or between gender and VA. Statistical Package for Social Sciences (SPSS) was used for statistical analysis.

RESULTS

From 2,002 lifeguards, the mean age was 20.0 ± 4.73 years (median of 19.0 years) with a range from 15.0 to 69.1. Lifeguard gender was 51.1% female, 48.4% male, and 0.4% unknown. The usual vision correction worn by the lifeguards was 28.6% contact lenses, 8.8% spectacles, and 62.6% not wearing any refractive correction.

The mean decimal VA for all lifeguards was 1.09 ± 0.20 (median of 1.25) with a range from 0.25 to 1.25 corresponding to a mean Snellen equivalent of 20/18.

ANOVA showed a statistically significant difference in VA versus race (F=2.675, p=0.02). However, this was determined not to be clinically significant, with the mean acuity for each race group ranging only from 20/19 to 20/18. There is no correlation between age and VA (Pearson correlation=0.031) or between gender and VA.

Snellen Equivalent passing criteria were evaluated at 20/20, 20/25, and 20/30 cut points.

From the 20/20 group, 79.5% of the lifeguards had a VA of 20/20, 9.1% had a VA of 20/25, and 11.4% had a VA of 20/30. This indicates that a usual-corrected binocular distance acuity passing threshold of 20/20 would restrict a larger number of lifeguards from duty than a visual acuity passing threshold of 20/25 or 20/30.

CONCLUSION

This study indicates that a usual-corrected binocular distance acuity passing threshold of 20/20 would restrict a larger number of lifeguards from duty than a visual acuity passing threshold of 20/25 or 20/30. Although the current study makes no attempt to qualify the impact of visual acuity on lifeguarding, it should be recognized that nearly one-fifth of the lifeguards in this sample would be unable to be employed if a 20/20 visual acuity passing threshold were used. It should also be recognized that other visual skills such as contrast sensitivity, visual field, and stereopsis may also play a role in lifeguarding besides just the visual acuity studied here.
INTRODUCTION

A good case history is critical in the doctor’s approach to treatment of dry eye. Factors contributing to dry eye include: age, sex, medications, diet, disease, surgery, contact lens wear and environmental factors. A patient may have evaporative dry eye, aqueous deficient dry eye or both conditions. Dry eye disease can be classified as mild, moderate or severe. TearLab Corp has designed an instrument to measure tear osmolarity and classify the severity of the disease. The purpose of this pilot study was to measure tear osmolarity in a young population (<40 years). The quantity of tear production was then measured to evaluate if aqueous deficiency was related to elevated tear osmolarity in this population of subjects.

METHODS

134 second year optometry students were tested using a calibrated TearLab instrument. Subjects were instructed not to wear contact lenses or put any drops in their eyes 2 hrs prior to being tested. Both the eyes of each subject were tested and recorded. Values > 309 (MOSMS/L) were considered the lower limit for dry eye disease with the instrument for this study. Following the testing tear quantity was assessed by performing a Zone Quick test on both eyes of each subject. Results were analyzed using a 2 way repeated Analysis of Variance. Tear break up time (TBT) was performed on subjects with an elevated tear osmolarity level.

RESULTS

1. Only a small percentage of subjects in this study had elevated tear osmolarity as classified by TearLab. (94.8% normal 5.2% elevated)
2. Both groups of subjects showed normal tear quantity production using Zone Quick testing.
   Normal 22.61 mm OD, 23.27 mm OS
   Elevated 24.16 mm OD 24.50 mm OS
   (F=0.57, p=0.45)
3. Subjects with elevated osmolarity exhibited a reduced TBT.
   5.8 mm OD 5.4 mm OS
4. No subjects in the study were classified as severe dry eye (>335)

DISCUSSION

Appropriate therapy for DES depends on appropriate diagnosis of the cause(s) of the disease. Clinical examination of the patient to determine the cause(s) of the problem is imperative in prescribing and managing the appropriate therapy for the patient. Tear hyperosmolarity can be caused by a number of factors and has been linked to dry eye disease. Simply obtaining an elevated tear osmolarity does not address the cause of the problem. TearLab analysis uses osmolarity values of <308 as normal, 309-320 as mild, 321-335 as moderate and >335 severe when classifying dry eye. 5.2 % of the normal young subjects in this study had elevated tear osmolarity. There was no difference in tear quantity measurements between the normal and elevated tear osmolarity groups. All of the patients with elevated osmolarity levels showed a decreased TBT. Blepharitis and meibomian gland dysfunction were not evaluated in the study.

CONCLUSIONS

1. Supplemental drops containing mucinomimetics might be a good approach for younger patients with mild to moderate dry eye as classified by TearLab
2. Future studies should be proposed using mucinomimetics to monitor tear osmolarity levels.
3. Research should develop new methods to increase mucin production.
4. Tear production is not reduced in all patients with elevated tear osmolarity.
5. A patient with elevated osmolarity levels without an evaporative component (blepharitis) and normal tear production might be classified as mucin deficient.

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Atypical Presentation of Endophthalmitis After Cataract Extraction

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BACKGROUND

Endophthalmitis is a rare but serious complication following cataract surgery. Without prompt treatment, irreversible vision loss can occur. This is a presentation of an atypical case of staphylococcus epidermidis positive endophthalmitis presenting without pain or redness one week after cataract extraction.

PERTINENT FINDINGS

70 y/o African American female presented for her scheduled one week follow-up for an uncomplicated cataract extraction complaining of blurry vision and cob webs for two days in the operated eye. She denied any pain, discomfort or redness and was using her post-operative drops as directed (pred acetate QID OD, ofloxacin QID OD, ketorolac QID OD).

Medical History: HTN, DM, CAD
Medications: aspirin, lisinopril, warfarin, chlorthalidone, Lopressor, simvastatin
BCVA: OD: HM
Slit Lamp Exam: OD: 3+ cells, 2+ flare, 1mm hypopyon, no conjunctival injection.
DFE: OD: 4+ vitritis
Diagnosis: OD: endophthalmitis positive for staphylococcus epidermidis
Differential Diagnosis: Toxic Anterior Segment Syndrome (TASS)
Treatment: Pars plana vitrectomy and intravitreal vancomycin OD

PATHOPHYSIOLOGY

Endophthalmitis is an inflammatory condition involving the aqueous and vitreous. Destruction of the intraocular tissue occurs by direct invasion of the organism and by the inflammatory mediators of the immune response. Ultimately, destruction of the neurosensory retina and RPE occurs.

DISCUSSION

Inflammation is an expected outcome after any surgical procedure due to the breakdown of the blood aqueous barrier. One study shows that the expected amount of anterior chamber inflammation after uncomplicated anterior segment surgery is 2+ on day 1 and 1+ on day 14. Inflammation out of proportion to this should heighten the suspicion of endophthalmitis. Endophthalmitis has an incidence ranging from 0.08%-0.7% following cataract extraction. Approximately 20-30% of patients will present without pain or redness (see Table 1). Prompt treatment is essential in attempting to preserve vision. Treatment typically includes intravitreal antibiotics including vancomycin and ofloxacin. According to the EVS study, patients presenting with light perception vision or worse also benefit from an immediate vitrectomy. Approximately 1 month after treatment, the patient returned to clinic with reduced vision and macular edema (see Figure 1). Bromday once daily was initiated and the macular edema is slowly diminishing (see Figure 2).

Table 1: Expected findings in endophthalmitis from the EVS study

<table>
<thead>
<tr>
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<th>OD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cells</td>
<td>3+</td>
</tr>
<tr>
<td>Flare</td>
<td>2+</td>
</tr>
<tr>
<td>Hypopyon</td>
<td>1mm</td>
</tr>
<tr>
<td>Conjunctival injection</td>
<td>-</td>
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</table>

FIGURE 1: Macular edema one month after PPV and intravitreal vancomycin, CF VA.

FIGURE 2: Macular edema decreasing 2 weeks after initiation of Bromday once daily in the operated eye, 20/600 VA.

CONCLUSION

Patients presenting with decreased vision, hypopyon and vitritis after cataract surgery, with or without the presence of redness or pain, need immediate evaluation for endophthalmitis. It is also important not to overlook other potential causes of decreased vision such as macular edema.

REFERENCES

The Atlantis Scleral Lens Design: A Case Series on Twin Sisters

Jennifer S Harthan OD, FAAO
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CASES

Patient 1 presented with complaints of blurred vision, distorted vision, and discomfort with her current hybrid lenses. She had experienced discomfort with all other lens modalities. She was diagnosed with keratoconus ten years prior OD>OS. Her refraction was -6.00-0.50x075, 20/200 OD and +1.25-0.75x110, 20/25 OS. Topography showed K readings of 57.82/66.89 @128 OD and 43.65/44.61 @142 OS (Figures 1 and 2). The diagnosis of keratoconus OD>OS was confirmed and she was fit with the Atlantis™ lens based on the fitting guide (Figure 3).

Her vision improved to 20/100 OD, OS and she immediately noticed improved quality of vision. The patient has been able to wear her lenses comfortably for 14 hours per day.

Patient 2 was also fit with the Atlantis™ Lens after failing with the large diameter lenses. To date, both are achieving comfortable 20/20 vision during all waking hours.

DISCUSSION

Both patients presented with keratoconus and desired improved comfort with their contact lenses. Clear and comfortable vision may be achieved using mini-scleral or scleral gas permeable lenses. These lenses provide refractive correction for the irregular and regular astigmatism. The larger lens designs and a high Dk gas permeable material provide much success in the treatment of those with severe corneal disease and ectasias. The size of these lenses also improves comfort as the lid margin interacts with the surface of the lens rather than the edge. The Atlantis™ lens design has these fitting zones: the Base Curve or Central Zone, the Limbal Vault Zone, and the Scleral Zone. When fitting patients with this lens design, each zone can be manipulated to customize the lens fit for the patient. As with any lens fit, potential complications that may arise include corneal hypoxia, conjunctival and corneal staining, neovascularization, corneal infiltrates and microbial keratitis. These complications can be avoided with proper patient selection, fitting techniques, patient education, and close observation.

CONCLUSION

Both patients were diagnosed with corneal ectasia, with each having asymmetry in disease severity between their eyes. In such patients who have failed with other lens modalities, scleral lenses may be considered as an appropriate management option. In both cases, the patients reported good vision and markedly improved comfort with the large diameter lenses. To date, both are wearing their Atlantis™ lenses successfully all day long.

REFERENCES: Available upon request.

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INTRODUCTION
In the quarter century of its existence, the residency program at the Illinois College of Optometry (ICO) has worked with 240 people. Knowing the former resident’s thoughts about residency programs, as well as how it influenced their career will help to understand and share the value of completing a residency. This study investigates what people thought of the residency, as well as how their careers were influenced by residency programs from a private Optometry school.

METHODS
A link to an online survey (SurveyMonkey) was sent via email to 225 of the past residents. The survey had nineteen multiple choice and open ended questions. Information on demographics, schooling, and residency program completed was collected. The reason for selection of a specific program, advantages and disadvantages, satisfaction and comments on the best and worst thing about the residency were requested. Lastly, post residency career and academic contributions were investigated.

RESULTS
Ninety-three people (40%) responded to the survey. The majority of those that responded were women (68.8%) with an average age during the residency of 26.6 (24-36). The programs that were represented in the responses were:

At the Illinois College of Optometry: Primary care/ Ocular Disease (52.1%), Pediatrics/Binocular Vision (16.0%), Cornea/ Contact Lenses (7.4%) and Low Vision Rehabilitation/Ocular Disease (7.4%).

Affiliate programs were VA Ocular Disease/Low Vision (7.4%), Primary Care (1.1%) and Refractive Surgery Co-Management/Anterior Segment Disease (8.5%).

The top five reasons for selecting a specific residency were:
1. Location (72%)
2. Clinical diversity (65.6%)
3. Educational options in the program (59.1%)
4. Variety of doctors to work with (58.7%)
5. Being able to work in different clinical settings (53.8%)

When asked what the main advantages of completing a residency, over 95% responded the increased knowledge base, clinical skill and confidence. The ability to treat and diagnose eye disease (79.8%), having more career options (75.5%), interdisciplinary interactions (61.7%), networking (40.4%) and certification credit (39.4%) were also indicated. 1.1% of the respondents indicated there was no advantage to doing a residency. Common themes as to what the best thing about the resident included increased skill and confidence due to patient diversity and working with mentors as well as the friendships and interaction with faculty, staff and students.

The greatest disadvantage was the low pay (73.6%) while over a quarter of the respondents thought there were no disadvantages.

Residents practiced in a variety of settings upon completion of the residency. They also tended to change positions. The average resident reported practicing in 3 different sites, with the most reporting 10 different places. Initially, the largest number (38.2%) worked in education. This number decreased to 33% when asked where they are currently practicing. A move away from OD/MD practice (24.7% to 22.7%) and commercial optometry (16.9% to 6.8%) was also noted. More residents went to group practice (25.8% to 31.8%), solo practice (6.7% to 13.6%), VA optometry (3.4% to 4.5%) or research (1.1% to 2.3%).

When asked if they would encourage an optometry graduate to do a residency, one (1) person was undecided while the overwhelming majority (98.9%) answered yes.

CONCLUSIONS
The field of optometry has seen some dramatic changes since the residency program at ICO was established in 1987. Residency programs increase confidence in providing patient care. Despite the low pay, majority find the advantages to far outweigh the benefits. Most of those who completed residencies programs become educators or private practitioners. They provide academic contributions to the profession.
INTRODUCTION

A 2-year-old male was diagnosed with anisometropic amblyopia (refractive error of OD +2.00 sph, OS +4.50 sph). A spectacle Rx was prescribed. Visual acuity (VA) after one month of Rx wear was OD 20/60, OS 20/125 with poor cooperation secondary to age and ability. Dilated fundus exam was unremarkable. Occlusion therapy and then Atropine therapy were prescribed. Poor compliance was noted with each. Little progress was made in regard to VA improvement; therefore a diagnosis of pathology was more ardently pursued.

METHODS

Repeat cycloplegic refraction one year after initial diagnosis was OD +2.00, OS +3.50. At this point the diagnosis of anisometropic amblyopia was questioned. A repeat dilated fundus examination showed no significant findings. VA was stable. At 4 years old a small anterior cataract was noted on retinoscopy. Visual acuity was OD 20/125, OS 20/125. This was the first decrease noted in visual acuity OD. A repeat cycloplegic retinoscopy revealed OD +3.00 sph, OS +2.25 sph. An OCT and retinal photography were performed. The cycloplegic retinoscopy revealed OD +4.50 sph, OS +3.50.

RESULTS/TREATMENT

Treatment with topical dorzolamide was initiated with a goal of decreasing the macular edema and improving the visual acuity. Our patient underwent a Low Vision Evaluation. His grandmother was educated on the dispensing and use of magnification devices at distance and near, reading stand use, safety precautions in gym, Vision Itinerant Teacher, front row seating, testing accommodations and adaptive technology. He continues to wear his hyperopic spectacle correction and his refractive error is monitored regularly.

CONCLUSION

X-linked Juvenile Retinoschisis is an X-linked recessive disorder affecting males mostly. It typically displays symmetric bilateral macular involvement with onset in 1st decade of life. The prevalence of X-linked juvenile retinoschisis ranges from 1 case per 5,000 population to 1 case per 25,000 population. Visual acuity typically deteriorates during 1st-2nd decade of life and remains stable until 5th-6th decade of life. Patients have been diagnosed as early as age 3 months most patients are seen at 5 years or older.

"X-linked juvenile retinoschisis often presents in a young boy with slightly decreased vision that cannot be corrected fully by refraction. Diagnosis is easily missed during early onset."

The initial diagnosis of anisometropic amblyopia in this 2-year-old pediatric patient was correct and warranted. The inability to get accurate/repeatable visual acuity on a 2-3 old and the poor compliance with occlusion and atropine treatment influenced the diagnosis. Once a consistent lack of visual acuity improvement and a change in refractive error were noted the X-linked retinoschisis became more evident. Posterior pole photos and OCT technology were able to reveal what was not appreciable with a standard ophthalmoscope. An ERG confirmed the diagnosis with specificity. Referral within the optometric community provided the most up to date and complete care for this patient. As the diagnosis of our patient was being finalized it was revealed/discovered that he has two maternal cousins with a diagnosis of X-linked retinoschisis.

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A Hereditary Retinal Disease Masquerading as Anisometropic Amblyopia in a Pre-school Patient

Valerie M. Kattouf O.D., Leonard Messner O.D., Mary Flynn-Roberts O.D., Jacqueline Williams, Emily Lemburg, Sasha Murphy

Methods

Repeat cycloplegic refraction one year after initial diagnosis was OD +2.00, OS +3.50. At this point the diagnosis of anisometropic amblyopia was questioned. A repeat dilated fundus examination showed no significant findings. VA was stable. At 4 years old a small anterior cataract was noted on retinoscopy. Visual acuity was OD 20/125, OS 20/125. This was the first decrease noted in visual acuity OD. A repeat cycloplegic retinoscopy revealed OD +3.00 sph, OS +2.25 sph. An OCT and retinal photography were performed. The cycloplegic retinoscopy revealed OD +4.50 sph, OS +3.50.

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Late Stage Coat’s Disease in a 19-month-old male with a presumed diagnosis of Retinoblastoma

Valerie M. Kattouf, O.D., Kelsey Beck, Katie Davis

CASE HISTORY / INTRODUCTION

A 19-month-old African American male presents for his first eye exam. His mother notes an intermittent eye turn inward for several months. History notes a full term birth and no developmental delays. The patient has previously been diagnosed with Fabry disease (an X linked lysosomal storage disease), which is being managed by his primary care physician.

OCULAR EXAMINATION

The patient was able to fix and follow OD but unable to fixate and follow OS. Kappa-Hirschberg findings revealed no strabismus PRE dilation. Evaluation of alignment status with a trans illuminator also revealed leukocoria in the left eye (Figure 1: Leukocoria OS). Retinoscopy findings were +1.00 sphere in the right eye, no retinoscopy reflex could be obtained in the left eye. The anterior segment examination was unremarkable, no corneal clouding coincident with Fabry’s disease was apparent. A 25 prism diopter intermittent left esotropia was apparent POST dilation (Figure 2: Esotropia OS). Fundus examination of the right eye was unremarkable. Fundus examination of the left eye revealed a large mass obscuring the majority of the posterior pole (including the macula and optic nerve). The mass was vascularized and projecting significantly anterior in the globe (Figure 3: Ocular Mass).

RESULTS

The size and appearance of the mass led to a presumed diagnosis of Retinoblastoma. Additional differentials for leukocoria were considered. Congenital cataract, ROP and PHPV were ruled out. The vascular appearance of the mass and the apparent retinal detachment led to the consideration of Coat’s Disease as a differential. Coat’s disease, a rare congenital, nonhereditary eye disorder, results in the exudative retinitis and retinal telangiectasis that were apparent in our patient.

Table 1: Characteristics of Coat’s Disease

<table>
<thead>
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<th>Characteristic</th>
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<tbody>
<tr>
<td>Exudative retinitis, retinal telangiectasis</td>
</tr>
<tr>
<td>Inheritance pattern unknown</td>
</tr>
<tr>
<td>Very rare, young males (M:F, 3:1)</td>
</tr>
<tr>
<td>80% unilateral</td>
</tr>
<tr>
<td>Characterized by abnormal vessel development</td>
</tr>
<tr>
<td>Poor prognosis in advanced stages</td>
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<td>Retinal detachment in advanced stages</td>
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Table 2: Stages of Coat’s Disease

<table>
<thead>
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<th>Description</th>
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<tbody>
<tr>
<td>I</td>
<td>Abnormal dilation of retinal blood vessels</td>
</tr>
<tr>
<td>II</td>
<td>Telangiectasia and exudation</td>
</tr>
<tr>
<td>III</td>
<td>Exudative retinal detachment</td>
</tr>
<tr>
<td>IV</td>
<td>Total retinal detachment</td>
</tr>
<tr>
<td>V</td>
<td>Characterized by irreversible blindness</td>
</tr>
</tbody>
</table>

A consult with our pediatric ophthalmologist and a CT were scheduled to determine the etiology of the retinal findings. The CT scan confirmed a diagnosis of Stage IV Coat’s disease, a very severe presentation in a 19-month-old patient (Figure 4: Example of a CT scan in a Coat’s Disease). Referral was made to a pediatric retina specialist who treated our patient with injections and laser therapy. The treatment spared the eye and enucleation was not necessary.

CONCLUSION

Leukocoria presents with a varied list of differentials. The determination of the proper etiology is crucial as some differentials are sight and/or life threatening. Imaging workups are often necessary to determine the most precise diagnosis. Presentation of Coat’s disease at 19 months old is not expected (the peak age of onset for Coat’s Disease is 6-8 years of age). This case is a reminder that not all patients fall into classic age guidelines. The inheritance pattern of Coat’s Disease is unknown and affects males in a 3:1 ratio compared to females. 80% of cases are unilateral and characterized by abnormal blood vessel development as seen in our patient. Early diagnosis is important to prevent a poor visual outcome and possible retinal detachment.
optic disc edema in association with sudden onset panuveitis is a rare clinical entity. This entity was first reported by monheit and read in 2005 as optic disc edema associated with anterior uveitis and no posterior uveitis. to our knowledge, the clinical features and course of optic disc edema associated with sudden onset panuveitis have not been reported.

pertinent findings

35 y/o african american female presented with bilateral red eyes for three days.

medical history: fibromyalgia, asthma and anemia

medications: proventil inhaler

bcva: 20/30 od, os

pupils/slit lamp exam: perrl (-) apd/bilateral nodular episcleritis (see figures 1 & 2), ac deep & quiet OU

dfe: bilateral optic disc edema (see figures 3 & 4), vitreous clear with no cells present

b-scan ultrasonography: negative for posterior scleritis

cirrus® spectral domain OCT: increased RNFL thickness (see Figure 5) and positive angle of deflection of the RPE-Bruch’s complex suggestive of papilledema (see Figures 6 & 7)

humphrey visual field: enlarged blind spots in both eyes (see Figures 8 & 9)

mri/mrv: brain and orbits with and without contrast unremarkable

five days later, the patient presented with panuveitis in the left eye.

serology: negative for toxoplasmosis, sarcoidosis, syphilis, lupus and rheumatoid arthritis.

seventeen days after the initial presentation, visual acuities had declined to PH: 20/60.

diagnosis: optic disc edema associated with sudden onset panuveitis.

differential diagnosis:

- ocular toxoplasmosis
- ocular sarcoidosis
- ocular syphilis
- systemic lupus erythematosus
- rheumatoid arthritis

discussion

after ruling out infectious etiology, eighty milligrams oral steroids were initiated and tapered over three weeks. resolution of the panuveitis occurred within three weeks and the vision returned to 20/20 in each eye, while optic disc edema lagged by one month. the positive deflection of the RPE-Bruch’s complex ultimately returned to a neutral position, suggesting normalization of intracranial pressure.

conclusion

to our knowledge, this is the first report of the clinical features and course of optic disc edema associated with sudden onset panuveitis. resolution of the disc edema lagged that of the uveitis. in the presence of normal pupil function absence of visual field loss, return of normal vision, and absence of infectious etiology, this case suggests that treatment may be directed towards the uveitis rather than prolonging treatment until optic disc edema resolves.

references


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BACKGROUND
Preeclampsia is a potentially fatal condition of elevated blood pressure, proteinuria and edema after 20 weeks of gestation. The only known cure is delivery of the placenta. The acute elevation in blood pressure with preeclampsia can also result in severe vision loss. We present a case of presumed choroidal ischemia and serous retinal detachment in a pregnant woman with severe preeclampsia.

PERTINENT FINDINGS
26 y/o African American female presented with sudden blurry vision in her infero-nasal field of the right eye of one day duration. She also reported recent onset right upper eyelid swelling and bilateral lower leg edema.

MEDICAL HISTORY: 34 weeks pregnant without known complications.

MEDICATIONS: Prenatal vitamins.

BCVA: 20/10 OD, 20/20 OS.

BLOOD PRESSURE: Elevated at 188/125 mmHg RAS.

PUPILS/SLIT LAMP EXAM: PERRL (-) APD/unremarkable.

DFE: Right eye revealed serous retinal detachment and widespread presumed choroidal infarctions (see Figure 1). Left eye was unremarkable (see Figure 2). The optic nerves were healthy without edema.

CIRRUS™ SPECTRAL DOMA IN OCT: Macular involved serous retinal detachment in the right eye (see Figure 3). Left eye was unremarkable (see Figure 4).

DIAGNOSIS: Serous retinal detachment with presumed choroidal infarctions in the presence of elevated blood pressure and edema in a pregnant woman.

DIFFERENTIAL DIAGNOSIS: Central serous choroidopathy.

DISCUSSION
The patient’s obstetrician could not be reached, and she was immediately referred to the emergency room. She was diagnosed with preeclampsia and underwent an emergency cesarean section that night. The patient remained in the hospital for 5 days and was prescribed oral hypertensive medication. One week later, vision improved to 20/25+ OD and the right upper eyelid edema resolved. There was flattening of the serous retinal detachment (see Figure 5) and improvement of the presumed choroidal infarctions with remaining mild disseminated RPE changes temporal to the macula (see Figure 6).

PATOPHYSIOLOGY
- Choroidal infarctions due to an acute rise in BP.
  - Construction of the choroid and choriocapillaris leads to choroidal ischemia.
  - Damage to the endothelium of the choriocapillaris causes increased permeability and disruption of the blood-retinal barrier.
  - Macromolecules pass through and deposit within the retinal layers.
- Disruption of the vascular supply in the choroid caused by intense arteriolar vasospasm.
- Lack of choroidal perfusion decreases function of RPE and allows for accumulation of subretinal fluid.

CONCLUSION
This case represents a rare case of unilateral presumed choroidal infarctions and serous retinal detachment in a pregnant patient due to undiagnosed preeclampsia. Patients with preeclampsia may present with the isolated symptom of blurred vision. Checking blood pressure is key for diagnosis. Elevated blood pressure in pregnant patients should be communicated to the obstetrician and the presence of associated retinopathy requires immediate referral to the emergency room. Recognizing the signs and symptoms of this condition can save the lives of the mother and her baby.

REFERENCES

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Assessment of Motion Sickness Among Patients with Visual Impairment

Tracy L. Matchinski, OD, FAAO and Janis E. Winters, OD, FAAO

BACKGROUND

Motion sickness (MS) typically occurs when there is a neural mismatch between the sensory system (vision) and the vestibular system. A survey was developed to determine incidence of motion sickness in patients with no vision or patients losing their vision and what these patients did to alleviate their symptoms. Another objective of the survey was to determine if patients with vision impairments experience MS when receiving new glasses or using low vision devices.

METHODS

All patients with visual impairment entering 2 different Low Vision Rehabilitation clinics were asked to participate in a 31 item Motion Sickness Questionnaire. The questionnaire sought to characterize vision loss, MS and changes in MS of the survey was to determine if patients with vision impairments experience MS when receiving new glasses or using low vision devices.

RESULTS

Of the 263 VI patients surveyed, 25.5% (67) reported a history of motion sickness (MS). See Figure 1 and 2. Of those with MS:

- Demographics: 23.9% Age 18-39 yrs, 47.7% 40-59 yrs and 28.3% 60 yrs and older; 67% female
- 35% reported no MS prior to vision loss however 37% no memory /congenital VI

The majority felt MS has remained stable (54%) and their balance has worsened (53%) as VI had progressed.

- 59% reported noticing MS when riding in a car. The most common method of relief was to ‘think of something besides MS’ followed by ‘do nothing’. Unable to assess other modes of transportation, when reading on a mode of transportation or watching a movie due to limited number of patients performing those activities.

The majority did not notice of MS with glasses or low vision devices (66% and 77% respectively).

- If they did experience MS with devices, the most common categories patients reported experiencing MS with included electronic magnifiers and hand held magnifiers.

DISCUSSION

We are unable to assess if this study shows that people with vision impairment or blindness have increased incidence of MS or demographic trends follow the general population since data from the general population is unknown. However since 1:4 VI patients did report MS, surely MS is not rare among those who are VI.

Patients with a range of visual impairments and ocular conditions causing visual impairments reported a history of motion sickness. A large number reported that they developed MS after becoming VI.

Although the majority did not report motion sickness with new glasses or low vision devices, motion sickness still should be a consideration when caring for visually impaired patients. More rehabilitation training may be needed especially with hand held magnifiers or electronic magnifiers. Patients may discontinue use of devices to alleviate discomfort.

CONCLUSIONS

Clinicians should be aware that the potential for motion sickness in VI patients. Since the majority did not physically do anything to relieve MS, clinicians should be aware of common remedies and provide appropriate patient education about common treatment modalities of alleviating motion sickness. In addition, this survey showed that 53% reported that their balance had worsened with their vision loss and fall prevention education should be done.

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Financial support: None

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BACKGROUND
Optic neuritis is an inflammatory, demyelinating lesion of the optic nerve. The exact cause is unknown. It is the most common neuropathy in persons under 50 y/o and is the first presenting symptom of multiple sclerosis (MS) in 15-20% of cases. Patients in whom optic neuritis is the first manifestation of MS have shown to have a low rate of disability, compared to other MS patients. The presence of brain MRI abnormalities at the time of optic neuritis is a strong predictor for the 15 year progression to MS. Overall, 38% of patients will develop MS in 15 years.

PERTINENT FINDINGS
42 y/o Caucasian woman presented with sudden smoky blued vision w/ profound dyschromatopsia OS for 2 weeks (reported as 20/60), w/ resolved eye strain OS for two days the previous week. She reported a history of migraine with aura since 19 y/o; however, the new symptoms were not consistent with her previous aura. No other neurological symptoms.

Medical history: (+) migraines with aura since 19 y/o
Medications: (+) Tramitam pm
BCVA: 20/20 OD, OS
Pupils: (+) RAPD OS
Color Vision: R/G defect OS
Red cap desaturation: 90% desaturation OS
Clinical Exam/OFF: unremarkable; optic nerves pink and well-perfused, margins in tact OU (Figure 1, 2).
Cirrus™ Spectral Domain OCT: Unremarkable and symmetric (Figure 3, 4).
24-2 Sita-Standard Visual Field: Full OD (Figure 5); Centrococcal defect OS (Figure 6).
MRI: T1 through orbits with fat suppression show a lesion of the optic nerve distal to the optic chiasm, consistent with optic neuritis (Figure 7).

Corresponding coronal T1 image with enhancing lesion of the optic nerve (Figure 8).

Two hyperintense non-enhancing isolated periventricular white matter lesions on FLAIR, likely ischemic events (Figure 9).

The 15 year risk of developing MS with retrobulbar optic neuritis is 25% when there are no active demyelinating lesions on MRI. The presence of brain MRI abnormalities at the time of optic neuritis is a strong predictor for the 15 year progression to MS. Overall, 38% of patients will develop MS in 15 years.

DIFFERENTIAL DIAGNOSIS
Optic neuritis is an inflammatory, demyelinating lesion of the optic nerve. The exact cause is unknown. It is the most common neuropathy in persons under 50 y/o and is the first presenting symptom of multiple sclerosis (MS) in 15-20% of cases. Patients in whom optic neuritis is the first manifestation of MS have shown to have a low rate of disability, compared to other MS patients. The presence of brain MRI abnormalities at the time of optic neuritis is a strong predictor for the 15 year progression to MS. Overall, 38% of patients will develop MS in 15 years.

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The 15 year risk of developing MS with retrobulbar optic neuritis is 25% when there are no active demyelinating lesions on MRI. The presence of brain MRI abnormalities at the time of optic neuritis is a strong predictor for the 15 year progression to MS. Overall, 38% of patients will develop MS in 15 years.

DISCUSSION
This case exemplifies atypical symptoms in a case of retrobulbar optic neuritis. She presented without classic pain on eye movement, described as eye strain for two days the previous week. The patient presented with profound dyschromatopsia and desaturation. Given her past history of migraines with aura, posterior ischemic optic neuropathy was ruled out with MRI.

A paradoxical relationship exists between visual acuity and GCC in resolving optic neuritis. This relationship is seen in this case, as visual acuity improves, GCC thickness decreases.

The MRI of the brain showed an enhancing lesion of the left optic nerve distal to the optic chiasm, which was consistent with optic neuritis. Her two non-enhancing periventricular white matter lesions were not characteristic of demyelinating lesions, but of previous ischemic events from migraine. Her risk of developing MS in 15 years without encountering active demyelinating lesions at the time of the optic neuritis was 25%. It was important to assess her risk of developing MS, as it is important not to incorrectly give a patient the diagnosis of MS and commit the patient to lifelong disease modifying treatment.

ACKNOWLEDGEMENTS

REFERENCES
BACKGROUND
Angelman syndrome (AS) is a developmental disorder characterized by ataxia with hypotonia, severe mental retardation, epilepsy, panerysimal laughter and severe speech impairment. An obsolete term “happy puppet syndrome” was once coined for this syndrome, as the children appear as if they are walking like puppets on a string due to the ataxic gate. Prevalence is estimated between 1/10,000 to 1/20,000. Genetic studies most frequently reveal a deletion of the long arm (q) on chromosome 15. Ocular findings consist of hypopigmentation of the fundus and iris, nystagmus, strabismus and refractive error.

CASE STUDY
A 5-year-old Hispanic female was referred to the developmental disabilities clinic at the Illinois Eye Institute from an outside optometrist for a comprehensive eye examination. A review of medical history indicated full term birth with seizures noted before 24 months. At examination. A review of medical history indicated full term birth with seizures noted before 24 months. At 26 months, a diagnosis was made for AS by seizures, developmental delay, ataxia, tongue protrusion and hypotonia. Genetic studies revealed a deletion of chromosome 15q. A course of therapy with occupational, physical and speech therapists was initiated.

Visit #1:
At the initial visit, the patient was currently on Keppra for seizures. She was unable to walk independently secondary to hypotonia and atactic gait. The patient exhibited severe mental retardation, language delay, macrostomia, tongue protrusion and panerysimal laughter. Visual acuity measurements were attempted but unobtainable using Teller visual acuity cards. Herschberg was central steady OU. Bruckner displayed equal reflexes OU. Pupils were equal, round and reactive to light. No strabismus was noted upon cover test. The extraocular muscles revealed full range of motion. The cycloplegic refraction revealed +0.50 -3.75 X 165 OD and +2.00 -3.00 X 015 OS. External health was unremarkable. Dilated fundus exam revealed a hypopigmented fundus. The patient was diagnosed with ametrophia, astigmatism and ocular hypopigmentation. Glasses were prescribed for full-time wear and parents were educated about sunwear.

Visit #2:
Follow-up examination occurred 1.5 months after glasses were prescribed. The patient had been wearing the glasses for most of the course of a day. Mother noted that she seemed more aware of her visual surroundings with glasses on. At this visit, Teller acuity was found to be 20/400 with the glasses on revealed low plus OD and OS. No strabismus was noted upon cover test. The patient was scheduled for follow up in 4 months.

DISCUSSION
AS is often difficult to diagnose with a developmental delay noted first at about 6 months but other clinical features of AS not becoming apparent until over the age of 1. Laboratory testing is used to confirm the clinical diagnosis. As the patient enters adulthood, the clinical features of AS change: Seizures typically remain but with decreasing frequency and hypersomnia and sleep issues improve. Patients with AS have a near normal life expectancy.

<table>
<thead>
<tr>
<th>Table 1: Clinical Features</th>
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<tr>
<td><strong>Systemic Features</strong></td>
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<td>-abnormal EEG</td>
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<td><strong>Ocular-Visual</strong></td>
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<td>-nystagmus</td>
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<td>-amblyopia</td>
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<td>-astigmatism</td>
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<td>-keratoconus</td>
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<td>-atrophy piosis</td>
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<tr>
<td><strong>Physical Characteristics</strong></td>
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<tr>
<td>-ataxia</td>
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<td>-hypopigmentation of skin</td>
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REFERENCES
Sudden Onset Reduced Vision in Acute Viral Meningoencephalitis

Molly O’Shaughnessey, O.D.
Jesse Brown Veteran’s Administration Medical Center, Chicago IL

INTRODUCTION

A case of sudden onset vision reduction presented with systemic malaise and headache warranting a work-up that indicated meningoencephalitis. Symptoms and further testing suggested a viral etiology.

CASE HISTORY

A 68 y/o AA male presented to the triage clinic with complaints of a frontal headache and fever worsening over the previous 17 days with associated reduced vision OS only. The patient had a past ocular history significant for OAG OU treated with latanoprost, which he self-discontinued when his visual symptoms began. The patient had his yearly DFE 8 weeks prior to onset at which he was correctable to 20/20 OD, OS and was recommended to RTC in 4 months for a HVF.

PERTINENT FINDINGS

During the clinical exam, the patient had an altered mental status and suffered from malaise. He also admitted to an unintentional weight loss of 10 lbs over the past few weeks and night sweats. There was no temporal artery tenderness or jaw claudication.

A CT, MRI and Carotid Duplex were performed and came back within normal limits.

On the day of presentation, the patient had an ESR of 113 and a CRP of 4.60 (NL: 0.0-1.0mg/dl).

VDRL, RPR, HCV, HIV, ANCA,ANA, anti-DNA, CCP, anti-SSA/SSB, SPEP, Quantiferon, West Nile CSF, VZV CSF, Enterovirus CSF, CMV CSF, EBV CSF, HSV CSF were all negative.

The patient was referred immediately to the ER and later admitted to be co-managed with rheumatology and neurology. Diagnosis was originally based on medical history and examination. Initial treatment included IV: ampicillin, vancomycin, ceftriaxone, acyclovir and methylprednisolone. Neuroimaging was performed followed by an LP. CSF analysis found elevated WBCs and steroids were discontinued. Protein, glucose levels, cellular analysis, and serology were all WNL. Negative bacterial cultures lead to the antibiotics being stopped after 3 days. Acyclovir was continued for 7 days followed by a 7 day course of Valtrex due to presumed HSV.

Three days after initial presentation, BCVA improved to 20/20-3 OD, OS and the patient’s CVF were FTFC OD, OS. A temporal artery biopsy was initially considered but was deemed unnecessary due to rapid recovery with antiviral therapy.

DIAGNOSIS & MANAGEMENT

The patient was referred immediately to the ER and later admitted to be co-managed with rheumatology and neurology. Diagnosis was originally based on medical history and examination. Initial treatment included IV: ampicillin, vancomycin, ceftriaxone, acyclovir and methylprednisolone. Neuroimaging was performed followed by an LP. CSF analysis found elevated WBCs and steroids were discontinued. Protein, glucose levels, cellular analysis, and serology were all WNL. Negative bacterial cultures lead to the antibiotics being stopped after 3 days. Acyclovir was continued for 7 days followed by a 7 day course of Valtrex due to presumed HSV.

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DIFFERENTIAL DIAGNOSIS

- Acute Meningoencephalitis: Viral vs Bacterial
- Giant Cell Arteritis

REFERENCES


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ACKNOWLEDGEMENTS

Thank you to everyone who helped with this case and reviewed the contents of this poster.

Table of Contents
Structure–Function Relationship of an Arachnoid Cyst as seen with MRI, Macular Ganglion Cell-Inner Plexiform Layer and Visual Field

Dominick L Opitz, OD, FAAO; Leonard V Messner, OD, FAAO
Illinois College of Optometry, Chicago, IL

BACKGROUND

Early detection of structural and functional changes in patients with glaucoma is necessary to prevent or delay disease progression which could lead to blindness. Historically, critical evaluation of the optic nerve and the retinal nerve fiber layer (RNFL) has been the primary methods for structural assessment in glaucoma. Optical coherence tomography (OCT) has greatly enhanced our ability to detect early structural changes to the RNFL, often before functional loss of vision is detected with visual field testing. Assessment of the macular ganglion cell-inner plexiform layer (GCIPL) is possible with spectral domain optical coherence tomography (SD-OCT) and studies have demonstrated the diagnostic accuracy of the GCIPL thickness and glaucoma.1,2

Additionally, one study suggests that the GCIPL thickness is more valuable than the peripapillary RNFL thickness for detecting glaucomatous eyes with paravesical VF defects.3 GCIPL thinning has also been reported in patients with multiple sclerosis and may offer insight for monitoring for disease progression.4 Presently, there is little evidence demonstrating structure-function correlation with other non-ophthalmic brain disorders. We present a case of a glaucoma patient with visual field loss resulting from a prominent arachnoid cyst.

CASE REPORT

A 53 year-old African American male presented to the Illinois Eye Institute for a glaucoma evaluation. Medical history is significant for cerebral palsy, seizure disorder, hypertension and hypercholesterolemia. The patient reported taking the following medications: hydrochlorothiazide, Flomox, carbamazepine, and Zocor. The patient denied previous eye injury or surgery. Upon evaluation, best corrected visual acuity was 20/20 OD, OS at both distance and near. Pupils and EOMs were normal OU, but a bilateral right hemianopia VF defect OS was elicited during confrontation fields. Stilt tap examination was normal. IOP was 38mmHg OD, 30 mmHg OS. Gonioscopy was open to the ciliary body in each eye. Optic nerve photos are shown in figures 1 and 2. Threshold perimetry results are shown in figures 3 and 4. Results of the retinal nerve fiber layer analysis and the ganglion cell analysis with the Cirrus SD-OCT are shown in figure 5 and figure 6 respectively. The patient was diagnosed with open angle glaucoma. Traboprost 0.004% was prescribed every evening in both eyes. Brimonidine 0.1% was added bid OU on a subsequent visit to reach a target IOP of the mid-teens. MRI of the brain with and without contrast was obtained. Figures 7-10 show a large left middle cranial fossa arachnoid cyst affecting the visual pathway. When compared to previous MRI, no progression or change were noted. The patient’s IOP has been maintained at 14mmHg OU with his current treatment.

CONCLUSION

Visual field loss can occur with arachnoid cysts. Monitoring for progression of VF loss can be challenging especially when significant VF loss has already occurred as with our patient. Our case demonstrates the structural and functional relationship of the arachnoid cyst as seen by MRI, Cirrus SD-OCT ganglion cell analysis (GCA), and automated perimetry. The GCIPL thickness as measured by the GCA may offer an alternative method to monitor for structural changes to monitor for progression of functional loss of vision that result from non-ophthalmic disorders of the brain especially those that affect the visual pathway.

REFERENCES


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Figure 1 and 2: Optic nerve photo of the right eye and left eye, respectively.

Figure 3: Cirrus SD-OCT nerve fiber layer analysis with diffuse thinning of the RNFL OD and temporal thinning OS.

Figure 4: Humphrey visual field 24-2 showing a bilateral right hemianopia.

Figure 5: Cirrus SD-OCT Ganglion Cell Analysis shows nasal thinning OD correlating with the temporal hemianopia VF defect OD. The left eye GCA shows temporal thinning correlating with the nasal hemianopia VF defect OS.

Figure 6: Cirrus SD-OCT Ganglion Cell Analysis shows nasal thinning OD correlating with the temporal hemianopia VF defect OD. The left eye GCA shows temporal thinning correlating with the nasal hemianopia VF defect OS.

Figure 7: Axial view of a T2 MRI image showing a fluid filled cyst contiguous with the posterior horn of the lateral ventricle.

Figure 8: Coronal view of a T2 MRI image showing compartmentalized fluid filled cyst involving the left temporal and left parietal lobes which are affecting the visual pathway.

Figure 9: Coronal view T2 MRI image showing a fluid filled cyst contiguous with the posterior horn of the lateral ventricle.

Figure 10: Sagittal view of T2 MRI image through the left side of brain. Large compartmentalized fluid filled cyst at the parietal lobe.
**PURPOSE**

A common test for confirming optic nerve hypoplasia (ONH) is to evaluate the disc-macula distance to disc diameter ratio (DM:DD). We have published a case report showing Heidelberg Retina Tomograph (HRT) to be useful for assisting in diagnosis of ONH. The purpose of this study was to determine if HRT accurately diagnoses ONH, and the proper cutoff value for disc area to diagnose ONH. Furthermore, use of HRT was compared to DM:DD in diagnosis of ONH.

**METHODS**

Thirty subjects were recruited. All subjects had comprehensive eye examinations and diagnosis of either unilateral or bilateral ONH, resulting in 42 eyes with ONH. Fundus photography and HRT were performed by one technician. DM:DD ratios were measured by one of the authors who was masked to subjects’ other clinical data. A clinical cutoff of >3 for DM:DD was used to assist in diagnosis of ONH. Three cutoffs for HRT disc area were determined: 1.07 mm² (= mean disc area-1.96 SD), 1.32 mm² (= mean-1.50 SD), and 1.60 mm² (= mean disc area-1.50 SD). Pearson Chi-square test was used to determine the accuracy of HRT and DM:DD in diagnosing ONH.

**RESULTS**

The demographic characteristics of our subjects are listed in Table 1. Table 2 shows the classification of ONH subjects. The general ocular characteristics of ONH subjects are described (Table 3). Figures 1 and 2 show fundus photos of two of our subjects. The mean DM:DD for ONH eyes was 4.00±1.22. The mean HRT disc area was 0.86±0.36 mm². The cutoff of 3 for DM:DD was significant to diagnose ONH (X²=19.55, P=0.001). Disc area of 1.60 mm² was not significant to diagnose ONH (P=0.08); however, disc area of 1.32 was significant (X²=11.25, P=0.001) as well as disc area of 1.07 mm² (X²=7.63, P=0.001). The accuracy of a HRT cutoff of 1.32 in diagnosing ONH was 89% vs. 68% for a DM:DD cutoff of 1.07. In addition, there was a significant association between a HRT cutoff of 1.32 and a DM:DD ratio of 3 in diagnosing ONH (X²=8.3, P=0.004). Figure 3 shows the Receiver Operating Characteristic (ROC) curves for DM:DD ratio and HRT. Area under the ROC curve was 0.80 (P=0.001, 95% CI: 0.66-0.94) for HRT and 0.88 (P<0.001, 95% CI: 0.80-0.97) for DM:DD, which indicates that both HRT and DM:DD ratio are valuable tests for diagnosing ONH.

**CONCLUSION**

- Both HRT and DM:DD ratio are effective for detecting ONH.
- HRT can be used to assist in ONH diagnosis and the cutoff should be 1.32 mm², not 1.60 mm².
- The DM:DD ratio remains a useful clinical tool for diagnosis of ONH.

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**Table 1: Demographic Characteristics of ONH Subjects (n = 30)**

<table>
<thead>
<tr>
<th>GENDER</th>
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<tbody>
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<td>African American</td>
<td>19 (63.3)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>6 (20.0)</td>
</tr>
<tr>
<td>Asian</td>
<td>5 (16.7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGE (YEARS)</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 4</td>
<td>2 (6.7)</td>
</tr>
<tr>
<td>5 - 9</td>
<td>7 (23.3)</td>
</tr>
<tr>
<td>10 - 14</td>
<td>8 (26.7)</td>
</tr>
<tr>
<td>15 - 19</td>
<td>6 (20.0)</td>
</tr>
<tr>
<td>20 - 24</td>
<td>5 (16.7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right eye</td>
<td>2 (11)</td>
</tr>
<tr>
<td>Left eye</td>
<td>14 (91.6)</td>
</tr>
</tbody>
</table>

**Table 2: Classification of ONH (n=30)**

<table>
<thead>
<tr>
<th>UNILATERAL ONH</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right eye</td>
<td>16 (91.6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BILATERAL ONH</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left eye</td>
<td>12 (40)</td>
</tr>
</tbody>
</table>

**Table 3: General Ocular Characteristics of ONH Subjects (subjects = 30, ONH eyes= 42)**

<table>
<thead>
<tr>
<th>MEAN VA</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20/20</td>
<td>15 (35.7)</td>
</tr>
<tr>
<td>20/30</td>
<td>10 (23.8)</td>
</tr>
<tr>
<td>20/40</td>
<td>6 (14.3)</td>
</tr>
<tr>
<td>20/50</td>
<td>4 (9.5)</td>
</tr>
<tr>
<td>20/60</td>
<td>4 (9.5)</td>
</tr>
<tr>
<td>NLP</td>
<td>1 (2.4)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STRABISMUS</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esotropia</td>
<td>5 (11.9)</td>
</tr>
<tr>
<td>Exotropia</td>
<td>12 (28.6)</td>
</tr>
<tr>
<td>Hypertropia</td>
<td>14 (33.3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MYOPIA</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperopic</td>
<td>10 (23.8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DVA</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stereoacuity positive</td>
<td>14 (46.7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>APD HT</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(42 ONH EYES)</td>
<td>26 (61.9)</td>
</tr>
<tr>
<td>Full</td>
<td>7 (26.9)</td>
</tr>
<tr>
<td>Partial</td>
<td>19 (73.8)</td>
</tr>
<tr>
<td>Vessel Tortuosity (42 ONH eyes)</td>
<td>10 (23.8)</td>
</tr>
</tbody>
</table>

*Cover test could not be performed in 3 subjects because of poor VA (no light perception).
Bulbar Conjunctival Chemosis and Choroidal Folds in Posterior Scleritis Patient

Trisha H. Patel, OD; Erica Ittner, OD
Illinois College of Optometry

DIAGNOSIS/TREATMENT

The patient was referred to ophthalmology for systemic workup to rule out autoimmune and infectious causes of posterior scleritis. Ophthalmology confirmed the diagnosis of posterior scleritis and began 60 mg prophylactic isoniazid three times daily. The patient’s blood workup tested negative for all laboratory tests ordered with the exception of quantiFERON Gold. The patient was then referred to infectious disease for further evaluation. A chest x-ray was ordered and was normal. As a result, isoniazid treatment was initiated for latent tuberculosis. One week follow-up showed resolving choroidal folds and bulbar conjunctival chemosis with subjective improvement of periorcular pain.

DISCUSSION

The presence of choroidal folds is an important sign of posterior scleritis. Choroidal folds are most often idiopathic; however, non-idiopathic causes must be ruled out in acquired choroidal folds, especially if presented unilaterally. Furthermore, ancillary testing, specifically a B scan ultrasound, is integral in the diagnosis of posterior scleritis. A scan of posterior scleritis demonstrates a characteristic T-sign, highlighting the thickened, inflamed sclera and choroid. In addition to early diagnosis, further autoimmune and systemic work up is pertinent due to the strong association to systemic disorders.

BIBLIOGRAPHY


CONTACT INFORMATION

Trisha H. Patel, OD.
trisha@icyco.edu
www.icyco.edu
The patient did well for several months but returned on April 7, 2011 with mucopurulent discharge. She was again positive for Pseudomonas and was given ciprofloxacin drops. In addition, the corneal ophthalmologist swabbed the patient’s fornix with povidone iodine. On 4/21, she appeared to be about 60% better and the medicine was changed to ciprofloxacin drops with tobramycin ointment at bedtime as suggested by the culture sensitivities. On 4/26, she was repeated and revealed less pseudomonas. She was started with Cefdinir, a third generation cephalosporin. On October 13, she had significantly less discharge however her lower lid was red and severely swollen. Differentials were dacryocystitis versus preseptal cellulitis. Her primary care physician was consulted and systemic treatment was started with Cefdinir, a third generation cephalosporin. On October 16, she had only mildly improved so the culture was repeated and revealed less pseudomonas. She was followed closely and on November 10, 2010 her condition finally resolved.

The patient finally resolved.

An 82-year old African-American male had been previously diagnosed with orbital fat atrophy likely secondary to prostaglandin use. Figure 3. His left eye was blind from glaucoma. In addition, he suffered from recurrent erosions(REC) and flammable keratitis for which BCLs had been used in the past. When he presented to clinic on March 6 complaining of grittiness, he had a small RCE and several filaments. Figure 4. The filaments were removed with a golf club spud and a BCL was applied. He was already using oxicin, so it was continued. Over the next two months, he presented with multiple RCEs for which BCLs were applied. However, at each follow-up visit no lens was noted. The caregivers reported never finding a lens. On April 24, there was significant mucous and filaments but again no BCL. Thus a fornix sweep was recommended to prevent further infection and determine if any lenses had been “lost” in the fornix. A pseudone idema swab was inserted into the upper fornix nasally and swept temporally, three times. It went in approximately 2.5 inches and swabbed recovered five BCLs which were still in good condition. Subsequently, patient has been taping his lids shut and punctal plugs have been inserted. His staining and filaments have improved. Referral for acetylcysteine therapy may be necessary if filaments return as bandage lenses are now contraindicated.

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INTRODUCTION

Although mid-peripheral iris transillumination defects (ITDs) are a hallmark of “classic” type pigment dispersion syndrome (PDS), little is known about the natural history and stability of this clinical sign, mostly likely because sensitive methods to detect and record ITDs have not been readily available. We therefore analyzed serial investigations of near infrared (NIR) iris transillumination imaging.

METHODS

An NIR iris transillumination database was accumulated at a single urban eye care facility in Chicago, IL, U.S.A., during the development and study of digital imaging systems to examine iris disorders. We searched this database for any “classic” type PDS subjects who had archived images collected on more than one occasion, with at least 4 years between the earliest and latest imaging date. Analysis included side by side comparison of early/late images (Figure 1) using a three person consensus panel, as well as ITD mapping and quantification using custom designed MATLAB computer algorithms (Figure 2). This process involved alignment and adjustment of initial and late images so that direct comparisons could be made, selection of ITD areas, and then calculation of ITD area as a percentage of total iris area.

RESULTS

Analysis included 7 PDS subjects (2 females, 5 males), ranging from 28.4 to 67.6 years (median=56.1 years) at initial imaging (Tables 1 & 2). Length of time between initial and last imaging ranged from 4.4 to 7.0 years (median=5.4 years). At initial imaging, the median ITD area as a percentage of total iris area was 3.4% (1.1 to 16.7%) for right eyes and 3.2% (0 to 12.6%) for left eyes. Difference in ITD total area between the early/late imaging was median= -0.4% (-3.0 to 6.6%) for right eyes and +0.3% (-2.0 to 4.1%) for left eyes. Using gross visual inspection, there was agreement among the consensus panel that overt differences in ITD appearances could not be detected between the early/late images for each subject.

DISCUSSION

To our knowledge, no other work has attempted to evaluate the stability of ITDs associated with PDS. Thus, although this dataset is small, it helps gain some initial insight into the natural history of ITDs, as well as methods that can be used for further study. Questions currently exist regarding the variability of ITD patterns, their age of onset, change with time, and whether they have any predictive value toward level of disease activity and/or the development and progression of associated glaucoma.

CONCLUSIONS

In this initial attempt to longitudinally study ITD-related ITDs using NR iris imaging, we observed relative stability of ITDs over a several year period. These initial observations, along with methods used, may be helpful to future studies of PDS.

REFERENCES

BACKGROUND
In 1909, Karl Stargardt described the clinical appearance of yellow, pisciform-shaped lesions or flecks in the macula of seven patients from two families. The macular dystrophy that he described generally presents between the ages of 8 and 16 years and became known as Stargardt disease. It is the most common form of juvenile macular dystrophy and results in a bilateral reduction in visual acuity, central scotomata, photoaversion, dyschromatopsia, and dark adaptation difficulty. The autosomal recessive form of Stargardt disease is associated with a mutation in ABCA4, while the much less common dominant form involves ELOVL4.

PATIENT PRESENTATION
A 34 y/o Caucasian female was referred by her retinal specialist for “salt and pepper retinopathy.” She reported a progressive decline in central vision, depth perception, and color vision. She denied any symptoms of nyctalopia or peripheral field defects. There was no history of ocular trauma or surgery. Her medical history was unremarkable. She denied taking any medications. There was no family history of retinal disease.

CLINICAL TESTING
BCVA: 20/120 OD, OS
ISHIHARA: Sees only test plate OD, OS
SLIT LAMP EXAM: Unremarkable
DFE: Bull’s eye macular appearance with diffuse partially resorbed fundus flecks extending anterior to the vascular arcades OD, OS (see Figure 1)
SPECTRAL DOMAIN OCT: Marked macular thinning with disrupted photoreceptor inner segment ellipsoid band in the fovea and peripapillary sparing OD, OS (see Figure 2)
GOLDMANN VISUAL FIELD: Central scotoma with mild constriction to the size III4e target OD, OS (see Figure 3)
ERG: Reduced rod and cone function OD (see Figure 4)
GENOTYPING: Compound heterozygous ABCA4 (L541P exon 12; A1038V exon 21; D576H exon 12)
DIAGNOSIS: Stargardt disease – stage 2/3

DISCUSSION
Patients with Stargardt disease may be classified according to four distinct stages outlined by Fishman in 1976:
Stage 1 - flecks limited to macula with or without an atrophic macular lesion
Stage 2 - diffuse flecks anterior to vascular arcades, some partially or totally resorbed
Stage 3 - diffuse, totally resorbed flecks often with choriocapillaris atrophy in the macula
Stage 4 - diffusely resorbed flecks with extensive choriocapillaris and RPE atrophy

Based on the clinical presentation, findings, OCT imaging, visual field results, and genotyping, a diagnosis of Stargardt disease was made. Specifically, this patient was categorized as having late stage two or early stage three Stargardt disease.

PATHOPHYSIOLOGY
A genetic mutation in the ABCA4 gene causes a rim protein dysfunction that results in an accumulation of toxic bisretinoid compounds in the outer segments of photoreceptors. As retinal pigment epithelial (RPE) cells phagocytose the outer segments of photoreceptors, the compound causes subsequent cellular damage to the RPE. Histological studies show that the pisciform lesions or flecks represent aggregates of swollen RPE cells inflated with lipofuscin. Intravenous fluorescein angiography (IVFA) often reveals a “silent choroid” as lipofuscin in the RPE cells blocks underlying chorioidal fluorescence.

CONCLUSION
Goldmann visual field testing, electroretinography, SD-OCT imaging, and genetic analysis are valuable tools to aid in making a diagnosis of Stargardt disease. Proper treatment and management includes patient education regarding prognosis, low vision rehabilitation options, genetics, and emerging clinical trials.

REFERENCES

CONTACT INFORMATION
Josh Robinson, O.D. • jrobinson@ico.edu • www.ico.edu

FIGURE 1: Fundus photo exhibiting bull’s eye macular appearance with partially resorbed lipofuscin flecks OD, OS
FIGURE 2: OCT results showing macular thinning with disrupted inner segment ellipsoid band with peripapillary sparing OD, OS
FIGURE 3: Central scotoma on Goldmann Visual Field testing OD, OS
FIGURE 4: ERG results indicating reduced rod and cone function OD, OS

FIGURE 2: OCT results showing macular thinning and disrupted inner segment ellipsoid band with peripapillary sparing OD, OS
FIGURE 3: Central scotoma on Goldmann Visual Field testing OD, OS
FIGURE 4: ERG results indicating reduced rod and cone function OD, OS

Stage 3 - diffuse, totally resorbed flecks often with choriocapillaris atrophy in the macula
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REFERENCES
Epibulbar dermoid cysts are congenital choristomas that are fairly rare. The cyst wall can contain dermal appendages such as hair shafts, sebaceous glands and sweat glands. They may present unilaterally or bilaterally and are most frequently located on the inferior temporal limbus. While dermoid cysts are benign in nature, a correct diagnosis is important because they can be associated with Goldenhar syndrome which has the classic triad of signs of epibulbar dermoids, preauricular appendages and pretragal fistulas. Goldenhar syndrome also has multiple associated systemic findings such as cerebral, cardiac, renal and pulmonary defects.

CASE REPORT

A 12-year-old Hispanic male presented for a comprehensive eye exam to evaluate the "bumps" on both eyes that had been present since birth but had recently started becoming itchy and red. He reported a history of esotropia with surgical correction, surgery on his mouth had been present since birth but had recently started, and heart problems noted shortly after birth. There was no family history of facial or other congenital anomalies. All entrance testing was normal. His refractive error was myopic.

The anterior segment showed no astigmatism in either eye. The anterior chamber was normal. There were no cataracts noted. The eyes were normal and dilated. The IOP was normal. The patient was referred to an ophthalmologist for further evaluation.

DISCUSSION

Epibulbar dermoids can be unilateral or bilateral and are most commonly found at the inferior temporal limbus. They are marginally vascularized, smooth, white or yellow lesions that grow very slowly if at all. They are thought to arise from an early embryological anomaly occurring at 5-10 weeks gestation resulting in metaplastic transformation of the mesoderm between the rim of the optic nerve and surface ectoderm. Histologically, they contain choristomatous tissue such as hair follicles, fat, muscle, cartilage, brain, teeth and bone. The most common ocular complications of epibulbar dermoids are amblyopia, cosmetic concerns, exposure keratopathy, ocular irritation and dellen. The major indication for treatment is cosmesis. If the lesion is amblyogenic, either by occlusion of the visual axis or by induction of astigmatism, surgical excision should be strongly considered. They are frequently an isolated anomaly but in about one-third of cases they are seen in association with congenital abnormalities such as Goldenhar syndrome.

Goldenhar syndrome was identified by Maurice Goldenhar, a Swiss ophthalmologist, in 1952 and included preauricular appendages, epibulbar dermoids and ocular anomalies. The syndrome was recognized as a disorder of the first and second branchial arches. The exact etiology is unknown, but it is believed to be due to abnormal embryonic vascular supply to the first arch and abnormality of mesoblastic development affecting the formation of the branchial and vertebral system. It is a disorder where the patient's facial features are incompletely developed on one side, resulting in eye, ear and jaw abnormalities as well as multiple systemic anomalies such as cardiac, pulmonary, central nervous system, renal and vertebral abnormalities.

REFERENCES

Oculomotor Nerve Palsy Due to Metastatic Space Occupying Lesion and Concomittant Vasogenic Edema of the Pons and Midbrain

Javeria Azhar, B.Sc; Faheemah Saeed, O.D., F.A.A.O. • Chicago, IL

BACKGROUND
Oculomotor nerve (CN III) palsy resulting secondarily from diabetes mellitus, aneurysmal compression, or cavernous sinus lesion is well documented. Our patient presented with CN III palsy secondary to a metastatic lesion involving the lateral aspect of midbrain and pons.

CASE REPORT
A case of a 49-year-old female with history of stage 4 breast cancer 10 years prior is being reported who presented with a complaint of intermittent recent onset diplopia. Pupil and extracocular motility testing revealed a partial right CN III palsy and relative pupil sparing. Figures 3a – 3i show the partial CN III palsy in the 9 positions of gaze.

Figure 1: CNIII Pathway: The CNIII nucleus (red arrow) lies within the dorsal midbrain. CNIII (green arrow) exits the ventral midbrain and enters the Cavernous Sinus (CS) passing between the superior cerebellar artery and posterior cerebral artery and lies most superiority within the CS. In the orbit, the preganglionic parasympathetic fibers to the ciliary ganglion travel with the inferior division of CNIII. The trigeminal ganglion (blue arrow) is located in the Meckel’s cave. Reference: AMIRSYS STATdx, www.statdx.com

Figure 2: CNIII Nucleus: The CNIII nucleus (red arrow) lies in the dorsal midbrain at the level of the superior colliculus (green arrow) and is located anterior to the central aqueduct (blue arrow). CNIII (yellow arrow) exits the ventral midbrain and enters the interpeduncular fossa. Reference: AMIRSYS STATdx, www.statdx.com

Trigeminal nerve (CN V) involvement was also suspected based on patient’s complaint of sensory loss along her oral cavity and weakness of muscles of mastication on her right side. The atrophied muscles of mastication can be appreciated in all the facial photos (Figures 3a – 3i).

Patient was referred to her primary care physician and oculoplastic to rule out an aneurysm or brain or orbital metastasis. Imaging studies revealed a well-circumscribed, homogenously enhancing solid mass, consistent with neoplasm, centered within the right lateral aspect of the midbrain and pons (See Figures 4, 5a and 6a). Tumor extension through the right Meckel’s cave along CN V3 was also noted (See Figures 4, 5b, 5c, 6b and 6c).

Figure 3a – 3i: Nine positions of gaze: show an incomplete CN III Palsy.

Figure 4: MRI T1 post-contrast axial image: shows an enhancing mass centered in the right midbrain / pons (Red arrow) with extension along the right Meckel’s cave (Blue arrow).

Figure 5a, b, c: MRI T1 post-contrast sagittal images: show an enhancing mass centered in the right midbrain / pons (Red arrow) with extension along the right Meckel’s cave (Blue arrow).

Figure 6a, b, c: MRI T1 post-contrast coronal images: show an enhancing mass centered in the right midbrain / pons (Red arrow) with extension through the right Meckel’s cave along V3 (Blue arrow).

Local mass effect resulting from concomitant vasogenic edema of the entire right half of the midbrain (See Figure 8) and pons (See Figures 7a and 7c) was also noted. Severe atrophy of the muscles of mastication on the right side including the masseter, temporalis, medial pterygoid and lateral pterygoid, with fatty infiltration as a result of chronic neuropathy of the mandibular division of trigeminal nerve secondary to tumor invasion, was also observed (See Figure 6). The orbits including the globes, extracocular muscles and optic nerves appeared normal.

Figure 7b, c: MRI T2 axial images: show hyper-intensity in the right midbrain, pons and brachium pontis consistent with vasogenic edema in the right midbrain (orange arrow) and the right pons and brachium points (green arrow) due to the mass.

CONCLUSION
Midbrain space-occupying lesion at the level of oculomotor nerve nucleus or fascicle should be considered as a differential diagnosis for patients presenting with CN III palsy, especially with a history of carcinoma and/or signs of involvement of multiple cranial nerves.
BACKGROUND

In patients with Graft versus-host disease (GVHD) secondary to stem cell or bone marrow transplant, host antigens activate donor immune-competent cells, instigating inflammatory processes. Nearly 60-90% of these patients develop debilitating ocular complications, which may include severe chronic keratoconjunctivitis sicca, cicaternal lagophthalmos, persistent corneal epithelial defects, corneal ulcerations, and keratinization of the conjunctiva and cornea. Further complications may include perforation, scarring, and permanent vision loss. Current treatment for ocular GVHD focuses on supportive therapy with topical lubricants, steroids, and immune-modulators in addition to punctal occlusion and lid hygiene. This case summarizes a patient with ocular GVHD who was fit with scleral lenses to improve vision and rehabilitate her ocular surface.

CASE SUMMARY

A 51 year old Caucasian female was referred for a therapeutic contact lens fit secondary to ocular GVHD. She had a bone marrow transplant to treat leukemia five years prior. She had complaints of foreign body sensation, pain, mucus discharge, and extreme photophobia in both eyes, which was persistant for the last six months. She reported no relief with topical lubricants and punctal plugs. Ocular history was remarkable for corneal abrasions in both eyes three weeks prior. Corrected visual acuities with the patient’s habitual glasses were 20/25 OD and 20/40 OS, no improvement with pinhole. Manifest refraction was stable to the patient’s glasses: OD: 2.00 -0.50 x 125 with a VA of 20/25 and OS: -2.00 -0.50 x 090 with a VA of 20/40. Topographies showed a relatively spherical cornea OD and two diopeters of the rule astigmatism OS (Figures 1 and 2). Corrected visual acuities throughout the follow-up period fluctuated consistently between 20/30 and 20/40 for both eyes. Biomicroscopy findings in both eyes revealed meibomian gland dysfunction, conjunctival chemosis and injection, microcystic corneal edema, and diffuse punctate epithelial erosions with sodium fluorescein and lissamine green staining (Figures 3 and 4). Posterior segment findings were within normal limits.

Assessments of keratoconjunctivitis sicca and graft versus host disease were made. The patient was instructed to continue supportive therapy in both eyes – including Restasis twice per day, preservative free tears every hour, and lubricating ointment at bedtime. She was also fit with 18.2-millimeter diameter Jupiter lenses. The peripheral zones were flatted to achieve optimal conjunctival landing and 200-250 microns of vault were maintained to ensure an optimal tear reservoir (Figures 5-7). Within months of scleral lens wear, the patient’s VA stabilized to a consistent 20/40 OD, 20/30+ OS, anterior segment inflammation calmed (Figure 8), and the patient’s symptoms improved drastically. Therapeutic treatment is ongoing and the patient is still being monitored regularly.

DISCUSSION

Clear and comfortable vision may be achieved using mini-scleral or scleral gas permeable lenses. These lenses can contribute to the management of ocular surface disease by allowing more tear exchange from the vaulting of the lens and providing increased comfort due to the larger size. These lenses also provide refractive correction for the irregular and regular astigmatism. The tear film reservoir accumulated under the lens provides optical assistance for clearer vision. Irregular corneal changes from ocular surface disruption can often times make it more challenging to fit with regular contact lenses. Larger diameter gas permeable contact lenses provide protection to the eye, acting as a barrier for insubstantial corneae against inflamed tissue of the lids. The size of these lenses also improves comfort as the lid margin interacts with the surface of the lens rather than the edge. The use of mini-scleral and scleral contact lenses has become a major indication for individuals who not only need a refractive correction but also suffer from irregular corneas and severe ocular surface disease.

CONCLUSION

Our findings suggest that scleral contact lenses are a promising management options for patients with ocular GVHD. Due to the severe complications associated with this condition, patients with GVHD require a comprehensive management approach. In addition to supportive therapy, scleral lenses can aid in rehabilitating the ocular surface, minimizing patient symptoms, and improving the quality of vision; thus helping sustain optimum vision potential.

References: Available upon request.

CONTACT INFORMATION

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Therapeutic Scleral Lenses: Treatment of Ocular Graft-Versus-Host-Disease
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INTRODUCTION

Injury to the visual system is common in traumatic brain injury (TBI) and can occur by several mechanisms. Deficits in contrast sensitivity and visual field, although not apparent to the patient, may occur following a TBI. With undiagnosed, these can have significant consequences on rehabilitation and quality of life. The purpose of this study is to determine if there is a difference in contrast sensitivity (CS) and visual field (VF) between patients that have sustained a mild or moderate TBI and those that have not.

METHODS

A cross-sectional study design was used to compare differences in contrast sensitivity and visual field between the mild and moderate TBI subject population and the non-TBI population. Subjects from the active duty and retired military population were recruited in each group, 34 in the TBI group and 32 in the non-TBI group. CS, Mean Deviation (MD), Pattern Standard Deviation (PSD) and location of defects were compared using the Wilcoxon rank sum test. Fisher’s exact test (univariable analysis per eye) and general linear regression estimation equations (GEE) for both conditions. Confounding effects of visual symptoms, PTSD, and injury by blast were explored using GEE.

RESULTS

Of the 66 subjects enrolled, there were 30 subjects in both the TBI group and non-TBI group between the ages of 21 and 57. Of the TBI group, all were classified as mild TBI (mTBI) except for 2 that were moderate. The median interval from the time of TBI to study testing was 4.7 months (3.195). The median age in the TBI group was 29 years (range: 21-57). The median age in the non-TBI group was 31 years (range: 21-57). There was no statistically significant difference in contrast sensitivity between the groups (median CS in OD eye for both groups=1.72, p=0.70). Analysis of visual fields showed a significant difference in MD (TBI median in OD eye=-2.47 vs. non-TBI=-0.02, p=0.001), TBI median OS=1.82 (1.76-1.88) vs. non-TBI=1.84 (1.72-1.88) p=0.196. There was no significant difference in location or categorical defects (quadrant, hemianopsia, etc) between groups.

DISCUSSION

Visual field defects have long been associated with TBI but are likely to occur in the more severely injured and those sustaining a cerebral vascular accident (1, 2-4). This study did find a significant difference between mTBI (MD) and Pattern Standard Deviation (PSD) but no significant difference in location of the defects and no categorical (ie. quadrantanopsia) defects in either group. A reduction in sensitivity can accompany many ocular and neurologic pathologies and optic nerve damage has been noted to occur in TBI (27) However, our study participants had ocular pathology ruled out on enrollment.

The two most likely causes are an overall neurological disruption from the TBI slowing or altering the visual pathways or a lack of focus during testing by the patient reducing the reliability of testing (1-8). The results of this study were affected by the presence of Post Traumatic Stress Disorder (PTSD) in the TBI group. PTSD is an anxiety disorder characterized by re-experiencing, avoidance, and hyperarousal symptoms following exposure to a traumatic event. (11) PTSD has been linked to TBI and Post-Concussion Disorder (PCD). (13) Exploratory analysis in this study showed patients with both TBI and PTSD had significantly worse visual field results than those with TBI alone.

CONCLUSION

TBI subjects in this study exhibited no statistically significant difference in contrast sensitivity compared to their non-TBI counterparts. However, PTSD inclusion and outcomes did show a significant reduction in MD and significance of PSD in the TBI population. Although there were no categorical defects, visual field testing should be taken into consideration as an important addition to the examination protocol for the mild or moderate TBI patient.

REFERENCES

**INTRODUCTION**

A 2 year 10 month old African American female presented with a chief complaint of a close working distance and possible eye turn. The patient was a twin, 37 weeks gestation, 5 lbs 8 oz, no oxygen required and all developmental milestones were reached. Health history was positive for eczema.

**METHODS**

A cycloplegic retinoscopy revealed high anisometropia with myopia. Amblyopia was present OD and suppression is evident with spectacle Rx. No strabismus was noted at the time of examination and follow-up. Slit lamp and fundus examination was unremarkable. Furthermore, no known systemic associations were found. The diagnosis of anisometropic amblyopia was made.

**RESULTS/TREATMENT**

At the initial exam the patient was prescribed SRx for full time wear. However, patient compliance with the SRx was poor secondary to age and likely visual discomfort due to anisometropia. The patient was then fit with extended wear soft contact lenses (Acuvue Oasys) to promote compliance and decrease anisomia. The patient was educated/trained on contact lens insertion and removal. At multiple follow-ups it was noted that patient rubs out her contact lenses likely secondary to the history of eczema and dry eye. Artificial tears were prescribed in order to promote comfort of the lenses. In addition, polycarbonate glasses were prescribed to wear over the contact lenses for protection and avoidance of eye rubbing.

**CONCLUSION**

This is a unique case of high myopia with an anisometropic amblyopia component in a young child. In such cases it is important to rule out pathologic etiology and to make an appropriate referral. A study done in London, UK found that only 8% of 112 children with high myopia had simple myopia with no associated ocular or systemic conditions. The remaining children in the study either had systemic (54%) or ocular problems along with high myopia (38%). At this time, the patient did not present with any ocular or systemic findings related to high myopia. However, it is crucial to follow her with annual dilated exams.

It was essential that the patient was compliant with SRx wear due to the anisometropic amblyopia OD>OS. Although it is a challenge to fit a pediatric patient with contact lenses, there is substantial benefit in a patient with high refractive error or anisometropia; including compliance, cosmesis, normal binocularity, reduction in ocular image disparity, peripheral distortion and amblyopia. The patient’s compliance improved significantly with contact lenses versus spectacles. Visual acuity will be monitored and if no improvement is seen in 2-3 months, occlusion treatment of the left eye will be initiated.

**CONTACT INFORMATION**

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A 38 year old Caucasian male (MF) presented to the IEI, MF was started on a 16-day course of prednisone course and follow-up for observation in 3 months. MF denied pain, headache, scalp tenderness, and vision loss in the left eye (OS) beginning one week before presentation. MF denied any history of hypertension or cardiovascular disease. The patient was referred by a primary care practitioner with buproprion HCl and a sleep-study to investigate for nocturnal blood pressure fluctuation.

FIGURE 1: Humphrey visual field (HVF) and Cirrus OCT combined report at presentation. OD Inferior altitudinal depression with scattered depressions superior nasally corresponds to retina nerve fiber layer (RNFL) thinning present on OCT and diffuse disk pallor. OS Inferior altitudinal depression with scattered depression superior temporal on OCT, coarse RNFL deposition consistent with thin RNFL.

FIGURE 2: Combined report at 3 week follow up. OD Relatively stable HVF and OCT. OS General depression of visual field, more dense below the horizontal. OCT shows the RNFL, remaining normal thickness with thinning superior-temporally and only mild thickening inferiorly.

FIGURE 3: Combined report at 3 month follow up. OD Relatively stable HVF and OCT. OS Inferior altitudinal depression with continued RNFL thinning on OCT.

DISCUSSION
The pathophysiology of NAION is complex and highly controversial. The underlying mechanism is thought to be ischemic infarction of the optic nerve head, likely owing to hypoperfusion of the blood supply from the posterior ciliary arteries (PCAs). The hypoperfusion in these cases is believed to be transient in nature, due to delayed filling of the PCAs seen on fluorescein angiography without evidence of permanent occlusion. Ganglion axonal edema occurs in response to the ischemia, causing a compartment syndrome leading to cell death by apoptosis, especially in a structurally crowded optic disc.

There has been much research exploring potential systemic cardiovascular risk factors for NAION, including but not limited to: diabetes mellitus, hypertension, hyperlipidemia, chronic obstructive pulmonary disease, sleep apnea syndrome and smoking. Another possible associated factor in development of NAION is the use of phosphodiesterase type 5 (PDE5) inhibitor drugs such as Viagra and Cialis. These medications potentiates nitric oxide and are thought to create a hypotensive state at the site of the optic nerve head in associated NAION.

Non-articular anterior ischemic optic neuropathy (NAION) is an ischemic vascular disorder of the optic nerve. It is the most common cause of acute optic neuropathy in patients over 50 years of age, and affects approximately 2-10 individuals per 100,000 in the United States annually. Long-term follow-up studies have shown an incidence of new NAION in the fellow eye of 14.7% over a median follow-up period of 5.1 years. Like the arteritic form, NAION was previously thought to be a condition exclusive to middle-aged and elderly patients, but recent research shows that as many as 15% of cases occur in patients under the age of 45. The underlying mechanism is thought to result from ischemic infection of the posterior ciliary arteries supplying the optic nerve. Treatment trials have been aimed at reducing axonal edema to prevent progressive cell loss.

BACKGROUND
Non-articular anterior ischemic optic neuropathy (NAION) is an ischemic vascular disorder of the optic nerve. It is the most common cause of acute optic neuropathy in patients over 50 years of age, and affects approximately 2-10 individuals per 100,000 in the United States annually. Long-term follow-up studies have shown an incidence of new NAION in the fellow eye of 14.7% over a median follow-up period of 5.1 years. Like the arteritic form, NAION was previously thought to be a condition exclusive to middle-aged and elderly patients, but recent research shows that as many as 15% of cases occur in patients under the age of 45. The underlying mechanism is thought to result from ischemic infection of the posterior ciliary arteries supplying the optic nerve. Treatment trials have been aimed at reducing axonal edema to prevent progressive cell loss.

CASE REPORT
A 38 year old Caucasian male (MF) presented to the Illinois Eye Institute (IEI) complaining of sudden onset vision loss in the left eye (OS) beginning one week earlier and worsening upon awakening that morning. The patient denied pain, headache, scalp tenderness, and jaw claudication. He reported a similar occurrence in the right eye (OD) one month prior and sought care with a neuro-ophthalmologist at that time. Two days before presenting to the IEI, MF was started on a 16-day course of prednisone by a different neuro-ophthalmologist. MF reported that the following tests were all performed twice and read as normal: complete blood count with differential, carotid duplex, erythrocyte sedimentation rate, C-reactive protein, electrocardiogram and magnetic resonance imaging of the brain and orbits. He was asked to seek a second opinion.

Medical history was positive for depression and hypothyroidism, which were being managed by his primary care practitioner with buproprion HCl and levothyroxine, respectively. The patient denied any history of smoking or use of recreational drugs including phosphodiesterase type 5 inhibitors. Initial and follow-up exam data with serial photographs, Humphrey perimetry (HVF), and Cirrus optical coherence tomography (OCT) are depicted to the right.

Our findings confirmed the diagnosis of segmental NAION OD, followed by OS. MF was advised to complete the oral prednisone course and follow-up for observation in 3 weeks, then monthly for 2 months. We recommended a sleep study to investigate for nocturnal blood pressure fluctuation.

REFERENCES

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Scleral Uveitis: Differential Diagnosis and Approach to Treatment Options

Thomas R Stelmack, O.D., FAAO

ABSTRACT

The differential diagnosis of Scleral Uveitis can be difficult but very important to guide treatment options. It is very important to delineate infectious from autoimmune etiology. A series of cases will demonstrate the clinical approach to make this differentiation.

CASE #1

50 y/o CAM c/o OS painful photophobia & globe sensitive to touch
20/20 OD OS with small pupils + LLAPD & light – near dissociation. Motility / VF full
Sclera showed diffuse injection
OS AC rin 2+ cell c 2+ flare
+ serum VDRL & FTA – Abs
Hx intercourse c prostitute x 1 mo
IV Pen x 10 days 1x106 units

50 y/o CAM c/o OS painful photophobia & globe sensitive to touch recurrent following successful tx with oral NSAID (Indomethacin 50 mg x3 x 1 mo)
20/20 OD OS initially treated for allergic then bacterial blepharoconjunctivitis s resolution
Motility / VF full / pupils normal s APD
Scleral injection noted but w/o pain. Started on 25 mg x3 x16 units

60 y/o NAM c/o OS painful photophobia & globe sensitive to touch recurrent following successful tx with oral NSAID (Indomethacin 50 mg x3 x 1 mo)
20/20 OD OS initially treated for allergic then bacterial blepharoconjunctivitis s resolution
Motility / VF full / pupils normal s APD
Scleral injection noted but w/o pain. Started on 25 mg x3 x16 units

CASE #2

60 y/o NAM c/o OS painful photophobia & globe sensitive to touch recurrent following successful tx with oral NSAID (Indomethacin 50 mg x3 x 1 mo)
20/20 OD OS initially treated for allergic then bacterial blepharoconjunctivitis s resolution
Motility / VF full / pupils normal s APD
Scleral injection noted but w/o pain. Started on 25 mg x3 x16 units

CASE #3

41 y/o AAM c/o bilateral NON – painful mucopurulent red eye x 1 wk. Prior hx glaucoma suspect (CD / CCT).
20/20 OD OS initially treated for allergic then bacterial blepharoconjunctivitis s resolution
Motility / VF full / pupils normal s APD
Scleral injection noted but w/o pain. Started on 25 mg x3 x16 units

CASE #4

41 y/o AAM c/o bilateral NON – painful mucopurulent red eye x 1 wk. Prior hx glaucoma suspect (CD / CCT).
20/20 OD OS initially treated for allergic then bacterial blepharoconjunctivitis s resolution
Motility / VF full / pupils normal s APD
Scleral injection noted but w/o pain. Started on 25 mg x3 x16 units

CASE #5

65 y/o AAM c/o OD painful photophobia & globe sensitive to touch, h/o uIar drift and morning joint pain.
20/20 OD OS with motility / VF full / pupils wnl -RAPD
Scleral diffuse injection OD 2+ cell mild flare
Labs ordered: CBC c diff, RF, ANA, ESR, ACE, Lysosome, HLA, ANCA, & claimed – PPD in recent past. RF = 500. Ds RA already being seen by Rheumatology. They weaned of oral Pred (steroid responder) and started Imuran because of scleral uveitis.

Presented to uvea rounds asking for opinion starting oral Pred (steroid responder) and started Imuran because of scleral uveitis.

BECAME CASE #3

Case #5 responded poorly to immunosuppresant tx (Imuran max daily dose). Fundus module noted below and Quantiferon Gold ordered and was positive.

ID consulted but since chest CT negative and patient denied night sweats, weight loss and lethargy, was started only on INH 300 mg daily. Simultaneously was started on anti-TNF Humira sub c q 2 wks. Sclerouveitis resolved

CONTACT INFORMATION

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INTRODUCTION

The Illinois Eye Institute at Princeton School (IEI at CPS) opened in 2011 as a collaboration between the Illinois Eye Institute (IEI) and the Chicago Public Schools. The goal of this program was to decrease the number of children in Chicago that were failing to receive vision services. The clinic operates year round, and has served more than 15,000 Chicago children as of October 1, 2013. During its first year, we found that we were still referring a large number of students to the Illinois Eye Institute, main campus for follow up care. Because of the large unmet need, we felt it would be beneficial to extend our hours and add specific times for vision therapy. In July 2012, we expanded our clinic hours to include afternoon vision therapy appointments. We added a visigraph and new vision therapy equipment to help with training. In February 2013, we were able to obtain a retinal camera and an OCT.

RESULTS

Between July 1, 2011 and April 30, 2012, IEI at CPS referred 208 of 4571 patients for follow up care. Reasons included vision therapy (94), strabismus consult (8), cornea (17), retina (23), glaucoma evaluation (59), and other (7). Because of the large unmet need, we felt it would be beneficial to extend our hours and add specific times for vision therapy. In July 2012, we expanded our clinic hours to include afternoon vision therapy appointments. We added a visigraph and new vision therapy equipment to help with training. In February 2013, we were able to obtain a retinal camera and an OCT.

Between July 1, 2012 and April 30, 2013, IEI at CPS referred only 86 of our 5016 patients. Reasons for referral included vision therapy (8), strabismus surgery consult (9), cornea (14), retina (21), glaucoma evaluation (27), and other (7). Other referrals included 2 for diagnostic testing and 5 for headache evaluations. All but two of the glaucoma evaluations occurred before we received our camera and OCT. Vision therapy referrals were for patients who preferred weekend or evening appointments.

CONCLUSION

Expanding the services available at IEI at CPS has allowed us to greatly reduce our outside referral rate. Increasing our afternoon appointment slots and including contact lens care may be ways to further reduce our number of referrals. However, many patients that we ask to return to IEI at CPS for strabismus and amblyopia follow ups are still not receiving the care they need. During the next year, we plan to focus our efforts in this area.

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Ronald O. Harrison, OD
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Figure 1: Referrals to Illinois Eye Institute Main Campus
INTRODUCTION

Prostaglandin analogues (PGAs) are used in the treatment and management of glaucoma by increasing aqueous outflow via the uveoscleral pathway. Common known side effects of these drugs include increased pigmentation of irides and lashes, hypertrichosis, blurred vision and conjunctival hyperemia. Periorbitopathy is a more recently documented side effect that has been noted with an absence of dermatochalasis, levator dehiscence, ptosis of upper lid, decreased prominence of orbital fat pads and relative enophthalmos. This case report presents three cases of prostaglandin associated periorbitopathy (PAP) that resulted in exposure keratopathy.

CASE REPORTS

PATIENT 1: 90 yo CM with POAG treated with bimatoprost 0.03% bilaterally at bedtime for the past eight years. Bilateral PAP observed with more significant changes to the left ocular adnexa (Photo 1). Slit lamp examination revealed a 6mm x 2mm sterile corneal ulcer in the 5-7'clock positions in the left eye (Photo 2).

PATIENT 2: 90 yo CM with POAG was initially treated bilaterally at bedtime with bimatoprost for three years and was switched to travoprost for the past 7 years due to insurance coverage. Bilateral PAP was observed (Photo 3) by external evaluation. Slit lamp exam revealed neovascularization of the cornea and an overlying 5mm x 2mm sterile corneal ulcer in the 4-6 o'clock position in the left eye (Photo 4).

PATIENT 3: 80yo CM with primary open angle glaucoma (POAG) taking bimatoprost .01% bilaterally at bedtime for the past 3 years. Upon external examination, bilateral PAP was noted (Photo 5). Slit lamp examination revealed pannus and punctate surface irregularities in the 4-6 o'clock position in the right eye (Photo 6).

All three patients were treated with bacitracin ointment at bedtime to the affected eye and were instructed to use copious amounts of artificial tears. The PGAs were discontinued. Improvement of the ocular surface was noted within 2-3 weeks in each of the cases and alternative therapy was initiated to manage the intraocular pressure. After changing topical glaucoma therapy, all three patients demonstrated resolution of PAP within the year and no recurrence of exposure keratopathy was noted.

DISCUSSION

PAP was initially reported in 2004 with bimatoprost and subsequent cases were then documented with travoprost, latanoprost, tafluprost, and unoprostone. It is thought to occur most frequently with bimatoprost. The exact mechanisms of these side effects have not yet been established. These effects have been documented to appear after a period of several weeks and have been reported to be reversible after discontinuing use of PGAs.

CONCLUSIONS

It is important to recognize PAP as a side effect of prostaglandin medications in the treatment and management of glaucoma. In addition, this side effect should be considered with unilateral administration of these medications. Patients with these side effects may note increased ocular surface irritation and have an increased risk for exposure keratopathy. As this case demonstrated, it has been reported that PAP resolves after discontinuation of the offending medication. Consideration should be given for topical medication adjustments should this side effect become problematic.

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Atypically Located Unilateral Optic Disc Pit with Serous Detachment and Evidence for Cerebrospinal Fluid Source Theory

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¹. MCPHS University School of Optometry, ². Illinois College of Optometry

BACKGROUND
Optic disc pits are congenital anomalies predispositionally affecting the temporal optic disc. The pathophysiologic basis of optic disc pits is controversial and has been a topic of debate. This case presents a child with an unusual inferotemporal optic disc pit and adjacent serous detachment. Spectral domain OCT images may give insight to the source of the fluid.

CASE REPORT
13-year-old African American male

- Recent eye examination: unremarkable
- No conjunctival or corneal findings
- No prior ocular history, orbital history unremarkable.

- Best corrected vision 20/20 OD, OS.
- OD: Positive stirrups (D+2.50, D+2.50, +1.25 x 180)
- OS: Positive stirrups (D+2.50, D+2.50, +1.75 x 180)

- Three month follow-up examination showed stability in area of detachment. The patient was treated with a 15% dexamethasone and 0.1% fluorometholone qid for two months. The patient was then on a monthly tapering regimen.

- Atypically located unilateral optic disc pit with vitreous traction may give insight to the source of the fluid.

DISCUSSION

- The pathophysiologic basis of optic disc pits is controversial and has been a topic of debate. This case presents a child with an unusual inferotemporal optic disc pit and adjacent serous detachment. Spectral domain OCT images may give insight to the source of the fluid.

- Initial OCT Imaging findings supported a diagnosis of optic disc pit (ODP) with adjacent serous detachment. OCT images were consistent with the presence of multiple thin layers, a possible elevated area superiorly, and a possible communication between the subretinal space and retinal pigment epithelium.

- Fluid SOURCE THEORIES:

- Laskey blood vessels at base of pit or under subretinal space:
- Vitrine fluid source (physical link between vitreous fluid cavity hypothesis):
- Vitrine fluid source (physical link between vitreous fluid cavity hypothesis):
- Most likely source:
- Cerebrospinal fluid (CSF) from the subarachnoid space:
- Thyro-ocular anastomosis (fibrous network):
- Thyro-ocular anastomosis (fibrous network):

CONCLUSION

- This case presents a child with an unusual inferotemporal optic disc pit with vitreous traction and adjacent serous detachment. This case highlights the importance of considering the potential sources of serous detachment in cases of optic disc pits. Further research is needed to better understand the pathophysiologic basis of optic disc pits and the mechanisms underlying serous detachment in these cases.

REFERENCES

Abstract

Unexplained decrease in best corrected visual acuity (BCVA) can be frustrating. Sometimes common strategies with atypical signs are the culprit, while in other cases it is a rare condition that could be treated or stabilized, if properly identified. This unique case began as a diagnosis of non exudative Age Related Macular Degeneration (AMD), but with second opinions, a retina referral, blood tests, and somewhat novel functional and imaging studies a diagnosis and management plan were reached.

Details

A 66 year old white male previously diagnosed with AMD presented for a two month follow up appointment. Since his last appointment, he had lost one line of BCVA (20/40 OD, OS down from 20/30 OD, 20/20 OS).

Medications: Daily Vitamin B Complex Capsule 25 mg Hydrochlorothiazide

Unique Lifestyle History: Strict vegetarian, regular blood donor (150 lifetime pints)

Clinical findings: • Quiet macularnwearing OD OS with RPE matting OU • Accelerated retinal arteriolarsclerotic changes OU (<1/3 AV ratio) with wide u and 8 zone peripapillary atrophy (PPA) OU. BCVA 20/40 OD, OS (down from 20/30 OD, 20/20 OS)

Imaging: Foveal Optical Imaging OD and OS taken 08/22/2013 showed some drusen irregularity, and mild PPA OU, but no classic characteristics of AMD. The dark circular areas OD>OS are likely a result of the aforementioned diving accident.

Lab Testing

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Conclusion/Discussion

Pattern dystrophy encompasses several autosomal dominant retinal dystrophies causing variations in macular RPE and abnormal foveal accumulation. It is often misdiagnosed as AMD. Pattern dystrophy is rare, with mild symptoms presenting later in life. It can present with a variety of patterns. This case had creamy-white pigment disturbance, however black, gray, brown, orange, or yellow patterns are also possible. Patients are often monitored for signs and symptoms of choroidal neovascular membrane, and in rare cases can develop geographic atrophy. The OD performed revealed a stripping/mottled pattern of hyperfluorescence at the macula with window defects characteristic of pattern dystrophy. On careful examination of the fundus, a classic creamy-white sheen was observed. The white/yellow flecks previously thought to be drusen were actually areas of RPE atrophy also characteristic of pattern dystrophy.

Acknowledgements

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Sources


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DECREASED VISUAL ACUITY AND FOVEAL RETINAL THINNING IN A 66 YEAR OLD MALE VEGETARIAN AND SERIAL BLOOD DONOR

Daniel K Roberson OD, PhD, Stuart Richer OD, PhD
Captain James A. Lovell Federal Health Care Center, North Chicago, Illinois, USA

Functional Testing

OD OS

With field Optical Imaging OD and OS taken 08/22/2013 show some drusen irregularity, and mild PPA OU, but no classic characteristics of AMD. The dark circular areas OD>OS are likely a result of the aforementioned diving accident.

QuantifEYES-MPOD II showed decreased pigment optical density (GWOE) which was confirmed by SSRI 3D profile.

Macular Pigment Density: OD 1142 AUC (LOW) OS 1142 AUC (LOW)

OD OS

Non Exudative Geographic Atrophy

Iron deficiency without anemia and Macular pattern dystrophy resulting in disruption of PDL, decreased BCVA, decreased contrast sensitivity, and central/peripheral scotomas OS and OD.

Treatment/Management

• Start Martek vegetarian EPA/DHA supplement
• Start two aspirin 81 mg per day
• Recommended reduced frequency of blood donation
• Patient will self monitor Amader Grid
• Monitor. Follow up in 8 months

Retina Consult

Fluorescein angiography (FA) during a retina consult on 10/19/13 revealed RPE atrophy, and window defects. Slit lamp examination showed a subtle cream colored sheen to the retina at the macula OD.
However, when HTN is not sufficiently controlled, a concern for resistant hypertension arises.

Case History
A 56-year-old Japanese male veteran presented to the emergency room for evaluation of sudden vision loss in the right eye occurring one day prior. He reported his vision returned for one hour, then was lost again. He was admitted for hypertensive crisis with blood pressure (BP) of 238/126 and was also diagnosed with Type 2 DM. His personal medical history was unknown due to the patient's lack of medical care for the past 35 years. His body mass index was 27.0.

Central retinal artery occlusion (CRAO) is an acute event that results in profound and often permanent vision loss. Because these patients are at higher risk for stroke and ischemic heart disease, it is imperative for eye and health care professionals to determine the source of the occlusion.

Controlling risk factors such as hypertension (HTN) and diabetes mellitus (DM) will improve health outcomes and, in patients with unilateral disease, prevent vision loss in the fellow eye.

However, when HTN is not sufficiently controlled, a concern for resistant hypertension arises.

Imaging/Lab tests
Carotid duplex study revealed no significant stenosis but did reveal moderate plaques on the right side. Transesophageal echocardiogram (TEE) was unremarkable. Other imaging and lab tests ruled out giant cell arteritis (GCA), hyperviscosity syndrome, pheochromocytoma, renal artery stenosis, and Moyamoya disease.

Assessment
1. Non-arteritic CRAO OD, with the source of the embolus likely originating from the carotid artery
2. Grade 3 hypertensive retinopathy OU
3. Diabetic macular edema (DME) OS
4. Severe non-proliferative diabetic retinopathy OU

All the above conditions are secondary to longstanding undiagnosed essential HTN, DM, and chronic kidney disease (CKD).

Management/Outcome
Treatment was held in the left eye to allow for spontaneous resolution of macular edema. Visual acuity in both eyes remained stable at all subsequent visits to the clinic. OCT two months later revealed diffuse retinal atrophy in the posterior pole of the right eye and significantly improved macular edema in the left eye.

The medical center’s ophthalmology, primary care, cardiology, and nephrology clinics are closely following this patient. Due to the rapid decline in his kidney function in the last two months, his BP control regimen has changed drastically. He is currently taking hydralazine 50 mg po for HTN. Meanwhile, his home monitor BP measurements remain high, measuring as high as 209/109. While the appearance of his retina has improved and a catheterization is pending, aggressive intervention in his BP and blood sugar (BS) control are still needed to give this patient the potential to return to normal vision.

Discussion
CRAO
Fluorescein angiography should be performed in all CRAO patients 50 years and older. It plays a crucial role in the diagnosis of artheritic CRAO and GCA, in almost every patient with GCA, fluorescein angiography discloses occlusion of the posterior ciliary arteries.

Following a diagnosis of CRAO, a carotid duplex and echocardiogram should be ordered to determine the origin of the embolus. Negative results do not mean that these structures were not involved because the resolution of these images may not be sensitive enough to detect very small plaques or lesions that could be significant enough to cause CRAO.

• Carotid duplex: The internal carotid artery should be evaluated not only for stenosis but also for the presence of plaques. The carotid duplex only evaluates the carotid artery within the neck, possibly missing plaques above or below.

TEE
TEE produces superior images to the transthoracic echocardiogram (TTE) in detecting heart abnormalities.

The absence of an evident embolus in the central retinal artery does not mean the occlusion was not caused by an embolus. It could have migrated and disappeared by the time the eye was examined.

Resistant HTN
Strict glycemic and blood pressure control remain the most effective ways of reducing DM. However, HTN is not controlled even with multiple oral anti-hypertensive medications and optimal compliance, a concern for resistant hypertension arises. The exact prevalence is unknown, but data from population studies and clinical trials suggest that it is a relatively common problem. Prevalence is expected to rise given the aging population and trends in obesity and CKD.

Diagnosis of this condition is complicated by "pseudo-resistance," i.e. improper BP measurement technique, the white-coat effect, and poor compliance with medications and lifestyle adjustments, such as sodium restriction, weight loss if obese, and reduction of alcohol intake.

Appropriate lab work and imaging should be considered in malignant and resistant HTN to rule out pheochromocytoma, renal artery stenosis, and hyperviscosity syndrome.

Optimal BP control can only be achieved if the treatment regimen is directed toward the cause, i.e. volume overload should be treated with the appropriate dose and type of diuretic.

Take Home Messages
• In CRAO, determining the etiology is important in improving remaining quality of life and vision.
• The resolution of carotid and TEE may not be sensitive enough to detect small plaques significant enough to cause CRAO.
• Eye care professionals should advocate for strict BP and BS control for patients with macular edema.

References

Acknowledgements
This case report paper is based on original clinical work supported by the Ophthalmology/Optometry section of Captain James Lovell Federal Health Care Facility FVH Naval Medical Center, North Chicago, IL, USA. There are no conflicts of interest.

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ARVO
14 ICO PRESENTATIONS
Eye-Movement Analysis in Relationship to Birth Order in Children

Christine L. Allison, OD, FAAO, FOVO + Darrell G. Schlange, OD, FAAO
Illinois College of Optometry, Chicago, IL

PURPOSE
The purpose of this study was to evaluate the relationship that birth order may have in relationship to the development of eye movement skills. We previously reported on the results of 81 children (Allison, C, Schlange, D, AFOV 2013). The relationship between birth order and eye movements was evaluated in a number of studies in the past, with many finding that first-born children had higher scores on intelligence tests, as well as in behavioral development. In a study by Childs and Bell (1979), they found that first-borns were superior in a number of skills, including reading, at an early age span.

METHODS
Ninety-three children were examined the summer prior to entering Kindergarten. The age range of these children was 4 to 6 years old depending on their birthdays, and the date of the exam. The children were given a full comprehensive eye examination, including but not limited to, binocular fusion, accommodative amplitude, refractive status, and a full ocular health evaluation. See Table 1 for a list of the tests performed. The subjects also received eye movement recordings using the Vagaphor G (Taylors), an infra-red system (ROI) with goggles (the subject wears while viewing stereo numbers and symbol targets). Figure 4 & 5 shows how a typical eye movement recording appeared. The software analysis of the recorded data is used with this young population to evaluate the results. The following three procedures were completed.

Fixation Control:
Task 1 determines how successful our subject is at holding fixation on a target (2020 equivalent letter or face target, 33 cm viewing distance) for 15 seconds and exhibiting all-eyes and head movement. Fixation fixation, attention loss and off-target saccades are recorded and evaluated for frequency and amplitude (Figure 6).

Saccadic Speed:
Task 2 determines how quickly and accurately the subject can complete horizontal saccadic movements. Target distance in alternated between two 15 deg. separated targets for 20 sec. duration. The number of saccadic excursions is a saccadic speed score. Targets similar to Task 1 are used (Figure 7).

Saccadic Accuracy:
Task 3 determines how accurately the subject can respond to number of saccades/second correct or incorrect. The number of saccades excursions are a saccadic speed score similar to Task 1 (Figures 8 & 9). Our sample size included three sub-groups, compared according to fixation control, Saccadic Speed and Saccadic Accuracy: • Only child • First-born with one sibling • May not be first born, with multiple siblings

RESULTS
Subjects who were first in birth order exhibited the following findings for tasks 1, 4 and 6 (See Figures 6-11):
1. Better fixation control with fewer off-target drifts and fewer saccades (F 27.46, p<0.05)
2. Better saccadic accuracy with faster duration and fewer saccades (F 6.84, p< 0.05)
3. No effect on saccadic speed or accuracy with reading, and in relationship to certain sports (reading experiences, coloring/drawing, etc.) compared to the other two groups
4. Children with multiple outside experiences appeared to have enhanced ocular motility development.

CONCLUSIONS
The type of activities that first born children are encouraged to perform may lead to development of better eye movement skills by the time they are of the age to enter elementary school. This may result in early school success and earlier reading when compared to children later in the birth order. Whether the better eye movement skills will continue to influence academic behavior will need to be examined in these same children in the later years (third grade and beyond) to determine if this trend continues once children have learned to read, and are beginning to read to learn. Analysis of the survey questions in relationship to later success in academics, specifically related to reading, and in relationship to certain sports may also be of value for future studies. Also we will continue to look at longitudinal trends in refractive errors and pupil parameters in comparison to their results upon entering Kindergarten.

REFERENCE
Allison, C, Schlange, D. “Eye Movements and Their Relationship to Birth Order and Eye Movement Skills.” Illinois College of Optometry, Chicago, IL

CONTACT INFORMATION
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Illinois College of Optometry, Chicago, IL

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Comparison of Hispanic to Black Subjects - Cycloplegic

Comparison of Autorefraction Results Between Hispanic Subjects to Black Subjects

<table>
<thead>
<tr>
<th>Autorefraction Type</th>
<th>Race</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Levene's Test for Equality of Variances</th>
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<th>Column 2</th>
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<tr>
<td>Sphere (Cycloplegic)</td>
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<td>0.34</td>
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<td>1.28</td>
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Comparison of Autorefraction Results From Younger Subjects to Older Subjects

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<th>Autorefraction Type</th>
<th>Age</th>
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<th>Mean</th>
<th>Std. Deviation</th>
<th>F Sig.</th>
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<td>0.02</td>
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<td>1.15</td>
<td>32.69</td>
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Comparison of Hispanic to Black Cylinder - Dry

<table>
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<th>Race</th>
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<th>Mean</th>
<th>Std. Deviation</th>
<th>F Sig.</th>
<th>p</th>
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Comparison of Hispanic to Black Cylinder - Wet

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<th>Mean</th>
<th>Std. Deviation</th>
<th>F Sig.</th>
<th>p</th>
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Comparison of Hispanic to Black Spherical Equivalent - Dry

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<th>Autorefraction Type</th>
<th>Race</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>F Sig.</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spherical Equivalent (Dry)</td>
<td>Black</td>
<td>784</td>
<td>0.02</td>
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<td>1.00</td>
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Comparison of Hispanic to Black Spherical Equivalent - Wet

<table>
<thead>
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<th>Race</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>F Sig.</th>
<th>p</th>
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<tbody>
<tr>
<td>Spherical Equivalent (Wet)</td>
<td>Black</td>
<td>784</td>
<td>0.02</td>
<td>4.00</td>
<td>0.000</td>
<td>1.00</td>
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CONCLUSIONS

Hispanic children show significantly more cylinder in both dry and Cycloplegic states than Black children. This finding is in agreement with literature on refractive error in these races reported in other geographic areas in the US.

In addition, a myopic shift is seen in the subjects from the age of 6-7 years to the age of 11-12 years. Limitations include the fact that this is a cross-sectional and not a longitudinal study.
A Comparison of the MacuScope and QuantifEye Macular Pigment Densitometers in Two Distinct Population Types

Robert J. Donati, PhD, Elizabeth Wyles, OD
Illinois College of Optometry, Chicago, IL

BACKGROUND

Studies have suggested that reduced levels of macular pigment (MP) may increase risk for developing age-related macular degeneration (AMD). There are two compact commercially available heterochromic flicker photometry instruments that measure MP in the USA. Previous studies revealed significant variability between instruments. Our aim was to determine if the same variability would be found in a young, healthy, population compared to an older population for which these instruments have more significance.

METHODS

Twenty-one young healthy adults (21-29 years old) and 28 older adults (50-70 years old) with and without early signs of AMD were recruited from the Illinois Eye Institute patient base. Macular pigment optical density (MPOD) was measured using the MacuScope and QuantifEye. Data was collected for each patient in one session. A single, but different operator collected data for each of the patient populations. Whether a subject was first tested on the MacuScope or QuantifEye was randomly determined. Two measurements per eye were taken on each instrument and each eye was used as a separate data point. If the difference was greater than 0.24 absorbance units between two measurements on a single instrument, a third measurement was taken. Invald readings were excluded. Of the 98 eyes tested, 95 paired eyes provided valid data for comparison of the individual subjects standard deviations. Paired t-tests and ANOVA were done to compare the statistical significance of the individual subjects standard deviations. Paired t-tests provided valid data for comparison of the mean MPOD levels across the two age groups. t-tests were done for an added comparison.

RESULTS AND CONCLUSIONS

• There was no significant difference between the mean MPOD readings of the two instruments for either age group (Figure 1).
• A repeated measures Bland-Altman analysis revealed that overall, both machines are sufficient to measure MPOD in both age groups (Figure 2) with a relatively evenly distributed and below the mean. However, the spread of the paired observations between the limits of agreement demonstrates a lack of precision between the instruments.
• There is a significant difference in intra-instrument measurement variability when considering individual subject variability in the 50-70 age group and the combined age group (Figure 3). The individual subject variability for each instrument with the 21-29 age group, while not statistically significant, demonstrated a wide range variability.
• Is this variability acceptable?
• The clinician must take this variability into account if using MPOD as an indicator for AMD risk and/or clinical care.
• If MPOD is being monitored clinically to assess risk of AMD with the possibility of causing altered treatment regimens, the need for reliable data measurements is imperative.

REFERENCES


Nishizawa H, Matsuda A, Kubota Y, et al. Comparison of the mean Standard Deviations (SD) of repeated MPOD measurements from individual eyes on the QuantifEye™ and Macuscope. A.) Eyes were measured 2-3 times with the QuantifEye™ (n=88) and with the Macuscope (n=90) from adults aged 50-70. The mean SD of MPOD measurement from each eye was 0.0377 ± 0.0044 from the QuantifEye™ and 0.0391 ± 0.0048 from the Macuscope. An unpaired student’s t-test was performed using GraphPad Prism 5.0 software. The p=0.0006 indicates a significant difference when looking at the individual subject variability between the 2 instruments. B.) Eyes were measured 2-3 times with the QuantifEye™ (n=42) and with the Macuscope (n=39) from adults aged 21-29. The mean SD of MPOD measurement from each eye was 0.0425 ± 0.0042 from the QuantifEye™ and 0.0479 ± 0.0061 from the Macuscope. The p=0.0398 signifies no significant difference between the instruments. C.) Eyes were measured 2-3 times with the QuantifEye™ (n=88) and with the Macuscope (n=89) from the combined groups. The mean SD of MPOD measurement from each eye was 0.0387 ± 0.0067 from the Macuscope. The p=0.0004 indicates a significant difference when looking at the individual subject variability between the 2 instruments.
Background:
In 2005, it was estimated that 1.04 billion people were presbyopic globally, and that 517 million are not adequately corrected. The number will only increase with an aging population. Current treatments for presbyopia include spectacle lenses and accommodating IOLs, but no treatments fully return the natural accommodative abilities of the younger lens. Presbyopia creates both a financial and psychological detriment to the patient, and therefore there is a need for improved correction.

Methods:
Fresh porcine eyes were obtained from a local abattoir (Park Packing Company, Chicago IL). Lenses were removed within 2 hours of collection. Using modifications of previously published methods1,6,7 lenses were treated with chymotrypsin (3mg/mL) and washed before incubating in EdU (2.52 µg/µL) for 2 hours at 37°C. The lenses were fixed and permeabilized before tagging with “click” chemistry. The EdU labeled nuclei were conjugated to the Alexa594 fluorophore during a 1 hour incubation at room temperature protected from light. Lenses were washed before being counterstained with SYTO 9 to visualize all background nuclei. Samples were viewed using a Nikon A 1R-MP+ multiphoton microscope.

Results:
In our preliminary assessment of the lenses, approximately 0.31% of the GZLE cells were labeled with EdU and analyzed using Fiji image J (NIH). Collected images were viewed using EdU in Whole Pig Lenses to Establish Anterior Epithelial Cell Division Rates

Table 1. Cell counts per Z stack of 400 µm2 and percentage of EdU labeled cells as taken by the Nikon A1R-MP+ multiphoton microscope.

<table>
<thead>
<tr>
<th>Number of EdU Labeled Cells</th>
<th>Total Number of Cells</th>
<th>Percentage of EdU Labeled Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>11452</td>
<td>0.35%</td>
</tr>
<tr>
<td>5</td>
<td>9799</td>
<td>0.30%</td>
</tr>
<tr>
<td>6</td>
<td>7010</td>
<td>0.30%</td>
</tr>
<tr>
<td>7</td>
<td>2773</td>
<td>0.31%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>41</td>
<td>13452</td>
</tr>
</tbody>
</table>

Discussion:
• We were successfully able to identify dividing cells in the GZLE cells using EdU as a marker. The 0.31% of mitotic cells located 500 µm from the equator that we report is comparable with other literature4,5.
• Although the geometric patterns are slightly different, porcine lenses are a viable model to their human counterparts due to similar protein composition to human lenses6,7 and easy availability from nearby slaughterhouse.
• We will be utilizing this procedure to establish baseline values for comparisons to treated lenses.

Future Directions:
• Develop a more accurate and repeatable method for quantifying EdU labeled cells, representative of the entire lens epithelium.
• Consider counterstaining background nuclei with Hoechst 33342 to reduce interference between the red and green fluorescent channels.
• Compare our reported percentage of mitotic GZLE cells to laser treated lenses.

References:
Is Peripheral Retinal Ischemia Associated with Systemic Atherosclerosis?

Spengler, Ashley M.; Hiura, Shaurt; Panj, Yi; Loong, Danielle; Patel, Rani D.; Messner, Leonard W.; Hariprasad, Seenu A. 1

1 Section of Ophthalmology and Visual Science, Department of Surgery, University of Chicago, Chicago, IL, United States. 2 Retinal Vitreal Consultants, Ltd, Chicago, IL, United States.

INTRODUCTION

Diabetes and carotid intima media thickness (IMT) are both well-known risk factors for cardiovascular disease and atherosclerosis. The Framingham Study showed a nearly 10x increase in cardiovascular events in middle-age patients with diabetic retinopathy (DR). Technological advances in recent years have produced smaller, portable ultrasound devices making screening of IMT in the carotid arteries easier and more accessible. Fluorescein angiography technology has evolved, providing up to 200 degree fundoscopic views in a single, high-resolution image. These images have allowed improved visualization of the extent of peripheral retinal nonperfusion. Previous studies have found that diabetic patients presenting with retinopathy have a higher IMT than diabetic patients without retinopathy and patients with severe DR are more likely to have subclinical vascular disease.

The purpose of this study was to investigate whether there was a correlation between peripheral retinal nonperfusion and IMT thickness of the common carotid artery in patients with DR. A positive correlation might suggest a significant relationship between peripheral retinal nonperfusion and IMT grade of the carotid artery in patients with DR. A positive correlation might allow for more diverse and non-invasive means to screen for macroangiopathy. This association might allow for further investigation with a larger cohort may provide more accurate results.

METHODS

In this cross-sectional pilot study, 15 subjects with diabetes and advanced DR were enrolled. No subject had PPR treatment. Ultrasound images of both common carotid arteries were taken using the HeartSmart II handheld portable ultrasound device (Figure 2). The scans were electronically transferred and read by an off-site reading facility. A grade of IMT was assigned by the reading facility based on comparison to a database of over 40,000 patients mapped and categorized based on age, gender, and race. A grade of normal represents the mean IMT for age and gender, and mild, moderate and severe categories represent 2, 4, and 8 standard deviations above the mean, respectively. Ultrasound and fluorescein angiography technology were used to assess peripheral retinal nonperfusion.

RESULTS

Compiled demographic data from the 15 subjects is presented in Table 1. Average ISI in the right eye was 0.145 (± 0.046) ranging from 0.01 to 0.47. ISI values classified by IMT group are presented in Table 2. No subjects were classified as severe. No statistically significant difference was identified in right eye ISI among normal, mild, and moderate IMT groups in the left carotid artery (F = 1.31, P = 0.285). However, there was significant difference in left eye ISI among all IMT groups in the left carotid artery (F = 7.63, P = 0.005). Post hoc analysis reveals the difference in left eye ISI was between the normal and mild IMT groups (P = 0.005).

CONCLUSION

• In this pilot study was looked for a correlation between peripheral retinal nonperfusion and IMT grade of the common carotid artery in patients with DR.
• We found no statistical significant difference in ISI among IMT groups on the right side.
• We found significant difference in ISI among normal and mild IMT on the left side.
• Our study is limited by a small sample size and a narrow range of ISI (0.01-0.47) and IMT grade (normal – moderate). Previous studies investigating ISI have found values from 0-1.0.
• Our study supports a common pathogenic mechanism for both macro and microangiopathy but the data set may be too narrow to identify significance between groups.
• Further investigation with a larger cohort may provide more accurate results.

REFERENCES

PURPOSE
Accessibility features of tablets such as the Apple iPad have revolutionized reading rehabilitation for low vision patients. These features include system wide zoom and high reversible contrast. We compared subjective preference as well as reading rates on the Apple iPad and a closed circuit television (CCTV).

METHODS
After IRB approval, fourteen low vision patients, 18 years and older, were recruited with visual acuity ranging from 20/50 to 20/200 and minimal prior experience with an iPad or CCTV. Objective data collection involved calculating reading rates from a newspaper article and a book. Patients read each media for two minutes on each device at their preferred zoom, and a third time on the CCTV with the zoom matched to the iPad’s angle of resolution. Physical copies were provided to be used on the 24 inch Optelec Clearview CCTV and electronic copies were acquired for the third generation iPad. Upon conclusion of the reading assignments, patients were surveyed with a questionnaire concerning subjective comfort, performance and preference. Paired t-test with Bonferroni adjustment was used to compare reading rates.

RESULTS
The mean age of the subjects was 62.7 (Std Dev = 13.4) years and the range was 35 to 91. There were 9 different diagnoses, with proliferative diabetic retinopathy (5) and glaucoma (2) being the most common. The mean acuity was 20/108 and the range was 20/50 to 20/200. Twelve of 14 subjects (85.7%) chose the iPad for overall reading preference (mean age 59.3, mean acuity 20/110). The other two subjects preferred the CCTV (mean age 83.5, mean acuity 20/100). Faster reading rates of the newspaper with the CCTV at both the patient’s preferred zoom and constant angle of resolution to the iPad were statistically significant (p = 0.0047 and 0.0080 respectively), while there was no statistically significant difference between the CCTV and iPad reading rates with the book.

CONCLUSIONS
Despite equal or slower reading rates with the iPad, patients’ subjective preference was in favor of the iPad. Patients’ primary reasons for preference of the iPad were portability, ease of navigation, and added versatility. Considering these reasons in addition to lower cost and improved social acceptance, tablets, such as the iPad, should be considered in the reading rehabilitation of visually impaired patients.

CONTACT INFORMATION
Alex Zemke, OD
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INTRODUCTION
A number of authors have reported that human observers can accurately judge the physical distance of visual targets if they are located on a flat ground surface. Distance judgments measured with the blind-walking technique correlate highly with a target’s physical distance in lighted conditions. However, distance judgments of self-illuminated targets in darkness are very inaccurate.

Ooi and colleagues have proposed that in both darkness are very inaccurate.

Our experiments have revealed another aspect of this implicit surface, it is triggered by the absence of light in the visual field and suppressed by the presence of light in the visual field.

METHODS

**Measuring Perceived Distance**
- Subjects were instructed to look at a small, illuminated target placed on the floor of a large dark space.
- Subjects were then instructed to walk back to the remembered target location.
- Subjects were asked to place their toes at the point where they felt the small target had been.

**Blind-Walking in White Light**
- The second group was comprised of ten ICO students.
- These subjects were also instructed to view the small target in the dark, under monocular conditions.
- After they viewed the target they looked back at the illuminated target and walked to the remembered target location.
- However, when they performed the blind-walking task the room was illuminated with white light.
- The data confirm the target’s perceived distance and angle of declination previously reported by Ooi et al. when subjects were asked to blind-walk to the remembered target location in darkness.

**Blind-Walking in Red Light**
- The second group was comprised of ten ICO students.
- These subjects were also instructed to view the small target in the dark, under monocular conditions.
- After they viewed the target they looked back at the illuminated target and walked to the remembered target location.
- However, when they performed the blind-walking task the room was illuminated with 5 goose-neck lamps each fitted with a red-42 watt compact fluorescent bulb.
- This provided a low photopic luminance.

SUBJECTS
- Three groups of different subjects participated in the study.
- All subjects in each of the three groups were in their twenties and students at the Illinois College of Optometry (ICO). All subjects were naive with respect to the purpose of the study.

**Control Group: Blind-Walking in Darkness**
- The first group was comprised of 28 subjects. They viewed the small-illuminated target in darkness then blind-walked to the remembered location in darkness.
- When they indicated the remembered location the lights were turned on and perceived distance was measured by the experimenters.

RESULTS

- When subjects were asked to blind-walk to the remembered location in complete darkness they significantly underestimated target distance as shown in Figure 1.

- The overall F value = 18.85, p<0.001.

CONCLUSIONS
- The distance perception of targets viewed in darkness is dramatically affected by the presence or absence of room lighting. When subjects blind-walk to the remembered target location in darkness we assumed they relied on the implicit surface which according to the theory proposed by Ooi et al. (2006) would result in significant underestimates of target distance which should get worse the farther away the target. As can be seen in Figure 1 this assumption proves true.

- We assumed that if subjects blind-walked to the remembered target location with room illumination present (but they were still blindfolded) then there would again be a default to the implicit surface and distance perceptions would be underestimated.

- However, as Figure 2 clearly indicates the expected underestimation does not occur. Despite the fact that the subjects are blindfolded and received no visual cues other than that light was left on the room they blind-walked to the correct location.

- One conclusion that may be drawn from this result is that the visual system fails to default to the implicit surface unless there is darkness.

REFERENCES


CONTACT INFORMATION
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Effect of Amblyopia Treatment on Macular Thickness in Eyes with Myopic Anisometropic Amblyopia

Yi Pang, Kelly Franz, Sandy Block, Geoffrey Goodfellow, Christie Allison
Illinois College of Optometry, Chicago, IL

INTRODUCTION
In a previous study, we reported that amblyopic eyes with unilateral high myopia had significantly thinner minimum and average fovea but thinner inner and outer macula compared to sound eyes. In addition, we found that both refractive correction and patching significantly improved visual acuity (VA) of the amblyopic eye associated with myopic anisometropia. The purpose of this study was to investigate whether amblyopia treatment (both refractive correction and patching) affected macular thickness in the amblyopic eyes with unilateral high myopia. Furthermore, the association between VA improvement and the change of macular thickness in the amblyopic eyes was determined.

METHODS
A total of 20 children diagnosed with myopic anisometropic amblyopia were recruited at the Illinois Eye Institute, an urban eye clinic, and 17 children anisometropic amblyopia were recruited at the Illinois College of Optometry, Chicago, IL. The eligibility criteria are listed in Table 1.

Eligibility and Exclusion Criteria

ELIGIBILITY CRITERIA
- Age: 4 to < 14 years
- Presence of ocular pathology causing reduced visual acuity
- Poor ocular surgery
- Current vision therapy

EXCLUSION CRITERIA
- Presence of ocular pathology causing reduced visual acuity
- Poor ocular surgery
- Current vision therapy

In the current study, we performed OCT on all subjects. Optical coherence tomography (OCT) (Stratus OCT3: Carl Zeiss Meditec, Dublin, CA) was performed on all subjects at the enrollment visit and at the end of 16 weeks of patching. All scans had signal strength of at least 6. The following ten parameters were measured for each subject: foveal minimum thickness, average foveal thickness, inner nasal, superior, temporal, inferior, outer nasal, superior, temporal and inferior macular thickness. Spearman correlation was used to test the relationships between macular thickness decrease and VA improvement in amblyopic eyes. For multiple comparisons and correlations among the 10 OCT parameters, Bonferroni’s correction was applied with a resultant significance level of P < 0.005.

RESULTS
Mean (±SD) baseline VA in the amblyopic eyes was 0.96 (±0.27) logMAR and improved to 0.71 (±0.10) after amblyopia treatment, an average improvement of 0.25 logMAR lines (P < 0.001). Table 2 shows the macular thickness measurements before and after amblyopia treatment. No statistically significant change was identified in macular thickness before and after treatment, although there was a trend toward decreasing minimum and average foveal thickness after treatment. No correlation was found between macular thickness change and VA improvement. A sample OCT image from one of the subjects is shown in Figure 1 (before amblyopia treatment) and Figure 3 (after amblyopia treatment).

Table 1: Eligibility and Exclusion Criteria

<table>
<thead>
<tr>
<th>Eligibility Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best-corrected VA in the amblyopic eye 20/40 to 20/400</td>
<td>Presence of ocular pathology causing reduced visual acuity</td>
</tr>
<tr>
<td>Age: 4 to &lt; 14 years</td>
<td>Poor ocular surgery</td>
</tr>
<tr>
<td>Presence of ocular pathology causing reduced visual acuity</td>
<td>Current vision therapy</td>
</tr>
<tr>
<td>Amblyopia associated with myopic anisometropia</td>
<td></td>
</tr>
<tr>
<td>No amblyopia treatment (other than spectacles)</td>
<td></td>
</tr>
<tr>
<td>Inter-eye acuity difference ≥ 3 logMAR lines</td>
<td></td>
</tr>
<tr>
<td>Best-corrected VA in the amblyopic eye ≥ 20/40</td>
<td></td>
</tr>
<tr>
<td>No known skin reaction to patch or bandage adhesive</td>
<td></td>
</tr>
<tr>
<td>Current vision therapy</td>
<td></td>
</tr>
<tr>
<td>No known skin reaction to patch or bandage adhesive</td>
<td></td>
</tr>
<tr>
<td>Known skin reaction to patch or bandage adhesive</td>
<td></td>
</tr>
<tr>
<td>Amblyopia associated with myopic anisometropia</td>
<td></td>
</tr>
<tr>
<td>Inter-eye acuity difference &lt; 3 logMAR lines</td>
<td></td>
</tr>
<tr>
<td>Amblyopia associated with myopic anisometropia</td>
<td></td>
</tr>
<tr>
<td>Presence of ocular pathology causing reduced visual acuity</td>
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<tr>
<td>Poor ocular surgery</td>
<td></td>
</tr>
<tr>
<td>Current vision therapy</td>
<td></td>
</tr>
<tr>
<td>Known skin reaction to patch or bandage adhesive</td>
<td></td>
</tr>
</tbody>
</table>

REFERENCE LIST

CONCLUSION
- Amblyopia treatment improved VA in myopic amblyopic eyes, but anomalies in macular thickness of these eyes remained.
- These findings suggest that VA improvement in myopic amblyopic eyes is not due to macular thickness changes.

COMMENTS
This study was supported by the Illinois College of Optometry Research Fund, Illinois Society for the Prevention of Blindness, and CIBA Vision. The authors thank Rebecca Tudor for her assistance in performing OCT on all subjects.

Table 2: Macular Thickness (μm) of the Amblyopic Eyes before and after Amblyopia Treatment (n = 17)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Before Amblyopia Treatment</th>
<th>After Amblyopia Treatment</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average foveal thickness (1 mm)</td>
<td>198.19 ± 16.66</td>
<td>189.06 ± 16.79</td>
<td>0.05</td>
</tr>
<tr>
<td>Inner macula (3 mm)</td>
<td>259.69 ± 16.52</td>
<td>233.81 ± 11.36</td>
<td>0.12</td>
</tr>
<tr>
<td>Superior</td>
<td>250.25 ± 17.86</td>
<td>243.25 ± 14.42</td>
<td>0.14</td>
</tr>
<tr>
<td>Inferior</td>
<td>247.25 ± 17.42</td>
<td>246.19 ± 16.41</td>
<td>0.32</td>
</tr>
<tr>
<td>Macula (6 mm)</td>
<td>214.13 ± 17.66</td>
<td>213.76 ± 11.30</td>
<td>0.14</td>
</tr>
<tr>
<td>Nasal</td>
<td>245.81 ± 15.79</td>
<td>244.95 ± 14.95</td>
<td>0.65</td>
</tr>
<tr>
<td>Temporal</td>
<td>232.69 ± 13.92</td>
<td>225.63 ± 18.28</td>
<td>0.69</td>
</tr>
<tr>
<td>Inferior</td>
<td>207.96 ± 12.88</td>
<td>207.98 ± 20.89</td>
<td>0.41</td>
</tr>
</tbody>
</table>

Table 1: OCT Image of One of the Subjects after Amblyopia Treatment

Figure 1: Schematic diagram to demonstrate the locations of fovea, inner macula, and outer macula.

Figure 2: OCT Image of One of the Subjects before Amblyopia Treatment.

Figure 3: OCT Image of One of the Subjects after Amblyopia Treatment.

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The Effect Of Age On The Lens Ultrastructure During Accommodation As Measured Using Slit Lamp Photos And Wave Front Analysis

R.K. Zoltoski1, Elizabeth Wyles, Jennifer S. Harthan2, Jer R. Kuszak3

1Didactic Education and 2Cornea Center for Clinical Excellence, Illinois College of Optometry, Chicago, IL; LensAR Inc, Orlando, FL.

Purpose:
During dynamic focusing, the shape, as well as the ultra-structure of the lens is changed. Our lab is investigating these changes, specifically at the sutures of the lens during accommodation. We have hypothesized that unique structural features and organization of fiber cells enables them to interface at the sutures resulting in a change in surface curvature of the lens, as well as an increase in thickness, allowing near focus to occur. We are reporting data on lens slit lamp photos, OCT of lens thickness changes, and sequential ray tracing analysis of the patterns associated with the lens sutures to provide additional insight into the importance of the ultra-structure of the lens in the accommodative process.

Method:
OCT (VisanteTM), wavefront analysis (iTraceTM), and slit lamp photos (Haag Streit, 16X magnification, dilated eye) were collected on normal subjects, between the ages of 7 - 63 (n=30). The data was collected on the right eye. Accommodation was stimulated using minus lenses in front of the viewing eye in 2.5 D increments until the subject could no longer clearly view the target. For the photos a prism system was used to keep the eye appropriately oriented. The objective accommodative response was calculated as the change from a distance measurement using the iTrace refractive measurements corrected for stimulation lens power. ImageJ (NIH) was used to analyze the area of the sutural dark central region. Data were analyzed using Systat v11 to correlate accommodative response with total HOA, SA and the foil patterns, as well as changes in slit lamp suture areas. Spearman Rank Correlation coefficients and p values are presented.

Conclusions:
• In a young lens, accommodation leads to a decrease in the sutural dark band area, such that it is difficult to see
• This decrease in the area of the dark band is maintained as aging occurs, in relation to the objective accommodative response.
Regardless of age, increase in accommodative response results in changes in the ultra-structure of the lens, as evidenced by the decrease in area of the dark central region of the suture and in the total foil patterns. Further analysis of these changes will provide further insight into the anatomical basis of accommodation.

Funded by NIH Grant EY021015-01 and ICO RRC
Long anterior zonules (LAZ) are characterized by the presence of crystalline lens zonules central to the normal insertion zone on the anterior capsule.[1][2] They are frequently become pigmented due to contact lenses after pupillary dilation. In addition to this unique type of pigment dispersion, oriented, fine brown lines after pupillary dilation. Experiments have been performed with rabbits and analogous results have been obtained with a group of older African-Americans: an age, race, gender, and refractive error matched controls. The eye tested first was randomized, and the right eye was used to further ensure simultaneous control of variables for the ACD dimension.

RESULTS
Each of the variables, i.e., refractive error, ACD, LT, VBL, and AL, resembled Gaussian distributions with all subject groups together and when split into case and control groups. The mean age 40 (SD, range of the ACD cases 25 (7) to 75 (62 years) and controls (62 (6) to 85 (7) years); 48-89 years was similar (97 (5)), it was mean refractive error of the cases (18 (6) to (43 (0), -1.75 to +4.75) and controls (-3 (4) to 1.33, -5.75 to +4.95). The mean values for ACD, LT, VBL, and AL were very similar between the cases and controls, suggesting that any differences were exceptionally small (Table 1). Results did not vary with or without additional control for age and refractive error using regression analysis. To explore the data further, we evaluated the relationship between ACD and the other variables and found that ACD had the strongest correlations with LT and AL for both groups. In this regard, ACD had a negative correlation with LT (LAZ: n=150; r=-0.66, P<0.000; Controls: n=150; r=-0.52, P<0.000) and a positive correlation with AL (LAZ: n=150; r=0.37, P<0.002; Controls: n=150; r=0.31, P<0.002). Multiple linear regression showed similar models containing LT, VBL, and AL as significant explanatory variables for the ACD dimension (Table 2).

CONCLUSIONS
This group of African-American females with LAZ did not exhibit clinically significant differences in ACD, LT, VBL, and AL compared to age, sex, gender, and refractive error matched controls.

REFERENCE LIST

Table 2

Figure 2: Scatterplots showing the relationship of central ACD relative to refractive error, age, LT, and AL.

Figure 1: Normal anterior insertion on capsule artery, top vs. long anterior zonules (arrows, bottom).

Table 1

DATA SUMMARY
LAZ and CONTROL SUBJECTS MATCHED ON AGE AND REFRACTIVE ERROR

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control (N=50)</th>
<th>LAZ Subjects (N=150)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>67.1 ± 7.4</td>
<td>65.2 ± 7.6</td>
<td>0.04</td>
</tr>
<tr>
<td>Refractive Error (D)</td>
<td>1.18 ± 1.41</td>
<td>1.82 ± 1.31</td>
<td>0.02</td>
</tr>
<tr>
<td>Anterior Chamber Depth (mm)</td>
<td>4.34 ± 0.43</td>
<td>4.04 ± 0.43</td>
<td>0.03</td>
</tr>
<tr>
<td>Lens Thickness (mm)</td>
<td>4.09 ± 0.43</td>
<td>4.65 ± 0.51</td>
<td>0.001</td>
</tr>
<tr>
<td>Vitreous Body Length (mm)</td>
<td>10.04 ± 0.72</td>
<td>10.13 ± 0.72</td>
<td>0.03</td>
</tr>
<tr>
<td>Axial Length (mm)</td>
<td>22.38 ± 0.70</td>
<td>22.38 ± 0.70</td>
<td>0.005</td>
</tr>
<tr>
<td>Controls</td>
<td>65.2 ± 7.6</td>
<td>40.8 ± 6.7</td>
<td>0.02</td>
</tr>
<tr>
<td>LAZ Subjects</td>
<td>70.2 ± 7.4</td>
<td>56.3 ± 6.7</td>
<td>0.005</td>
</tr>
</tbody>
</table>

†Abbreviations: ACD, anterior chamber depth; AL, axial length; LT, lens thickness; VBL, vitreous body length.

MULTIPLE LINEAR REGRESSION MODELS

Table 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t Value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACD</td>
<td>4.34</td>
<td>0.43</td>
<td>10.04</td>
<td>0.001</td>
</tr>
<tr>
<td>LT</td>
<td>4.09</td>
<td>0.43</td>
<td>9.51</td>
<td>0.001</td>
</tr>
<tr>
<td>VBL</td>
<td>10.04</td>
<td>0.72</td>
<td>13.50</td>
<td>0.001</td>
</tr>
<tr>
<td>AL</td>
<td>22.38</td>
<td>0.70</td>
<td>31.67</td>
<td>0.001</td>
</tr>
</tbody>
</table>

†Abbreviations: ACD, anterior chamber depth; AL, axial length; LT, lens thickness; VBL, vitreous body length.

SUPPORT
The authors thank the Illinois Eye Institute, Department of Clinical Education, Illinois College of Optometry, Chicago, IL for the provision of primary eye care within an urban, teaching facility, located in Chicago, Illinois, USA. The investigation was to further assess certain dimensions of the LAZ phenotype may be a risk factor for angle-closure glaucoma, possibly in association with plateau iris configuration. The ocular dimensions of LAZ eyes are incompletely understood, and the purpose of this investigation was to further assess certain dimensions in LAZ eyes, with simultaneous control for refractive error.

METHODS
LAZ subjects were recruited via mailed invitation from a database developed over several years during the provision of primary eye care within an urban, teaching facility, located in Chicago, Illinois, USA. The criterion for LAZ was the presence of zonular fibers 400-μm central to the normal zonule termination zone on the anterior capsule (Fig. 1), with exclusion of subjects with ≤5 LAZ to ensure definitive cases. Only African-American females were included due to low numbers of males and people from other racial groups at the study site. Controls were recruited when they presented for routine care within the same setting, and invitation was based on one-to-one matching using age (±2 years), race, gender, and refractive error (±0.1D spherical equivalent).

All participants had oculocutaneous history, extracocular muscle testing, color vision testing, confrontation fields, pupil testing, subjective refraction, Goldmann applanation tonometry, four-microscope gonioscopy, and dilated fundus exam. A-scan ultrasonography (Sonoline®) at Biometric Ultrasound System, Steris Instrument Co., St. Louis, MO) was performed on each eye and averaged for the final measurements, which were analyzed unless inclusion criteria were not met.

Data analysis was carried out using the SAS® System, Release 8.2 for Microsoft Windows® (SAS Institute, Cary, NC, USA), Conditional multiple linear regression was used to further ensure simultaneous control of age and refractive error. Instructional Review Board approval was obtained for this investigation, and subjects provided informed consent to participate.
The ability to accurately monitor the disease status or improve the visual function of low vision patients requires reliable and repeatable vision tests. It is generally accepted that measures of visual function in the low vision patient population are more variable than normally sighted individuals. This may decrease the reliability of standard visual tests when applied to a population such as albinism. The purpose of our study is to determine whether one such test of visual function, contrast sensitivity, could reliably be measured in this population both in the presence of glare and without.

METHODS
CS test with Vector Vision CSV-1000LV (which is a low vision letter chart and the CSV-1000LVGT (halogen glare test) which tests CS in the presence of glare). Thirteen subjects with albinism with best corrected logMAR visual acuity (VA) ranging from 0.4 to 0.8 participated in this study. LogMAR VA was tested using the EDTRS chart. Dependent variables including CS under normal test condition and CS with glare, were tested at two different visits, 6 months apart. The CSV-1000LV chart was used to measure CS while the CSV-1000LVGT was utilized to measure the effect of glare on CS. Test-retest reliability was assessed with both the correlation of repeatability (COR) and the intraclass correlation coefficient (ICC).

PROCEDURES
1. Measuring best corrected LogMAR visual acuity: After obtaining informed consent, thirteen subjects with albinism with best corrected logMAR visual acuity (VA) ranging from 0.4 to 0.8 were recruited for this pilot study. LogMAR VA was tested using the EDTRS charts.
2. Measuring Contrast Sensitivity: CSV-1000LVV and CSV-1000 LV CV contrast sensitivity charts were used to provide an appropriate target size for our patient population. Contrast thresholds were obtained at a distance of 4 feet.
3. Measuring the effect of glare (Halogen Glare Test): CSV-1000HGT was used with the CSV-1000 LV test face to evaluate the effect of glare on contrast sensitivity. In medium setting, the unit is precisely calibrated to simulate two on-coming halogen car headlights as seen at night from 150 feet.

RESULTS
1. Figure 1a: The average LogMAR VA results for the thirteen subjects in our sample for Visit 1 versus the values obtained for the follow-up visit. The average logMAR acuity was 0.56 for the first visit and 0.53 at the follow-up visit. The slightly higher mean observed at the follow-up visit is not statistically significant (paired samples t-test, p=0.05).

2. Figure 1b: The best corrected LogMAR VA for the thirteen subjects for Visit 1 versus the values obtained for the follow-up visit. The solid line has a slope of 1.0. Although the correlation coefficient is fairly high (0.76) correlation coefficients cannot be used to assess test-retest reliability because the absolute value of the correlation varies with the range of the data points. The test-retest reliability was calculated with the ICC and is described below.

3. Figure 2a: The average CS test results for n = 13 under normal test conditions with no glare for test and follow-up visits. Again there is a slight increase in the follow-up mean log CS which in this case is significantly different from the log CS obtained at the initial visit (n = 13, p<0.05).

4. Figure 2b: CS test results (n = 13) with Vector Vision CSV-1000LV under normal test conditions (i.e., dim room illumination and no glare for visit 1 versus the values from the follow-up visit. Inspection of this scatterplot indicates that retest values fall above or on the line with a slope equal to 1.0 which explains the small but significant learning effect illustrated in Figure 2a.

5. Figure 3a: The average CS test results by visit for the without glare condition. The two means are not significantly different (t=1.16, p=0.13). Figure 3b presents CS test results (n = 13) with Vector Vision CSV-1000HGT (with glare) for visit 1 versus the values from the follow-up visit. The solid line has a slope of 1.0 and it can be seen that retest values lie above, on and below this line.

6. Figure 4 plots log CS without glare as a function of logMAR acuity. The graph illustrates that although the logMAR acuity extends over a range of values, the log CS never shows a systematic change. If the patient’s entire log CS function was shifted down then we might expect log CS to decrease as logMAR acuity decreases. However as this trend was not observed we can conclude that a drop in high spatial frequency sensitivity is not correlated with a drop in sensitivity to lower spatial frequencies.

7. ICC values were computed to examine test-retest reliability. The ICC value calculated for CS measured without glare was significantly different from zero, indicating very good to excellent reliability (ICC = 0.864, p<0.001).

8. The ICC value calculated for CS measured with glare was also significantly different from zero, although its absolute value was not as high as that observed without glare (ICC = 0.483, p=0.04).

CONCLUSIONS
• CS in patients with albinism, as tested with Vector Vision CSV-1000LV, shows a slight but significant practice effect even with the use of two charts and a 6 month test-retest interval.
• It is possible that the practice effect could be entirely eliminated if subjects were given a “practice” test with the second administration’s results recorded as the Visit 1 result.
• CS obtained with the CSV-1000HGT does not show a practice effect. Test-retest reliability is good (ICC coefficient = 0.5) but not as high as that observed for the without glare condition.
Sustained benefits of Therapeutic Tinted Contact Lenses (CL) in patients with Albinism

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Illinois College of Optometry, Chicago, IL

#2778

PURPOSE

To determine whether the improvement in visual function and nystagmus eye movements observed in patients with Albinism using tinted CL correction is sustained after 6 months following the initial dispensal.

RESULTS

1. The improved LogMAR VA observed with tinted CLs was still present at the 6-month FU visit. No difference was noted in the two visits (t-statistic = 1.17, p = 0.266).

2. Table 1 presents LogMAR visual acuity for individuals with tinted CL at the initial dispensal and at the 6-month FU visit. In 5 of 13 subjects, visual acuity was maintained with tinted CL wear at FU visit. In 2 subjects, visual acuity was further improved with tinted CL at FU visit. In 6 subjects, visual acuity was slightly decreased after 6 months of tinted CL wear compared to previously measured VA with tinted CL.

3. ISCAN recordings with 3 runs in each of 5 gaze directions show the average results for the group.

4. The improved logMar VA observed with tinted CLs was still present at the 6-month FU visit. No difference was noted in the two visits (t-statistic = 1.17, p = 0.266).

5. Table 1 presents LogMAR visual acuity for individuals with tinted CL at the initial dispensal and at the 6-month FU visit. In 5 of 13 subjects, visual acuity was maintained with tinted CL wear at FU visit. In 2 subjects, visual acuity was further improved with tinted CL at FU visit. In 6 subjects, visual acuity was slightly decreased after 6 months of tinted CL wear compared to previously measured VA with tinted CL.

6. The subjective improvement in visual function with tinted CL due to improper storage in no-rub CL wear was noted by one subject.

CONCLUSION

We previously reported that VA, nystagmus intensity and CS with and without glare were significantly improved with tinted CL wear in patients with albinism. The current study indicates that these significant improvements are maintained or even increased for at least six months following initial dispensing of tinted CLs.

REFERENCES

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2. Saeed F, Schlange D. Effectiveness of Therapeutic Tinted Contact Lenses (CL) in Patients with Albinism. Poster session presented at the annual conference of the Association of Research in Vision and Ophthalmology (ARVO); 2012 May; Fort Lauderdale, FL.

3. Saeed F, Schlange D. Factors Influencing Improvement in LogMAR Visual Acuity in Patients with Albinism. Poster session presented at the annual conference of the American Academy of Optometry (AAO); 2012 October; Phoenix, AZ.

ACKNOWLEDGEMENT

We would like to thank Dr. Susan Kelly for her help with statistical analysis of this data.

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INTRODUCTION

Diabetes and carotid intima media thickness (IMT) are both well-known risk factors for cardiovascular disease and atherosclerosis. The Framingham Study showed a nearly 15x increase in cardiovascular events in middle-age patients with diabetic retinopathy (DR). Technological advances in recent years have produced smaller, portable ultrasound devices making screening of IMT in the carotid arteries easier and more accessible. Fluorescein angiography technology has evolved, providing up to 200-degree fundoscopic views in a single, high-resolution image. These images have allowed improved visualization of the extent of peripheral retinal nonperfusion. Previous studies have found that diabetic patients presenting with retinopathy have a higher IMT than diabetic patients without retinopathy and patients with severe DR are more likely to have subclinical vascular disease. The purpose of this study was to investigate whether there was a correlation between peripheral retinal nonperfusion and IMT thickness of the common carotid artery in patients with DR. A positive correlation might suggest a significant relationship between microangiopathy in the retina and systemic macroangiopathy. This association might allow for more diverse and non-invasive means to screen for macroangiopathy. This association might allow for more accurate results.

METHODS

In this cross-sectional pilot study, 15 subjects with diabetes and advanced DR were enrolled. No subject had PPB treatment. Ultrasound images of both common carotid arteries were taken using the HeartSmart IMT® portable ultrasound device (Figure 1). The scans were electronically transferred and read by an off-site reading facility. A grade of IMT was assigned by the reading facility based on comparison to a database of over 40,000 patients mapped and categorized based on age, gender and race. A grade of normal represents the mean IMT for age and gender, and mild, moderate and severe categories represent 2, 4, and 8 standard deviations above the mean, respectively. Ultrasound images of both eyes were obtained using Optos C200 scanning laser ophthalmoscope (Figure 2). The same certified retinal photographer obtained all images. Using area measurement function in the V2 Vantage Review Software (Optos, PLC), one of the coauthors determined both the total area of gradable fundus and area of nonperfusion seen in the arteriovenous phase of the UWFFA. Ischemic index (I) was calculated by dividing the nonperfused retinal area with the total retinal area. An II of 0.2 indicates a fully perfused retina while an II of 1.0 indicates complete absence of retinal capillary perfusion. One-way ANOVA was performed to test if there was a difference in I between normal, mild, moderate, and severe IMT groups both in the right and left side.

RESULTS

Compiled demographic data from the 15 subjects is presented in Table 1. Average I in the right eye was 0.145 (± 0.134) ranged from 0.01 to 0.40, and 0.144 (± 0.346) in the left eye ranged from 0.01 to 0.47. ISI values classified by IMT group are presented in Table 2. No subjects were classified as severe. No statistically significant difference was identified in right eye I among normal, mild, and moderate IMT groups in the left carotid (F = 1.31, P = 0.31). However, there was significant difference in left eye I among all IMT groups in the left carotid (F = 7.63, P = 0.007). Post hoc analysis reveals the difference in left eye I was between the normal and mild IMT groups (P = 0.006).

CONCLUSION

- In this pilot study we looked for a correlation between peripheral retinal nonperfusion and IMT grade of the common carotid artery in patients with DR.
- We found no statistical significant difference in ISI among IMT groups on the right side.
- We found significant difference in I among normal and mild IMT on the left side.
- Our study is limited by a small sample size and a narrow range of ISI (0.01-0.47) and I grade (normal – moderate). Previous studies investigating I18 have found values from 0-1.0.
- Our study supports a common pathogenic mechanism for both macros and microangiopathy but the data set may too narrow to identify significance between groups.
- Further investigation with a larger cohort may provide more accurate results.

REFERENCES


Table 1: Demographics

<table>
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<th>Age (yrs)</th>
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Table 2: ISI values for IMT grade

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<th>Statistical significance</th>
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<td>0.1595 (± 0.3985)</td>
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<td>0.0099 (± 0.3636)</td>
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<td>0.2979</td>
<td>0.0925</td>
<td>0.0298 (± 0.2109)</td>
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<td>0.2979</td>
<td>0.0925</td>
<td>0.0298 (± 0.2109)</td>
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</table>

Figure 1: Intima-Media Thickness Report

Figure 2: Ultra-Widefield Fluorescein Angiogram. The white border outlines the extent of gradable fundus and the blue border delineates the extent of peripheral nonperfusion. The left side.
INTRODUCTION

Teller Acuity Cards: grating acuity is one of the most widely used tests of visual acuity in children who cannot perform recognition acuity tests. However, grating acuities may miss amblyopia.

Vernier acuity, often referred to as a "hyperacuity", may be more sensitive to amblyopia than grating acuity (Drover et al 2010).

Vernier acuity has a longer maturation course, and on several grounds is considered to be cortically mediated (Skoczenski & Good 2004).

PURPOSE

To compare vernier acuity (VeA) and grating acuity (GA) tests to a recognition acuity (RA) test in adolescents with visual impairment, hearing loss, and cognitive disabilities.

PARTICIPANTS

STUDENTS FROM DEAFBLIND PROGRAM -Perkins School -48 of 48 eyes (25 Adolescents) -10 Adolescents Ages 14 - 21 (Median = 19) -24 of 24 eyes (13 Adults) Ages 24 - 31 (Median = 25) -10 Adults (N=24)* -13 Adults (N=16 eyes) -10 Adolescents (N=16 eyes)

METHODS

-2 separate sessions (adults retested in 1-2 wks & adolescents by 1 wk -2 mo) -testing criteria:

- RA must be measurable

- BCVA 20/20 in each eye.

- No known ocular pathology

- Ages 14 - 21 (Median = 19)

- Ages 24 - 31 (Median = 25)

- Hearing Loss (mild-severe)

- Unknown

- Medical Diagnosis Number

- Optic Nerve Abnormality

- Primary Ocular Diagnosis Number

- Vision Treatment Required

- Exclusions

- Known visual abnormalities

- No known visual dysfunction

- Normal Visual Function

NORMAL ADULTS

- students from New England College of Optometry -N=16 eyes (10 Adolescents) -Ages 14 - 21 (Median = 19) -16 of 20 eyes qualified

- Testing Criteria:

- BOR 20/20 in each eye

- No known ocular pathology

RESULTS

- Mean Acuities and SD (in LogMAR)

<table>
<thead>
<tr>
<th>Tests</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
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<td>VeA (jittered): Total 95% LOA ≈ 0.69 logMAR (~7 lines)</td>
<td>24</td>
<td>-0.24</td>
<td>0.15</td>
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<td>RA (jittered): Total 95% LOA ≈ 0.56 logMAR (~6 lines)</td>
<td>24</td>
<td>-0.11</td>
<td>0.05</td>
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<tr>
<td>GA (jittered): Total 95% LOA ≈ 0.56 logMAR (~6 lines)</td>
<td>16</td>
<td>0.65</td>
<td>0.41</td>
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- Test Retest Differences

<table>
<thead>
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<td>24</td>
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<td>0.17</td>
<td>0.17</td>
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<tr>
<td>RA (adults retested in 1-2 wks &amp; adolescents by 1 wk -2 mo)</td>
<td>24</td>
<td>-0.11</td>
<td>0.34</td>
<td>0.21</td>
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<tr>
<td>GA (adolescents)</td>
<td>16</td>
<td>0.03</td>
<td>0.15</td>
<td>0.40</td>
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- Mean Acuities and SD

<table>
<thead>
<tr>
<th>Tests</th>
<th>N</th>
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<tr>
<td>VeA (adults retested in 1-2 wks &amp; adolescents by 1 wk -2 mo)</td>
<td>24</td>
<td>0.65</td>
<td>0.41</td>
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<tr>
<td>RA (adults retested in 1-2 wks &amp; adolescents by 1 wk -2 mo)</td>
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<td>0.72</td>
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<tr>
<td>GA (adolescents)</td>
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- Test Retest Reliability for Adults - RE only (Bland-Altman Method)

<table>
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<th>Tests</th>
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<tr>
<td>VeA</td>
<td>0.04</td>
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<tr>
<td>RA</td>
<td>0.11</td>
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<td>0.03</td>
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- Test Retest Reliability for Adolescents - RE only (Bland-Altman Method)

<table>
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<td>0.65</td>
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<td>0.01</td>
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<tr>
<td>RA</td>
<td>0.72</td>
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<td>0.00</td>
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<tr>
<td>GA</td>
<td>0.70</td>
<td>0.30</td>
<td>0.01</td>
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- Comparison of VeA, RA, and GA normalized value (ΔN) in adolescents

<table>
<thead>
<tr>
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<th>ΔN</th>
<th>Mean</th>
<th>SD</th>
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<td>-0.72</td>
<td>0.33</td>
<td>0.83</td>
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- Detection of shapes was poorer than detection of vernier misalignment: For the 6 adolescents able to identify shapes, median angle of misalignment: 0 degrees (0 to 90 degrees)

- Correlation between VeA and GA to RA using ΔN values in adolescents

<table>
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<th>ΔN</th>
<th>Mean</th>
<th>SD</th>
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<td>VeA</td>
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<td>0.44</td>
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<td>GA</td>
<td>-0.72</td>
<td>0.33</td>
<td>0.83</td>
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CONCLUSIONS

Test retest reliabilities are similar for RA, VeA, and GA tests in a small sample of adolescents with visual impairment, RA and other disabilities.

Normalized VeA and GA acuities have a similar relationship to normalized RA and are not significantly different on average.

Therefore, VeA may not be a better predictor of RA than GA in adolescents with visual impairment due to corneal and neurological causes.

VeA may be more sensitive to other visual deficits, specifically amblyopia, than GA (Drover et al 2010).

REFERENCES


CONTACT INFORMATION

kyin@ico.edu
BCLA
3 ICO PRESENTATIONS
RESULTS

Patients were predominantly female, 52.4 percent. The average age was 31.2 ± 11.6 years. Multiple races were represented.

Figure 1. Shows the racial distribution within our keratoconus population.

As seen in Figure 2, this differs from that of CLEK which has a seemingly opposite racial distribution. However, no significant difference was noted between races for any of the keratometric readings, P > 0.05.

The average of the mean K readings was 51.84 ± 6.60. The flat K readings ranged from 33.53D to 83.75D with an average of 49.19 ± 6.19. In our population, the average steep K was 54.49 ± 7.64 and ranged from 45.38 to 90.14.

Figure 3. Represents a graphical view of the keratometric readings of our patient population.

Utilizing CLEK criteria of 45D for mild keratoconus, only 11.8% of our patients fell into the mild category. Additionally, 30.0% of our patients were categorized as severe with average K readings greater than 52D. 11.5% of our keratoconic patients exceeded an average K of reading 60D.

Figure 4. compares our keratoconus population to that of the CLEK study. It demonstrates a mild shift towards more severe keratoconus.

Our patients had average spectacle acuity of 20/20. However 67 percent were able to achieve 20/40 or better vision. Our mean contact lens acuity was 20/40 or better acuity.

Corneal scarring was only noted in 17 percent of patients.

Figure 5. illustrates the racial distribution within our keratoconus population.

DISCUSSION AND CONCLUSIONS

Unlike CLEK this is a retrospective study to which enrollment bias does not apply. This may account for some of the differences. This study is limited to traditional, corneal gas and excludes more advanced designs. It does not include seemingly more advanced cases necessitating transplantation, piggyback, sclera or hybrids. This might suggest our population may be even more severe than indicated here.

Despite the seemingly steeper K readings within our population only 17% were noted to have scarring. This differs greatly with CLEK which reports 71% had scarring. This calls into question whether this observation was properly documented in our charts or do our patients actually exhibit less corneal signs but steeper corneal curvatures.

Our racial distribution is also different than that of CLEK. A review of our overall patient demographics may be indicated to determine if this finding is purely representative of our total patient base at the eye institute or whether selection bias in CLEK could have occurred.
PURPOSE
Keratoconus may be complicated by corneal hydrops. The purpose of this study was to determine the presentation, prevalence, and recurrence of corneal hydrops in the keratoconus population of the Illinois Eye Institute from 2007 to 2011.

BACKGROUND
Advanced keratoconus patients may develop acute hydrops. Acute hydrops are breaks in Descemet’s membrane that result in corneal edema. Following the break, aqueous humor leaks into the corneal stroma to cause edema and loss of corneal transparency. Clinical findings vary and include circumscribed, microcystic, or bullous edema and anterior chamber reaction. Patients with corneal hydrops may present with a variety of symptoms such as photophobia, pain, blurriness, foreign-body sensation, tearing, and redness.

METHOD
This study was approved by the internal review board. A query of our patient management system was performed, looking for diagnosis codes for keratoconus, irregular astigmatism, and corneal ectasia. The charts were reviewed for a definitive diagnosis of keratoconus. The final list contained 446 patients. From these charts, data collected included: race, gender, presence of allergies, history of atopy, and number of hydrops episodes. If hydrops was present, detailed data regarding date of presentation, presenting symptoms, time to resolution, break location, and outcome were collected. Descriptive statistics and t-tests were performed to identify significant results.

RESULTS
Corneal hydrops occurred in 41 of 446 patients for a prevalence of 9.2 percent. Within the hydrops population, 23 patients were male and 18 patients were female with an average age of 35.53 years. There was no statistical difference between the overall keratoconic population and the hydrops population with regard to gender.

Patients with hydrops were noted to have a significantly higher prevalence of atopy (p<0.005). Almost half of the hydrops events (23/50) occurred during Chicago’s peak pollen season from March to June. Also, hydrops events were increased in times of stress, with 11 of 50 events occurring during holiday season in December and January. Recurrences are not uncommon, occurring at a rate of 22 percent of hydrops patients. Therefore patients should be educated on the risk of recurrence and reassured that majority of patients are able to successfully return to contact lens wear with less than one fourth requiring corneal transplantation.

Visual acuity at presentation was highly variable ranging from 20/25 to light perception. Photophobia was the most common presenting symptom, followed by pain and blurred vision.

CONCLUSION
This study confirms a hydrops prevalence of less than ten percent. Patients undergoing hydrops statistically report greater atopy than those who do not experience hydrops. This correlation is further supported by the increased presentation during pollen season. Recurrences are not uncommon, occurring at a rate of 22 percent of hydrops patients. Therefore patients should be educated on the risk of recurrence and reassured that majority of patients are able to successfully return to contact lens wear with less than one fourth requiring corneal transplantation.

CONTACT INFORMATION
Renee Reeder, OD, FAAO, FBCLA
www.ico.edu
Patients with microcornea and microphthalmos often have significant refractive error and other ocular co-morbidities that lend themselves to correction with contact lenses. However, lens options have often been limited. Small diameter soft lenses can be utilized but in the US many of these designs are now custom and handling can be difficult for some patients. Corneal GPs are another option but lenses are quite small and some patients with high refractive errors may struggle with lens loss and handling. Recently the trend toward more oxygen permeable GP material with larger buttons has allowed the resurgence of scleral lens fitting. However many of the traditional scleral lens designs begin at 14mm which can be quite large for these small eye patients to successfully apply. Employed here is a standard intralimbal design for which the fitting set is available in 1.1.2mm. Three patients are presented here with aphakia and corneal diameters of less than 10.25mm who were successfully fitting using the intralimbal design, RoseK2IC, as a miniscleral.

**METHODS**

**Patient 1** a thirty-one year old African American male with a blind phthisical right eye and an aphakic left eye with a short was referred by the department of rehabilitative services for contact lenses. His topographies of the left eye showed over 4D irregular astigmatism. His corneal diameter was only 9.35mm.

We did not have a fitting set with corneal lenses small enough to get within the HVID and the patient had limited dexterity which was concerning for a traditional scleral lens. Adding 2.5mm to the corneal diameter suggested the need for a diameter of 11.12-12.5mm to provide appropriate limbal clearance and landing on the conjunctiva. A diagnostic lens of 11.2 with a base curve of 7.34 was applied but did not land far enough out on the conjunctiva. So, a 12.0mm RoseK2IC with a slightly steeper base curve was ordered for use as a secon scleral. The lens provided full corneal coverage, central clearance that was approximately 1/3 the thickness of the cornea suggesting approximately 200 microns of clearance, the limbus was cleared and the conjunctiva was unaltered by the lens. The patient was able to successfully apply and remove the lens using a large DMK suction cup. His vision improved 3 lines on Farnsworth.

**Patient 2** a 22 year old Hispanic female who suffered from microphthalmos, myopia, and bilateral aphakia secondary to congenital cataract. She had been wearing back toric lenses for several years and noticed that she was having more trouble with comfort and stability especially now that she was taking classes in a standard college lecture hall. The patient was originally fit with an 8.5mm diameter bitoric in both eyes. The right eye was fit with a base curve of 8.07/8.65 and a power of +2.75DS and the left eye was fit with a base curve of 8.50/7.95 and a power of +2.00DS. Her sim Ks were 38.54/32.34 in the right eye with an HVID of 9.35 and the left eye was 43.62/41.19 with HVID 9.67.

Evaluation of the fit revealed minimal clearance. Visual acuity was +1.75/-0.00 with a VA of 20/400. Refraction of left eye was -1.75/0.5 with a VA of 20/400. The right eye was fit with an 11.5mm diameter RoseK2IC lens with a base curve of 7.96 with steep peripheral curves and a power of +2.12DS. The left eye was fit with an 11.5mm diameter RoseK2IC lens with a base curve of 8.04 with steep peripheral curves and a power of +2.87 DS. The lab adjusted the base curve and power to account for changes in the periphery accordingly. Visual acuity improved to 20/20 and 20/20.

The second patient was a 22 year old Hispanic female who suffered from microphthalmos, myopia, and bilateral aphakia secondary to congenital cataract. She had been wearing back toric lenses for several years and noticed that she was having more trouble with comfort and stability especially now that she was taking classes in a standard college lecture hall. The patient was originally fit with an 8.5mm diameter bitoric in both eyes. The right eye was fit with a base curve of 8.07/8.65 and a power of +2.75DS and the left eye was fit with a base curve of 8.50/7.95 and a power of +2.00DS. Her sim Ks were 38.54/32.34 in the right eye with an HVID of 9.35 and the left eye was 43.62/41.19 with HVID 9.67.

Refraction of the right eye was +1.75/-0.00 with a VA of 20/400. VA and refraction of left eye was -1.75/0.5 with a VA of 20/400. The right eye was fit with an 11.5mm diameter RoseK2IC lens with a base curve of 7.96 with steep peripheral curves and a power of +2.12DS. The left eye was fit with an 11.5mm diameter RoseK2IC lens with a base curve of 8.04 with steep peripheral curves and a power of +2.87 DS. The lab adjusted the base curve and power to account for changes in the periphery accordingly. Visual acuity improved to 20/20 and 20/20. Patient reported she had no difficulty with the lens moving around or coming off of the eye.

**Patient 3** a ten year old unilateral pediatric aphakic had failed with multiple lens designs. He was emmetropic in his other eye. He was originally fit with a Silsoft lens in the right eye at the age of 2 but the parents struggled with application. He was then tried in a conical GP which they also could not get in and he rubbed his eye more with it. The parents eventually gave up and he returned at age 9. They continued to struggle with putting on the small diameter custom soft lens and the child would not try. So when he returned at age 10, the child decided he wanted to try to do it himself. Unfortunately, he could not hold his eye open wide enough to apply it. When a conical GP was attempted he screamed and kicked. Therefore, a decision was made to attempt a larger GP that would act like a scleral.

The patient was ordered an empirical 12.0mm RoseK2IC lens as a miniscleral with a 7.44mm base curve and a power of +2.00DS. Evaluation of the fit revealed minimal clearance. Visual acuity was stable but patient reported things were clearer. Ocular microscopy was +0.00. So a lens with a steeper base was ordered and the patient was trained to to apply and remove the lens himself. Photo attempts were unsuccessful as patient was tired and did not want to sit still. Finally he was referred to our binocular vision service for amblyopia therapy. He now wears his lens every day.

The third patient was a ten year old unilateral pediatric aphakic who had failed with multiple lens designs. He was emmetropic in his other eye. He was originally fit with a Silsoft lens in the right eye at the age of 2 but the parents struggled with application. He was then tried in a conical GP which they also could not get in and he rubbed his eye more with it. The parents eventually gave up and he returned at age 9. They continued to struggle with putting on the small diameter custom soft lens and the child would not try. So when he returned at age 10, the child decided he wanted to try to do it himself. Unfortunately, he could not hold his eye open wide enough to apply it. When a conical GP was attempted he screamed and kicked. Therefore, a decision was made to attempt a larger GP that would act like a scleral.

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**CONCLUSIONS**

This series of cases demonstrates that patients with small corneas can be provided with improved, vision, comfort and function by utilizing miniscleral fitting techniques and commercially available intrastral GP lenses. Lenses can be ordered empirically or utilizing a fitting set with good success. Additionally, the customizable peripheral options allow adjustments in the scleral portion as well.

Disclosures: Dr. Reeder has been a paid speaker for Blanchard Labs.

**CONTACT INFORMATION**

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AOA

2 ICO PRESENTATIONS
biclinic. The areas of peripapillary atrophy remained stable during follow up. The OD dilated fundus exam revealed peripapillary atrophy with pseudopapilled-like extensions outward from the optic nerve in both eyes. In OD there was a temporal extension toward the macular (figure 2a). In the OS there was an extension in the nasal direction (figure 3a). There was no evidence of retinal pigment epithelial dystrophy, subretinal neovascularization or chorio-retinal inflammation during the 7 year follow up of this patient. The areas of peripapillary atrophy remained stable during follow up.

**FUNDUS EXAM PATIENT 2**

The OD dilated fundus exam revealed peripapillary atrophy with pseudopapilled-like extensions outward from the optic nerve in both eyes. In OD there was a temporal extension toward the macular (figure 2a). In the OS there was an extension in the nasal direction (figure 3a). There was no evidence of retinal pigment epithelial dystrophy, subretinal neovascularization or chorio-retinal inflammation during the 7 year follow up of this patient. The areas of peripapillary atrophy remained stable during follow up.

**HISTORY, PATIENT 1**

Our first patient is a 41-year-old white male. He initially presented with visual complaints of a blurriness greater than distance in both eyes for six months, and a floaters which he could not locate. He had sinus/allergies and depression. He took oral Celebrex. He had an unremarkable family history.

**HISTORY, PATIENT 2**

Our second patient is a 75-year-old female who is 50% African-American and 50% Native American. She initially presented with visual complaints of a scotoma, and a floater. She could not locate the complaints to a specific eye. She had hypertension and a minor allergy, neither being treated. She had an unremarkable family history.

**CONCLUSIONS**

Recent understanding of the electrophysiological and genetic characteristics of SCRA allows more accurate diagnosis to be made. Inherited in an autosomal dominant pattern, the responsible gene has been mapped to chromosome 1p15. SCRA presents a distinct clinical picture of structure and function. Onset of the fundus lesions is as early as birth and can be slowly progressive throughout life moving from the peripapillary area to the macula. Electrodiagnostic testing supports the clinical observation that there is no edema or inflammation and suggests that the atrophy begins deep at the level of the retinal pigment epithelium only later involving more superficial retina. Visual function can be seen to follow structural change in that visual field loss is consistent with the retina involved and visual acuity and color vision are typically not affected until much later in the course when the fundus lesions involve the macula. A better understanding of this disorder can aid in making accurate diagnosis.
CASE

A 40-year-old African American male presented to Urgent Care Service with a chief complaint of redness and cloudy vision OS of four days duration. He noted his left upper eyelid had become swollen and reported ocular discomfort of 8/10 on the left side. The patient's left upper eyelid had become swollen and reported ocular discomfort of 8/10 on the left side. The patient's vision was decreased to 20/80 OS (PH 20/60) and intraocular pressure had risen to 16 mm Hg.

The patient refused appointment for bleb revision surgery or treatment of bleb site with tissue adhesive, but the patient was referred for bleb tap and intravitreal antibiotics. A presumptive diagnosis of recurrent late-onset blebitis was made.

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BACKGROUND

The IEI at Princeton Clinic is a large school-based vision clinic servicing children from the Chicago Public Schools. The clinic opened in January 2011 and has provided primary eye care for more than 14,000 children in the first 30 months. The clinic is open year round. Third and fourth year students rotate through the clinic for one quarter providing comprehensive primary eye care.

During this period, many patients have required secondary services including referrals for eye health, contact lenses, vision therapy, strabismus, and visual information processing.

METHODS

In the first 18 months, all patients who needed VT, fundus photography, visual information processing and oculomotor testing were referred over to the Illinois Eye Institute main campus. The follow-through was minimal. In response to the needs of our patients, we attempted to identify solutions that would increase compliance of the recommended follow up.

THE APPROACH HAD THREE PRONGS:

1. Introduction of a staff optometrist to provide vision therapy, visual information processing and oculomotor testing:

   From July 2012 through June 2013, Dr. Kathleen O’Leary provided direct care Tuesday through Thursday afternoon. This included comprehensive eye care as well as vision therapy and visual processing assessment.

   From July 2013, Dr. Adrianna Hempelmann has expanded service to Monday through Thursday afternoons.

2. A ChicagoHealth Corp member (AmeriCorp) was added to our staff to improve the communication between the clinic and families. The term of the member is 9 months and they works closely with us, as well as the vision team within the Chicago Public Schools. The ChicagoHealth Corp members is expected to:

   Work along side the Illinois College of Optometry students, faculty and staff providing entrance testing and monitoring flow each morning.

   Identify those patients requiring follow up care and contacting the families to work with them to schedule the needed care. If the care can be provided within the Illinois Eye Institute at Princeton clinic, she works to get the appointment scheduled. If the referral is for care on the main campus, the member conferences the staff on campus with the parents to schedule the appointment. She then monitors whether the appointment is kept and does appropriate follow-up.

3. Addition of a current vision therapy technology, a Visagraph, an OCT, and a fundus camera.

   Electronic health records was implemented which allows us to take OCTs and photos on site and share them with staff at the IEI for assistance in diagnosis.

   Through the generosity of a funder we were able to purchase several video based programs that have been instrumental in engaging our patients during vision therapy.

   The funder also made it possible to obtain a Visagraph for testing at our clinic.

RESULTS

Vision therapy was conducted three afternoons a week with 110 visits recorded in the 2012-2013 fiscal year. We have expanded this to four afternoons due to the demand and wait list.

Visual information processing assessments have been completed on 25 children.

The OCT and fundus camera had been available since February and we had reduced our referrals for eye health from 106 to 67 during the 2012-2013 fiscal year.

CONCLUSION

School-based clinics serve children who often do not access appropriate vision care services outside of the school setting. IEI at Princeton began with primary care services but quickly realized the need to expand services to include vision therapy, oculomotor assessments, visual information processing testing, and baseline fundus photos. We will continue to expand services to address the needs of our patients.
INTRODUCTION
The Center for Disease Control and Prevention reports that traumatic brain injury (TBI) occurs in 1.7 million individuals in the United States each year. The TBI problems routinely reported for those with TBI include binocular vision anomalies, accommodative and oculomotor dysfunctions, reduced visual acuity, visual field loss and vision information processing anomalies, as well as oculo-vestibular, midline perceptual shift and attentional problems.1-3 We present here, however, a long-term natural history or natural course of the oculo-visual anomalies associated with TBI. After an extensive PubMed/Google Scholar search, this case report appears to be the very first of its kind to appear in the literature.

CASE REPORT

CB is now a 21 y/o W/F who has a history of TBI after falling out of a window at age 2. She has been evaluated for oculo-vestibular, midline perceptual shift and attentional vision information processing anomalies, as well as binocular vision, accommodative and oculomotor anomalies associated with TBI. After an extensive full history, the examination sequence varied and different tools were used over the years as advances were made in developing examination instrumentation and techniques. Visual acuities were taken using Teller Cards, HOTV, Log symbols, Snellen and JPP. Objective examination procedures were frequently utilized because of behavior that would interfere with the standard subjective assessment techniques.

THE EXAMINATION

Vision Therapy

Post-surgical strabismus vision therapy for remaining binocular vision dysfunctions, ocular motor anomalies, amblyopia and vision information processing disorders (VIP) anomalies was instituted. VP problems diagnosed at 10 years 11 months of age included visual discrimination, memory, spatial relations, form constancy, sequential memory, figure-ground and round. Vision therapy can be an effective treatment for those with TBI.4-6 During vision therapy, TB did achieve 2nd and 3rd degree fusion. Lenses were prescribed to provide best VA and binocular vision.

DISCUSSION

Research has noted that those adults with intellectual disability and a psychiatric illness tend to offer few complaints when taking a case history even though they are often on numerous medications and exhibit frequent visual and systemic anomalies. The acceptance of visual disabilities was the case for this patient as well. The longitudinal findings seen here suggest that those with TBI be evaluated with variable findings over their lifetimes and require close monitoring of these changes so that appropriate and timely intervention can be provided. It also appears that surgery for strabismus may be of limited immediate and long term value.7 Optometric vision therapy appears to have moderate success at least initially. Vision therapy may need to be re-instituted with this new adult patient to help regain the 2nd degree fusion and stereopsis that TB demonstrated after the initial therapy program some years earlier.8-10

The Natural History of the Oculo-Visual Anomalies Associated with Traumatic Brain Injury (TBI): A Case Report

Dominick M Maino, OD, MEd, FAAO, FCOVD-A, Darrell G. Schlange, OD, DOS, FAAO
Illinois College of Optometry, Chicago, IL

References

6. Maino D, Schlange D, Foa E, Schaal S. Complex PTSD patients in the United States each year. The vision therapy appears to have moderate success at least initially. Vision therapy may need to be re-instituted with this new adult patient to help regain the 2nd degree fusion and stereopsis that TB demonstrated after the initial therapy program some years earlier.8-10
7. This is a representative sample of, but not necessarily complete data from every visit.
WCO
2 ICO PRESENTATIONS
Matching the Visual Needs of an Urban School District and Needs of an Optometric Educational Program

Sandra S. Block, OD, M Ed, FAAO, FCOVD • Valerie L. Conrad, OD, MPH, ARM • Melissa A. Suckow, OD, FAAO • Kathleen P. O’Leary, OD

PURPOSE

The Illinois College of Optometry (ICO) in partnership with Chicago Public Schools (CPS) opened a school-based vision program to address the unmet need of vision care for their children serving as the Illinois Eye Institute at Princeton School. The CPS system is one of the largest urban school systems in the United States serving 403,000 children housed in 681 schools.

Each year, over 100,000 children in the Chicago Public Schools (CPS) fail vision screenings, have broken/lost glasses, or fail to complete a required exam for entry to school. Lack of follow up and limited access to providers accepting state vision insurance coverage contribute to poor access to eye care. In addition, the Illinois College of Optometry was interested in optometric clinicians working in community based settings.

METHOD

The Illinois Eye Institute at Princeton School opened in Jan 2011 as a year round school-based vision clinic staffed by faculty, students, staff and opticians from Illinois College of Optometry. The building is a decommissioned elementary school which is wheelchair accessible located within a 10 minute drive from ICO.

Building a new school-based vision clinic required financial planning. Most of the financial support comes from state insurance. It was also necessary to reach out for significant grant support.

CPS provides a liaison whose responsibility is to schedule schools to attend the clinic. Each day CPS is in session, one school is scheduled to bring up to 45 children to the clinic. In addition, the clinic is open to walk-ins. On days where school is not in session, the clinic serves only walk-ins. The school liaison and ICO have worked hard to market the program to the parents within CPS that have not addressed the unmet need of vision care for their children serving as the Illinois Eye Institute at Princeton School.

ICO has worked hard to market the program to bring children to the clinic. In an effort to resolve these issues, preceptors may begin and finish exams and fourth year students are assigned to stay 30 minutes later on some days.

RESULTS

A review of the data shows that 74% of children seven need new eyeglasses. 80% of the children fall under the state health insurance. Glasses under this insurance take between 6-12 weeks for delivery.

Lions Clubs International Foundation (LCIF) provided 10,000 polycarbonate lenses to us which will allow the children to receive their glasses in a more timely manner. This pilot program from LCIF is one of four in the United States designed to address uncorrected refractive error.

The clinic has also diagnosed amblyopia, convergence insufficiency and strabismus in numbers that exceed that expected for the general population.

The recommendations for follow up of these problems show less than 20% of the children access appropriate services.

Many of the children provided care in the first two years has included recommendations for vision therapy. Vision therapy for patients with Medicaid is difficult to access. In the summer of 2012, 80 children at Princeton added appointments for vision therapy in the afternoons, with a limited numbers of patients accessing this service.

In our first year of service, many children were referred for additional care but did not access the care. A Chicago Health Corp member (AmeriCorps) was appointed to address the need of optometry students to leave for other academic or clinical assignments.

In addition, the busses from the schools do not always arrive in a timely manner and completing the eye exams in time for the optometric clinicians to arrive on time for their afternoon assignments has provided some challenges.

CONCLUSIONS

During our second year of service to the Chicago Public School students, we have expanded services in the following ways:

- Offered afternoon appointments for parents to bring children in for eye care
- Offered vision therapy in our clinic to those with state insurance or no insurance
- Staggered student assignments to address the need of optometry students to leave for other academic or clinical assignments
- Engaged a Chicago Health Corp member (AmeriCorps) to address lack of follow up recommended
- Received a grant from LCIF to address long delays in receiving prescription eye wear
- Added OCT, fundus camera and Visagraph so that referrals to the main campus of ICO is unnecessary for these services.
- Continued to market the clinic throughout the Chicago Public School system.

Future goals will include:

- Expansion of hours and services by becoming an externship site for fourth year optometric students at other institutions.
- Consider adding contact lenses to our services.
Comparison of Visual Findings of Athletes Participating in the Special Olympics Lions Clubs International Opening Eyes by Regions in 2010

Sandra S. Block1,2 Illinois College of Optometry, Chicago, IL, USA, 2Special Olympics International, Washington, D.C, USA

PURPOSE
This study is a review of the vision screenings of athletes participating in the Opening Eyes by the six regions: Africa, Asia Pacific, East Asia, Europe/ Eurasia, Latin America, and North America. Special Olympics is a year round program for individuals who have been diagnosed with intellectual or developmental disabilities. Please note data for the Middle East was unavailable.

METHOD
A standardized comprehensive vision program is offered to Special Olympics athletes at no cost around the world. A trained clinical director coordinates the screening, volunteers, and after the completion of the screening. The Opening Eyes Vision Screening evaluates visual acuity, cover-test, color vision, stereopsis, autorefraction, eye health and IOP. Data from the vision program is then entered into a central on-line data system. Data was then extracted for 2010 and analyzed with SPSS 17.0 comparing the visual findings of the athletes by region seen during 2010.

RESULTS
Data from 21,326 athletes was reviewed. Most of the athletes seen were male (64.1%) with no gender differences found among the regions. Athletes from Africa, Asia Pacific, East Asia, and Latin America were younger than the other regions (Figure 1). Athletes from Africa, Asia Pacific and Latin America were most likely to report that they never have an eye exam. A comparison of timing of the last eye exam based on athlete report as compared to the financial status based on World Bank criteria showed the athletes from the regions considered high income appear to access eye care within the recommendation of every 3 years more often (Figure 2).

The criteria for classification are as follows:
- low income, $1,025 - or less;
- lower-middle income, $1,026 – $4,035;
- upper-middle income, $4,036 – $12,475;
- high income, $12,476 or more

No regional difference in color vision and strabismus (distance and near) were found. The prevalence of strabismus ranged from 13.2%-17.6% at远. Refractive error did reflect regional differences with Asia Pacific showing highest mean spherical equivalent (-1.150 D +/-3.585) while East Asia had the lowest (-0.64 D +/-3.585). Post hoc tests revealed significant differences only between these regions (Figure 3).

CONCLUSIONS
More significant differences in refractive error were expected to be found between the regions based on diversity of refractive error reported in the literature than we actually found in our study. It is our interpretation that athletes participating in Special Olympics reflect more similarities in vision findings to each other than to the region that they represent. This is supported by the lack of the similarity in refractive error, strabismus and color vision between them and their respective regions and more similarity to each other.

One difference to note is that athletes residing in North America and Europe/Eurasia were more likely to have had an exam than the other four regions.

Limitations of this study include:
- the history is provided by the athletes;
- the athletes represent only those who were interested in participating first in Special Olympics and also interested in participating in the screening;
- our data may exclude those athletes receiving care locally;
- data is entered into the data base at multiple locations around the world and we have limited ability to ensure its accuracy in data entry.

Further study should include expanding the program to individuals with disabilities that do not participate in Special Olympics to be able to generalize the findings. This research is made possible by the financial and in-kind support of the following:
- a) Illinois College of Optometry;
- b) Special Olympics International;
- c) Safilo Lions Clubs International Foundation.

Figure 1: Opening Eyes by Regions in 2010

Figure 2: Last Eye Exam

Figure 3: Refractive Error by Region

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GLOBAL SPECIALTY LENS SYMPOSIUM

2 ICO PRESENTATIONS
Patients with Graves’ ophthalmopathy can be very challenging to manage secondary to the complex nature of their disease presentation. Patients may present with a variety of ocular findings including lid retraction, periorbital and lid swelling, chemosis, conjunctival hyperemia, proptosis, optic neuropathy, restrictive myopathy, exposure keratopathy and/or keratoconjunctivitis sicca. Patients with these problems who also require refractive correction may experience difficulties in achieving acceptable quality of vision with traditional contact lens designs. Even with maximum topical and systemic therapy, these patients’ ocular conditions may be difficult to manage. With the option of mini-scleral and scleral lens designs, patients now have an option to protect the cornea and offer improved vision for patients with complex comorbidities. The large gas permeable lenses serve as a pre-corneal fluid reservoir which provides optimal oxygenation to the ocular surface.

We present here two patients who had been diagnosed with Graves’ ophthalmopathy over ten years prior. With significant corneal surface irregularities and significant spectacle correction, both patients had never been able to wear contact lenses comfortably. The patients were fit with mini-scleral and scleral contact lenses not only to assist in the rehabilitation of their ocular surface, but also to improve the quality of their vision.

**CASES**

**PATIENT 1**
A 48 year old Caucasian male was diagnosed with Graves’ thirteen years prior and was status-post a complete thyroidectomy. He had previously worn soft, gas permeable, and hybrid contact lenses. He complained of blur at distance and near with his current hybrid lenses, double vision at the end of the day, and significant redness and irritation that did not improve with traditional supportive dry eye therapy.

Figures 1 and 2: Topographies showing irregular astigmatism.

The corneas showed central islands secondary to significant corneal erosions OD and OS, with peripheral zone, and slight scleral impingement. With this first pair of lenses, central touch was noted OD and OS, and significant conjunctival impingement OS. The overall pattern of contact lens secondary to significant contact lens discomfort. He presented with complaints of blurred vision, double vision, and ocular discomfort. An ablation deficit was noted upon EDMs OD. The patient was treated with and had diffuse conjunctival and corneal staining OD (hyperopic exotropia OU). The patient was also aphakic. Refraction was -1.00 OD and -2.00-1.00x180, 20/20 OD.

Topographies showed central islands secondary to significant corneal staining from exposure keratitis. (Figures 3-4)

**Final Lenses Ordered and Dispensed:**

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The lens was then ordered and dispensed with peripheral lift OD and OS. The patient immediately noted an increase in the clarity of his vision, quality of his vision, and an improvement in ocular comfort. (Figures 5-6)

**Initial MSD Parameters:**

<table>
<thead>
<tr>
<th>BC</th>
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<th>OAD</th>
<th>VA</th>
<th>Periphery</th>
</tr>
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<tr>
<td>OD</td>
<td>450S</td>
<td>plano</td>
<td>11.8</td>
<td>20/25-3.75</td>
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<tr>
<td>OS</td>
<td>450S</td>
<td>plano</td>
<td>11.8</td>
<td>20/30-4.75</td>
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</tbody>
</table>

With this first pair of lenses, central touch was noted OD, excessive limbal irritation in the mid-peripheral zone, and slight scleral impingement after about 20 minutes of sitting. The left lens demonstrated more central vault with peripheral impingement. Although the first set of diagnostic lenses were not an ideal fit, the patient subsequently noted improved ocular comfort, and a significant improvement in the quality of his vision. With the first pair of diagnostic lenses, the patient’s vision improved to 20/25 OD and 20/30 OS. The final lenses were ordered with an increased central vault. The periphery was also adjusted to decrease conjunctival impingement OD. The overall pattern improved, the patient’s comfort level increased, and the cornea had significantly less staining. The patient has been successfully wearing the lenses for 10 months noting an increase in the clarity of his vision, quality of his vision, and an improvement in ocular comfort. (Figures 5-6)

**Final Lenses Ordered and Dispensed:**

<table>
<thead>
<tr>
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<tr>
<td>OD</td>
<td>480S</td>
<td>-2.00 15.8 20/25+ standard</td>
<td>1 step flat</td>
<td></td>
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<tr>
<td>OS</td>
<td>7.50</td>
<td>11.8 20/25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PATIENT 2**
A 46 year old African-American male was diagnosed with Graves’ over ten years prior and was status-post orbital decompression and EOM surgery (2011). He had never successfully been able to wear any form of contact lens secondary to significant contact lens discomfort. He presented with complaints of blurred vision, double vision, and ocular discomfort. An ablation deficit was noted upon EDMs OU. The patient was prophetic and had diffuse conjunctival and corneal staining OD (hyperopic exotropia OU). The patient was also aphakic. Refraction was -1.00 OD and -2.00-1.00x180, 20/20 OD.

Topographies showed central islands secondary to significant corneal staining from exposure keratitis. (Figures 9-12)

**Final Lenses Ordered and Dispensed:**

<table>
<thead>
<tr>
<th>BC</th>
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<th>VA</th>
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<tr>
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<td>20/20 20/20 20/20</td>
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<tr>
<td>OS</td>
<td>7.50</td>
<td>12.8 20/20 10/10 standard</td>
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</table>

With this first pair of lenses, central touch was noted OD-OS, and the periphery had significant edge lift on the right eye and conjunctival impingement of the left eye. The high edge lift OD caused the lens to pop off during evaluation. Secondary to the lenses not providing an adequate fit, the patient was re-fitted with the Jupiter inverse geometry scleral lenses by Essilor. After several adjustments, the final lenses ordered and dispensed provided an improved overall pattern, increased corneal comfort, and decreased corneal staining. The patient has been successfully wearing the lenses for 3 months for up to 6-8 hours per day. He has noticed an increase in the clarity of his vision, quality of his vision, and an improvement in ocular comfort. (Figures 13-14)

**Initial Lenses Parameters:**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
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<td>0.25 0.25 220</td>
<td>20/100</td>
<td>97.20 17.00</td>
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</table>

**Final Jupiter Parameters:**

<table>
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<th>OAD</th>
<th>VA</th>
<th>Periphery</th>
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<tbody>
<tr>
<td>OD</td>
<td>8.23</td>
<td>0.25 0.25 220</td>
<td>20/100</td>
<td>97.20 17.00</td>
</tr>
</tbody>
</table>

**REFERENCES**

Segal O et al. Scleral contact lenses may help where other modalities fail. Cornea. 2003;22(4)308-310.

Cornea. 2003;22(4)308-310.


Sokol JA et al. Scleral contact lenses may help where other modalities fail. Cornea. 2003;22(4)308-310.


**CONCLUSIONS**

**CONTACT INFORMATION**

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SAO 4F / 2304 S. Michigan Avenue
Chicago, IL
Topography findings in the right eye showed a good LASIK outcome, with a clear central ablation zone. In regards to the left eye, the tangential map showed a clear demarcation line, with K values on the superior half of the cornea of 35 and the inferior half of 56. The elevation map also showed a relative shallowness of the superior half of the cornea compared to the inferior half of the cornea. And on the refractive map within the visual axis, a high amount of irregular astigmatism was present with dioptric powers ranging from 44.37 to 52.89.

Assessments of limbal stem cell deficiency secondary to trauma OS and glaucoma suspect OS were made. After discussing treatment options with the patient, a therapeutic scleral contact lens was chosen as a non-invasive option to provide immediate visual improvement. Taking into account the patient's small fissure, he was fitted with a -4.00, 47, 01, 15.6 Jupiter lens in Boston XO material with standard peripheral curves. With this lens, approximately 200-250 microns of vault was achieved with excellent conjunctival landing. The patient's visual acuity with the lens was 20/20 with no monocular diplopia. The patient was also scheduled to return for a glaucoma work-up including an OCT and HVF.
SOCIETY FOR NEUROSCIENCE

1 ICO PRESENTATION
Lipid rafts are specialized membrane domains rich in cholesterol and intimately associated with cytoskeletal components. G protein signaling is influenced by these domains, but, depending upon the receptor, G protein, and effector enzyme, they either facilitate or attenuate signaling (Allen et al., 2007, 2009). We have demonstrated that, for Gs and Gq-coupled receptors (α-adrenergic, V1A and 5HT-4, 4, 7), lipid rafts attenuate signaling by separating Gs from adenylyl cyclase.

Several lines of investigations from different laboratories suggest a post-synaptic effect of chronic antidepressants and a possible post-synaptic target for these drugs. Data from rats, cultured neuronal and glial cells, all suggest that the localization of the G protein, Gs, in lipid rafts is modified by chronic treatment with a number of antidepressant compounds (SSRI, MAOI and tricyclic) (Donati et al., 2005; Také et al., 2004). Antidepressant fragments the translocation of Gs from lipid rafts while post mortem studies show increased Gs in raft fractions from several brain regions of depressed suicide cases relative to controls. In this study, we sought to determine whether raft fractions prepared from platelets of depressed subjects showed enrichment of Gs in lipid raft fractions. Blood was collected in Ancona Italy, separated into components, coded and shipped to Chicago for assay. Platelet Gs was extracted, subsequently with Triton X-100 (non-raft fraction) and Triton X 114 (raft fraction). Gs in the raft fraction was significantly more (p<0.01) greater in platelets prepared from depressed subjects. This suggests the possible development of a simple blood test to indicate the presence of depression. As chronic antidepressants have been shown to translocate Gs from lipid rafts, it will be interesting to follow Gs sequestration in depressed patients as they receive and respond to treatment.

Despite decades of research, no common mechanism has emerged to link the activities of the diverse compounds used in therapy for depression. While primary targets of these agents differ, a shared effect includes increased CAMP production and a cascade of events resulting from sustained increase in CAMP in the activation of Gs (Malberg and Blendy, 2005).

Antidepressant treatment causes a shift in the localization of the heterotrimeric G protein, Gs, from a Triton X 100 insoluble lipid raft rich domain to a Triton X 100 soluble non-raft domain, leaving Gs more available to activate adenylyl cyclase. Both diminished Gs adenylyl cyclase coupling and an increase in the proportion of Gs in lipid rafts are seen in depression, and antidepressants concentrate in lipid rafts (Eisenhammer et al., 2005). Thus, it is hypothesized that Gs association with lipid raft will be high during depression and this will lead to decreased CAMP production; chronic antidepressant treatment with therapeutically effective antidepressants will mobilize Gs to non-raft domains of the plasma membrane and up-regulate the CAMP pathway; these central effects will be reflected in a peripheral biomarker for both depression and antidepressant response.

We have verified in post-mortem brain that depression correlates with an increased proportion of Gs in raft fractions (Ozawa et al., 2001), a decrease in Gs-activated adenylyl cyclase in depression has been observed in platelets (Hines and Tabakoff, 2005). We suggest that the levels of Gs associated with non-raft Gs is a biomarker of depression, marker readily measured in a standard clinical laboratory.

**Abstract**

Lipid rafts are specialized membrane domains rich in cholesterol and intimately associated with cytoskeletal components. G protein signaling is influenced by these domains, but, depending upon the receptor, G protein, and effector enzyme, they either facilitate or attenuate signaling (Allen et al., 2007, 2009). We have demonstrated that, for Gs and Gq-coupled receptors (α-adrenergic, V1A and 5HT-4, 4, 7), lipid rafts attenuate signaling by separating Gs from adenylyl cyclase.

**Introduction**

Antidepressant treatment causes a shift in the localization of the heterotrimeric G protein, Gs, from a Triton X 100 insoluble lipid raft rich domain to a Triton X 100 soluble non-raft domain, leaving Gs more available to activate adenylyl cyclase. Both diminished Gs adenylyl cyclase coupling and an increase in the proportion of Gs in lipid rafts are seen in depression, and antidepressants concentrate in lipid rafts (Eisenhammer et al., 2005). Thus, it is hypothesized that Gs association with lipid raft will be high during depression and this will lead to decreased CAMP production; chronic antidepressant treatment with therapeutically effective antidepressants will mobilize Gs to non-raft domains of the plasma membrane and up-regulate the CAMP pathway; these central effects will be reflected in a peripheral biomarker for both depression and antidepressant response.

We have verified in post-mortem brain that depression correlates with an increased proportion of Gs in raft fractions (Ozawa et al., 2001), a decrease in Gs-activated adenylyl cyclase in depression has been observed in platelets (Hines and Tabakoff, 2005). We suggest that the levels of Gs associated with non-raft Gs is a biomarker of depression, marker readily measured in a standard clinical laboratory.

Chronic Antidepressant treatment causes an exodus of Gsα from lipid rafts that has accumulated during periods of depression

Chronic antidepressant treatment increases coupling between Gsα and adenylyl cyclase and translocates Gsα from lipid rafts.

Post-mortem analysis reveals that Gsα is enriched in lipid rafts of membranes derived from brain of depressed patients.

Platlettes from depressed human suicide subjects show increased raft association, similar to that seen in postmortem human brain.

**Summary and Conclusions**

These data suggest the possible development of a simple blood test as a biomarker for depression that may be useful in confirming a clinical diagnosis and in aiding the recruitment of patients for Phase III efficacy trials. Furthermore, as chronic antidepressant treatment translocates Gsα from lipid rafts in cultured cells, it will be interesting to follow Gs sequestration in depressed patients as they receive and respond to treatment.

**Cited literature**


**Data from Zhang & Rasenick, 2010; see also Clazova and Rasenick, 1989.**
NAP
(NATIONAL ACADEMY OF PRACTICE)
1 ICO PRESENTATION
INTRODUCTION
Prevent Blindness America, with support from the Maternal and Child Health Bureau, established the National Center for Children's Vision and Eye Health (Center) to address children's vision screening. The National Center, established in 2009 is looking to create public health infrastructure, training and education addressing the vision and eye health needs of young children. The Center has initially targeted children aged 36 to <72 months. This center is one of 18 centers supported by MCHB – Division of Services for Children with Special Health Care Needs.

The challenge of the Center was to design a universal vision screening program that is flexible and effective on local, state, and national levels. Challenges include mobilizing stakeholders, building capacity and creating the expertise for success.

An original expert panel met over a 3 year period to determine what form the recommendations for children's vision screening. The Center has initially targeted children aged 36 to <72 months.

The National Expert Panel recently transitioned to an advisory body under the direction of Dr. Kathleen Murphy with three primary objectives:

1. Serve as technical resource for children's vision programs based on scientific evidence, build partnerships with key stakeholders which include physicians, community programs, educators, parents and state government.
2. Assist in creating an improved method for surveillance of children's vision screening, outcomes, follow up and disparities.
3. Develop and disseminate tools and information to promote a comprehensive approach to children's vision and eye health in an effort to improve surveillance.

The Advisory Committee of the Center under the direction of Dr. Kathleen Murphy has three legs: education, technical guidance and policy. These subgroups will work to advocate for implementation of the National Expert Panel recommendations.

PROCESS
The Center was focused on two primary initiatives: First establishing pilots programs in five states, and two, the National Expert Panel work to plan a comprehensive national approach to children's vision screening.

The National Expert Panel formed recommendations around 3 key areas:
1. Performance measures track both provision & receipt of vision screening in children 3-5 years of age.
2. Uniform management data collected during vision screening demographic, results screening, and capturing follow up to eye exams and treatment outcome.
3. Best practice protocol supported by research evidence.

The National Expert Panel formed recommendations around 3 key areas:
1. Performance measures track both provision & receipt of vision screening in children 3-5 years of age.
2. Uniform management data collected during vision screening demographic, results screening, and capturing follow up to eye exams and treatment outcome.
3. Best practice protocol supported by research evidence.

Recommendations were developed incorporating review of the literature; consultation with states developing their vision screening infrastructure; and consultation with experts in the national and state agencies that are actively involved with performance measurement development. The full recommendations are in process to be published in early 2013.

Pilot programs were established in five states (Ohio, Massachusetts, Illinois, Georgia, and North Carolina) to seek out best practices that align with the panel recommendations and to study possible strategies for vision screening, accessing comprehensive eye care and surveillance. Each state developed a program to improve or enhance their children's vision program.

The National Expert Panel recently transitioned to an advisory body under the direction of Dr. Kathleen Murphy with three primary objectives:

1. Serve as technical resource for children's vision programs based on scientific evidence, build partnerships with key stakeholders which include physicians, community programs, educators, parents and state government.
2. Assist in creating an improved method for surveillance of children's vision screening, outcomes, follow up and disparities.
3. Develop and disseminate tools and information to promote a comprehensive approach to children's vision and eye health in an effort to improve surveillance.

The top portion of the figure depicts a vision system in which all members of the target population receive a vision screen or full eye examination.

Figure 1. The top of the figure depicts the current state of children's vision in which only a portion of the population receives screening and/or eye care.

The bottom portion depicts a vision system in which all members of the target population receive a vision screen or full eye examination.

RESULTS
Vision performance measures:
Well-crafted valid and reliable measures performance measures can help to drive the development of appropriate data systems.

The panel determined all care received by the child should be included. A child-based measure is preferred, which includes all sources of vision care and removes duplicate counts for children receiving care from more than one provider.

Vision data collection:
Vision programming surveillance needs to incorporate systematic data collection, including child-specific identifiers to ensure that the data are accurately linked to the child without duplications.

Data entry should be simple for community-based as well as health care provider office-based screenings, incorporate communication among these entities (Figure 2), and be able to exchange information between electronic medical records (EMR) information and a state wide system.

Figure 2. Flow of vision screening outcomes in an integrated system.

Vision programs implementation:
Vision screening of children aged 36 through less than 72 months can be performed using scientifically recommended methods.

Regardless of the methods selected, the method is only one part of a comprehensive children's vision program (Image 1). The screening system is only successful when the result of the screening is used in a meaningful way.

Image 1. Key features of a comprehensive screening program.

CONCLUSIONS
Children's eye and vision health has been perpetually challenged by a lack of national standardization, infrastructure, and surveillance.

Vision screening lies at the intersection of multiple health care providers including pediatrics, optometrists, and ophthalmologists as well as many public institutions (Departments of Education, Departments of Public Health, etc.).

Each entity has a role in the in addressing children's vision, but often each role is uniquely defined varying by geography and profession.

The Expert Panel to the National Center for Children's Vision and Eye Health has suggested a comprehensive approach including implementation and surveillance with the goal of reducing the number of children suffering from needless vision loss.

The Advisory Group will be working diligently to engage the appropriate partners and provide needed support to transition the recommendations into action.

Uniformity in implementation of screening and follow up to eye care, improved data sharing and provider communication, and establishment of state and national level performance measures for children's vision screening and care represent the recommended pathway to healthier vision for children.

ACKNOWLEDGMENTS
We thank members of the National Expert Panel to the National Center for Children's Vision and Eye Health for their countless hours of work to improve children's vision in the U.S. The work represented here was supported by grants (H7MMC15141 and H7MMC24738) from the Maternal and Child Health Bureau of the Health and Human Services. We thank members of the National Expert Panel to the National Center for Children's Vision and Eye Health for their countless hours of work to improve children's vision in the U.S. The work represented here was supported by grants (H7MMC15141 and H7MMC24738) from the Maternal and Child Health Bureau of the Health and Human Services.

FOR FURTHER INFORMATION
Please contact kabadonado@preventblindness.org. More information on this and related projects can be obtained at http://nationalcenter.preventblindness.org.

H7MMC24738

Table of Contents
INTRODUCTION
Accessibility features of tablet computers such as the Apple iPad have revolutionized reading rehabilitation for low vision patients. These features include system wide zoom and high reversible contrast. We compared subjective preference as well as reading rates on the Apple iPad and a closed circuit television (CCTV).

METHODS
After IRB approval, 14 low vision patients, aged 18 years and older, were recruited with best corrected visual acuity (BCVA) of the better eye ranging from 20/50 to 20/200 and minimal prior experience with an iPad or a CCTV. The results of this entire study will be presented as a poster at the 2013 ARVO meeting. The present abstract focuses solely on two patients with optic atrophy, a neuro-ophthalmologic diagnosis. Data collection involved measuring reading rates from a newspaper article and a book individually. Patients read each media for two minutes on each device at their preferred zoom magnification, and a third time on the CCTV with the zoom magnification matched to the iPad’s angle of resolution. Physical copies were used on the 24-inch Optelec Clearview CCTV with print size of 1.0 M and electronic copies were acquired on a third generation iPad. Upon conclusion of the reading assignment, patients were surveyed with a questionnaire concerning subjective comfort, performance, and preference.

CONCLUSION
The iPad is a valuable new tool in assisting low vision patients, but may not completely replace the use of CCTV. Patients’ primary reasons for preference of the iPad were portability, ease of navigation, and added versatility. Considering these reasons in addition to lower cost and improved social acceptance, the iPad should be considered in the reading rehabilitation of visually impaired patients with optic atrophy.

SUPPORT
2012 Illinois Society for the Prevention of Blindness Grant

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CMSC
(CONSORTIUM OF MULTIPLE SCLEROSIS CENTERS)
1 ICO PRESENTATION
INTRODUCTION

Multiple Sclerosis (MS) is an autoimmune disease that affects the central nervous system and is characterized by altered permeability of the blood-brain barrier resulting in lesions and neurodegeneration. Primary Progressive Multiple Sclerosis (PPMS) is a type of MS that is characterized by steady worsening of neurologic function without any distinct relapses or periods of remission. Optical coherence tomography (OCT) can be used to assess retinal degeneration in MS. OCT can provide values that represent the retinal nerve fiber layer (RNFL) and the macular volume. Some of the literature suggests that PPMS may actually have a distinct pathophysiology different from the typical Relapsing-Remitting Multiple Sclerosis (RRMS) and may represent a primary neurodegenerative disorder. OCT can be used to study the layers of the retina and may give clues as to the mechanism of this disease.

PURPOSE

To evaluate the feasibility of using spectral domain OCT (SD-OCT) to evaluate the different retinal layer thicknesses and macular volume measurements in patients with PPMS compared to those with RRMS and normal controls.

METHODS

Subjects: A group of ten patients diagnosed with Primary Progressive Multiple Sclerosis were scanned and compared to age matched patients with Relapsing-Remitting Multiple Sclerosis and normal healthy controls.

OCT imaging: RNFL and total macular volume scans were obtained using a spectral-domain OCT (Heidelberg Spectralis SD-OCT, Heidelberg Engineering, Germany) for each eye of the patients. All scans were acquired by experienced operators and were reviewed for sufficient signal strength, correct centring and segmentation. Together the Ganglion Cell and Inner Plexiform layers, and the Inner Nuclear Layer were manually segmented on OCT images of the GCL, IPL, and INL in patients with PPMS. However, these changes were not seen in other segments of PPMS patients (temporal superior, temporal inferior, nasal, nasal superior, nasal inferior) compared to RRMS patients and controls. Segmentation of the Inner Nuclear Layer (INL) in PPMS patients in our study did not confirm the findings stated previously using similar technology (Heidelberg Spectralis SD-OCT), which found a reduction in the INL thickness in PPMS patients compared to RRMS patients and controls. It was also noted that the macular volume and thickness was decreased in patients with PPMS compared to those with RRMS and controls.

RESULTS

Segmentation of the Ganglion Cell Layer (GCL) and Inner Plexiform Layer (IPL) in patients with PPMS showed that the Papillomacular bundle (PMB) thickness was consistently higher than patients with RRMS. Similar findings were also noted in the temporal segment of PPMS patients. However, these changes were not seen in other segments of PPMS patients (temporal superior, temporal inferior, nasal, nasal superior, nasal inferior) compared to RRMS patients and controls. Segmentation of the Inner Nuclear Layer (INL) in PPMS patients in our study did not confirm the findings stated previously using similar technology (Heidelberg Spectralis SD-OCT), which found a reduction in the INL thickness in PPMS patients compared to RRMS patients and controls.

CONCLUSIONS

It is possible to obtain high-quality manually segmented SD-OCT images of the GCL, IPL, and INL in patients with PPMS. Further studies are needed using SD-OCT in a larger group of patients with PPMS to determine the mechanism as to why the thickness of the PMB and temporal segments of the GCL and IPL are preserved compared to patients with RRMS.

REFERENCES


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THE TEACHING PROFESSOR CONFERENCE
1 ICO PRESENTATION
INTRODUCTION

Traditional problem-based learning (PBL) is a learner-centered educational pedagogy in which students learn through the experience of problem solving in small collaborative groups. Primary Care Conference (PCC) is a hybrid project-based approach to learning that utilizes clinical cases to help bridge the gap between what happens in the classroom and the approach to learning that utilizes clinical cases to help bridge the gap.

Unfortunately, traditional problem-based learning is faculty intensive with one faculty member instructing a small group of students. This can act as a financial burden on the institution and prohibits its wide spread adoption.1,2 The Illinois College of Optometry (ICO) has developed PCC, a didactic course to supplement third year clinical patient care, which takes a novel approach by allowing a single instructor to act as a facilitator for a class size exceeding 150 students. The purpose of developing PCC is to provide our students with the benefits of PBL in a large class setting.