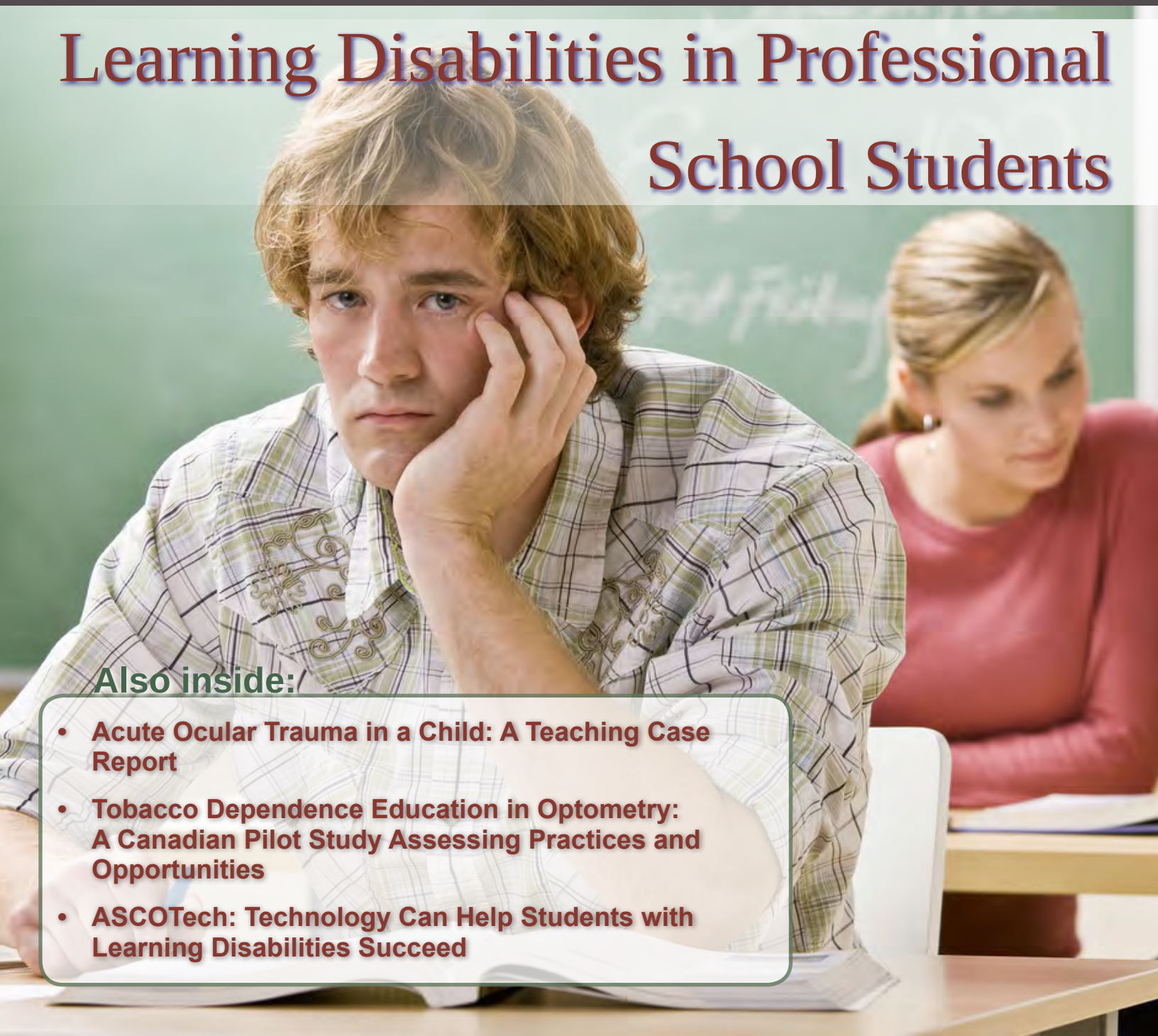
The Journal of the Association of Schools and Colleges of Optometry

OPTOMETRIC EDUCATION

Volume 36, Number 1 Fall 2010

Learning Disabilities in Professional School Students



Also inside:

- Acute Ocular Trauma in a Child: A Teaching Case Report
- Tobacco Dependence Education in Optometry: A Canadian Pilot Study Assessing Practices and Opportunities
- ASCOTech: Technology Can Help Students with Learning Disabilities Succeed

Association of Schools and Colleges of Optometry

The Association of Schools and Colleges of Optometry (ASCO) represents the professional programs of optometric education in the United States. ASCO is a nonprofit, tax-exempt professional educational association with national headquarters in Rockville, MD.

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FEATURES AND DEPARTMENTS

Past issues of Optometric Education *are available on the ASCO Web site at http://www.opted.org/i4a/pages/index.cfm?pageid=3404. Funding for archiving was generously provided by Transitions Optical.*

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VOL. 36
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The Journal of the Association of Schools and Colleges of Optometry

OPTOMETRIC EDUCATION is published by the Association of Schools and Colleges of Optometry (ASCO). Managing Editor: Desiree Ifft. Graphic Designer: Kerri McTigue. Business and editorial offices are located at 6110 Executive Boulevard, Suite 420, Rockville, MD 20852; (301) 231-5944. Optometric Education is published three times per year. To access *Optometric Education* online, please go to www.opted.org.

INDUSTRY NEWS

The following companies support ASCO's national programs and activities benefiting the schools and colleges of optometry in the U.S. and Puerto Rico.

Patrons ($50,000 - $99,999)
Essilor of America

Benefactors ($25,000 - $49,999)
CIBA Vision Corporation
Luxottica/EyeMed Vision Care
Walmart Stores, Inc.

Supporters ($15,000 - $24,999)
Alcon Laboratories
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Hoya Vision Care, North America
Transitions Optical, Inc.
Vision Service Plan
Vistakon, Division of Johnson & Johnson Vision Care

Friends ($10,000 - $14,999)
Abbott Medical Optics
Allergan, Inc.
Bausch + Lomb, Inc.
Compulink Business Systems
Haag-Streit
HEINE
Keeler Instruments, Inc.
M & S Technologies, Inc.
Marco
Optos North America
Volk Optical

Contributors ($5,000 – $9,999)
CooperVision
Marchon Eyewear
Ophthonix, Inc.
Safilo Group
TLC Vision
Vision Source!

B + L, VSP Offer Additional Contact Lens Rebates

BAUSCH + LOMB

As of November 1, members of VSP Vision Care can receive additional rebates when they purchase an annual supply of Bausch + Lomb contact lenses. Lenses purchased from one of VSP's 27,000 network providers are eligible for an additional amount on top of the previously available rebate offered by Bausch + Lomb.

For more information about the rebate program and to download a copy of the rebate form, visit www.specialoffers.vsp.com/bausch.

Allergan Receives FDA Approval of Lumigan 0.01% as First-Line Therapy

ALLERGAN

Allergen received FDA approval for bimatoprost ophthalmic solution 0.01% (Lumigan) as first-line therapy for the reduction of elevated intraocular pressure (IOP) in patients with open-angle glaucoma or ocular hypertension. Lumigan 0.01% is an optimized reformulation of Lumigan 0.03%.

"Lumigan 0.01% exemplifies Allergan's commitment to developing medications for glaucoma patients that maximize efficacy while minimizing drug exposure," said Scott Whitcup, MD, Allergan's executive vice president, Research and Development, chief scientific officer.

In a three-month study of patients with open-angle glaucoma or ocular hypertension with an average baseline IOP of 23.5 mmHg, Lumigan 0.01% lowered IOP up to 7 mmHg. The recommended dosage of Lumigan 0.01% is one drop in the affected eye(s) once daily. Full prescribing information is available at www.allergan.com.

Essilor of America Launches Ethnic-Specific Lenses.

essilor

Essilor of America has launched three lines of spectacle lenses designed to meet the unique visual needs of patients of Chinese and Indian ethnicity. Based on changing U.S. demographics and following success in China and India, the company is now offering Varilux Physio Enhanced Azio, Varilux Physio Enhanced India and Essilor Azio Single Vision lenses as the first of its new ethnic lens products.

Research and development analysis of more than 200,000 patients in the areas of optics, physiology and how people use their eyes and wear their frames revealed five out of six wearers in these populations have different measurements from the average values for pantoscopic tilt, wrap angle and vertex distance. Designed with Wavefront Advanced Vision Enhancement (W.A.V.E) Technology, Varilux Physio Enhanced Azio and Varilux Physio Enhanced India lenses are personalized for Chinese and Indian ethnic groups by accounting for unique facial anatomy and eye shapes and providing a personalized near-vision zone for these specific patients.

Essilor Azio Single Vision lenses, which also utilize W.A.V.E. Technology, optimize each prescription for each position of wear for the best possible vision.

For more information, contact a Varilux sales or lab representative or visit www.variluxusa.com.

Walmart Announces Scholarship Contest Winners

New England College of Optometry students Chris Cordero and Fabian Villacis won the inaugural Project Foresight national scholarship competition sponsored by Walmart Health and Wellness. They shared the grand prize of $20,000 for their winning entry, "Pride Vision."

The Project Foresight scholarship competition is open to optometry students in their first, second or third year of school. Teams made up of two students design and develop a business plan for an optometric practice that promotes the profession of optometry, incorporates the teachings from the colleges of optometry and highlights the values of Walmart Health and Wellness. Each team also creates a presentation to showcase its business plan. A panel of school and Walmart officials judges the entries at each participating school. The winning team from each school wins a $1,000 scholarship and a chance to compete in the national competition during Optometry's Meeting.

For information about the next Project Foresight scholarship competition, contact Kim Vo, OD, at kimuyen.vo@wal-mart.com or (479) 426-3979.

Transitions Optical Partners with NCNW; Names New COO

As part of its "Healthy Sight for Life: Focus on African-American Eyes" campaign, Transitions Optical has partnered with the National Council of Negro Women (NCNW). The company said the NCNW is a natural partner for the campaign, which aims to raise awareness about the importance of proper vision care and vision wear among the African-American community.

Transitions Optical provided free vision screenings and eye health education at this year's National Council of Negro Women Black Family Reunion Celebration in Washington, D.C.

The campaign officially launched this fall in Washington, D.C., at the annual NCNW Black Family Reunion Celebration, which attracted an estimated 250,000 consumers. During the event, Transitions provided free vision screenings and eye health education.

"This was the first time we had a partner who offered vision screenings and education at our event, which is a great complement to our health programming," said Avis Jones DeWeever, executive director, NCNW. "As part of our mission, we focus on promoting healthy lifestyles, and I believe eye health is an important aspect to overall health that we do not want to neglect. Our work with Transitions will afford us the opportunity to focus more on this area."

Dave Cole

In other news, Transitions announced the appointment of Dave Cole as chief operating officer. Cole started with the company when it began in 1990 and served most recently as general manager for the North America and Australia and New Zealand markets. According to CEO and president Rick Elias, "Dave is exceptionally well-suited for this leadership position. His in-depth knowledge of the optical industry and our business, vision for long-term success and industry growth, and passion for building strong partnerships across all levels are just a few of the reasons he inspires such trust and respect from colleagues and the industry alike."

Vistakon Makes Appointments; Introduces Enhanced Contact Lens

Vistakon, Division of Johnson & Johnson Vision Care, Inc., named Carol Lakkis, BScOptom, PhD, Clinical Research Fellow, Contact Lens Products, and Giovanna E. Olivares, OD, FAAO, Director, Professional Education.

Carol Lakkis, BScOptom., PhD

In her role, Dr. Lakkis is responsible for research and development of innovative new products. She brings nearly two decades of extensive clinical research experience to the position. She joins Vistakon from Clinical Vision Research Australia at the Australia College of Optometry, where she served as Research Director. Dr. Lakkis is a councilor of the International Society for Contact Lens Research and an adjunct associate professor at the Queensland University of Technology.

Giovanna E. Olivares, OD, FAAO

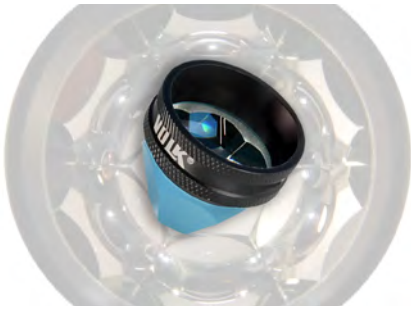
In her new role, Dr. Olivares is responsible for developing strategies for the implementation of the company's professional educational programs across a broad spectrum of groups, including students, practitioners, Professional Affairs Consultants and Vistakon Sales and Marketing organizations. She joined the company in 2004 as Manager of the R&D Design Clinical Research Group, where she led a multidisciplinary group of optometrists, ophthalmologists, vision scientists and biostatisticians overseeing the clinical development of innovative new contact lens products, including Acuvue Oasys for Astigmatism. Her team also developed novel methodologies and equipment for testing vision and measuring patients' experiences with contact lenses.

Vistakon also announced the availability of Acuvue Advance Plus Brand Contact Lenses. Acuvue Advance Plus is a redesigned and enhanced successor to the Acuvue Advance lens. Along with Ultra-Clean Technology for deposit resistance and Hydraclear Technology that combines high performance base materials with a moisture-rich wetting agent, the new lens offers improvements in initial and overall comfort and visual acuity. In addition, it blocks more than 90% of UV-A rays and 99% of UV-B rays that reach the lens.

The company says the Acuvue Advance Plus lens provides patients with the freshness of a two-week modality at a price comparable to a monthly lens. It is available in base curves of 8.3 mm and 8.7 mm at parameters of -0.50D to -6.00D and +0.50D to +6.0D in 0.25D increments and from -6.50D to 12.0D and +6.50D to +8.0D in .50D increments.

Volk Gonio Lens Designed for Better View in Less Time

A new gonioscopy lens from Volk Optical, the G-6, features six closely aligned mirrors to enable a true 360° view during glaucoma screening. The mirrors are equally angled at 63°, eliminating gaps for visualization of the entire anterior segment at 1.0X magnification. During examination, two of the mirrors are aligned in the superior and inferior regions, while the remaining four mirrors provide a continuous view through the nasal and temporal regions. This allows practitioners to scan across mirrors quickly, without the confusion of tracking where one view ends and the next begins that can come from rotating the lens. This fast scanning and reduced need to maneuver the slit lamp can reduce examination time.



The Volk G-6 is designed to provide a true 360° view of the anterior segment for glaucoma diagnosis.

The G-6 also features a taller, tapered profile, which is easier to hold within the orbit, and a no flange/no fluid design that facilitates use without viscous interface solutions. For improved handling flexibility, the lens comes with a ring or a 2-in-1 handle that can be adjusted to create a straight or 45° angled grip.

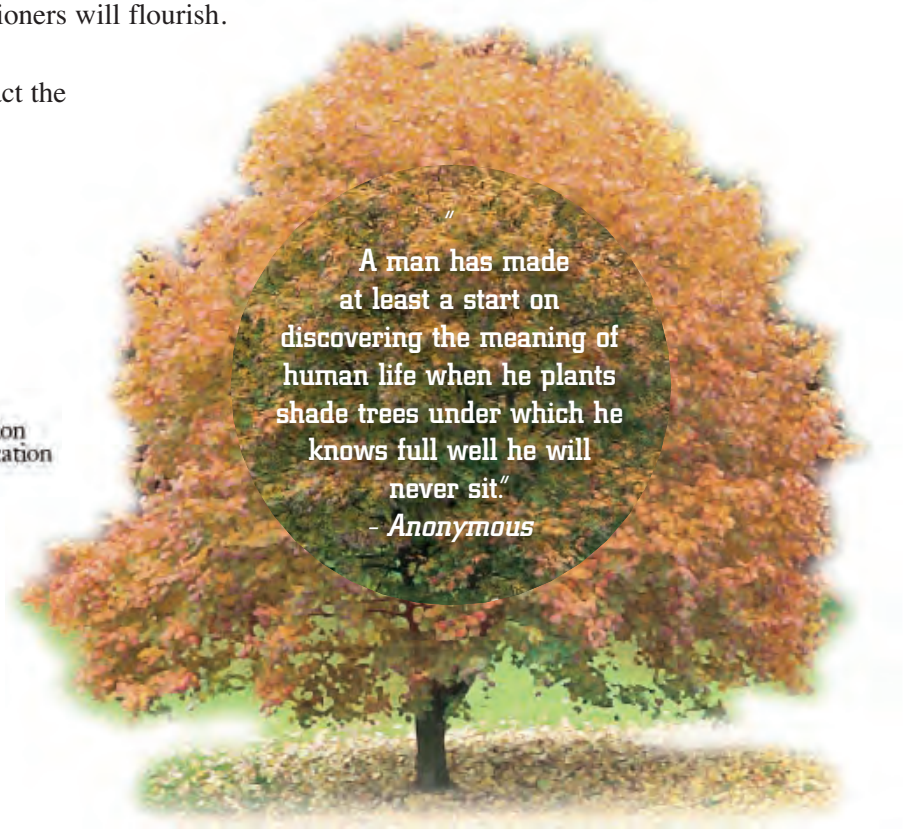
Have you thought about the future of Optometry?

We have!

The Partnership Foundation for Optometric Education is planting, cultivating, and nurturing. Together, this "true partnership" of state, regional, and national organizations is making a long-term investment in tomorrow. With the investment we make today in optometric education, future generations of practitioners will flourish.

For more information, contact the Partnership Foundation at www.opted.org or 301-231-5944, ext 3018.

Partnership Foundation for Optometric Education



EDITORIAL

WCOE:
Optometric Education Through a Global Lens

Aurora Denial, OD, FAAO

In September, I had the pleasure of attending and presenting at the World Council of Optometry's Sixth World Conference on Optometric Education (WCOE) in Durban, South Africa. As the WCO Web site explains, the WCOE is "the international forum for optometric educators from around the world to come together to discuss and debate challenges and trends in optometric education." A total of 269 speakers and delegates representing 44 countries, including 26 delegates from the United States and Canada, were present at the conference.

Key Themes and Subthemes

This year's overall theme was "Meeting Society's Needs: Challenges and Trends in Optometric Education." The conference also addressed three subthemes: developing appropriate human resources, strategies in providing quality education and curricular development, and trends and developments in optometric education programs. The meeting ran consecutively with the World Congress on Refractive Error, which was a unique opportunity to deepen our understanding of the global efforts being put forward to reduce vision impairment due to uncorrected refractive error.

According to Dr. Bina Patel, chairperson of the WCOE Steering Committee, "The conference was a success in bringing forward many important issues facing optometric education around the world. The improvement in the quality and availability of vision and eye care globally is directly related to the continual growth of optometric education programs." The conference included lecture and poster presentations, workshops and regional reports, and Dr. Patel reported the following highlights of the presentations:

- The need for human resource development, including the importance of understanding public health needs and educational resources.
- Faculty retention and mentorship, including the importance of supporting and developing scholarly activity.
- Successes and limitations of expansion of optometric programs with examples of institutions sharing expertise in developing curricular, faculty expertise and clinical experience.
- Sharing techniques for improving the effectiveness of optometric educators in didactic and clinical settings, such as cultural competency, critical thinking, technology and the importance of including neuro-development in the curriculum.
- Innovative methods of assessing student competencies, lifelong learning and issues with continuing education.

For me, attending the conference represented a learning experience and an opportunity to increase international involvement in the journal. Disseminating information on the challenges in optometric education in developing nations is an important component of the optometric educational literature. I encourage all of my international colleagues to contribute to *Optometric Education* by sharing your information, research, dilemmas and ideas.

In This Edition of the Journal

This edition of the journal highlights a topic that most faculty have encountered during their careers as educators. It is a privilege to participate in a student's education, but it is particularly rewarding when that student faces and overcomes the challenges of a learning disability. In her paper, "Meeting the Needs of the Optometry Student with ADHD," Ms. Elizabeth Heiney points out that "Students with Attention Deficit Hyperactivity Disorder represent the largest group of students seeking disability services in the college setting." The paper also presents recommendations for the educator in both the classroom and clinical settings. In a similarly themed paper, "Diagnosing Reading Disabilities at a Graduate School Level," Ms. Sandra Rainwater-Lawler and Dr. Jasmine Wong Yumori utilize a case report to discuss the topic of reading disabilities. Their paper presents information on types of reading disabilities, symptoms and diagnostic testing.

Other topics covered in this edition include the role of optometry in tobacco cessation. In "Tobacco Dependence Education in Optometry: A Canadian Pilot Study Assess-

ing Practices and Opportunities," Dr. Marlee M. Spafford and co-authors state that "tobacco use and dependence is a preventable cause of morbidity and mortality and healthcare providers can be effective facilitators of tobacco cessation among their patients."

This edition also features "Acute Ocular Trauma in a Child: A Teaching Case Report." Drs. Wendy J. Haaland Stone and Stephanie A. Klemencic present a clinical scenario and educational guidelines to facilitate teaching. This is an important topic because ocular injuries in children are common and can range in severity. Optometry students and recent graduates must feel confident providing care in these situations.

In this edition you will also notice a slight modification in the format of the "Think Tank" feature. The key concept — an opinion-based forum for sharing ideas — remains the same. However, rather than pre-identifying an issue and inviting contributors to submit their comments, we present "Some Thoughts on Clinical Teaching" from Dr. Mark Vogel. We challenge you, the readers of the journal, to voluntarily send us your comments on this piece. Do you agree with Dr. Vogel? Have you had the same experiences? Did you come to the same conclusions? Send your comments to me at DenialA@neco.edu, and we will publish them in the next edition of the journal.

Some Thoughts on Clinical Teaching

Mark S. Vogel, OD, FAAO

Dr. Vogel is an adjunct assistant clinical professor at State University of New York College of Optometry and a staff optometrist at Northport Veterans Affairs Medical Center in Northport, NY.

A while ago, I spoke with some fourth-year optometry students who were completing an externship at our VA hospital. I wanted to determine what they felt was positive and negative about their experiences in order to perpetuate the strengths of the program and shore up its weaknesses. It was gratifying to learn that they were generally pleased with the externship and compared it favorably to a number of others they had previously attended. I also asked them to compare their clinical experience in the current program with what they had encountered in the clinics of their optometry schools. I was startled at the severity of their responses with regard to the attitudes of what they described as a sizeable percentage of their clinical instructors.

They described an atmosphere in which they were afraid to express themselves for fear of being told they were either stupid or incompetent. They told of supervisors who expected perfection both in knowledge and performance even in the early stages of their clinical training when they had not yet been exposed to certain material either didactically or clinically. They described situations in which a particular instructor insisted that certain formats be followed only to be castigated by a succeeding supervisor for doing what they had been previously taught. They noted little consistency from one instructor to the next and little tolerance by instructors in their acceptance of alternate methods for achieving a goal. They also noted that what was taught to them in their initial clinical education was altered in subsequent courses because of the inherent inappropriateness of the original material in actual clinical encounters.

It should be noted that these were intelligent and highly competent clinical externs, far from the worst I have encountered in more than 30 years of clinical teaching, and that subsequent surveys of other students, residents and graduates of a number of schools have found these impressions to be generally consistent.

We Have All Experienced How Not to be Taught

I was reminded of two incidents from my own experience. The first occurred during one of my own externships, at an institution other than the one I attended. A friend and I were being supervised during patient encounters by a supervisor who had lectured to us about ways to perform certain clinical tests. I felt the methods I had learned previously were better and I performed the tests accordingly. Apparently my classmate had done the same thing because the supervisor took us into a room and berated us for not performing the tests his way and accused us of not paying attention during his lecture. Neither of us offered a defense or explanation, but we left the encounter with little respect for the instructor. Two years later I joined the faculty of that institution and discovered that particular individual was one of a few who prided themselves on their ability to "break" students. He continued to teach until his voluntary retirement.

The second incident that came to mind occurred a number of years ago while I was supervising in a first-year clinical methods laboratory. One of my students approached me with a question, which was overheard by another faculty person who chastised the student for asking the question. In front of other students and faculty he loudly proclaimed that the student should not be asking that question because he himself had taught her the material. He informed her that she must be stupid if she did not understand. When he walked away I explained the material to the student who asked the question as well as others who witnessed the encounter. I told them I would explain it as many times in as many ways as I could to help them understand. Because he was tenured, the instructor taught for many years and was probably the only person on staff who was unaware of his inability to disseminate information effectively.

I am sure anyone reading about these experiences would be appalled that such behavior exists in institutions of higher learning. By the same token, I doubt if anyone can think back on his or her own education and deny they encountered such individuals or situations. While I in no way feel that professional students should be coddled or overly protected, I do feel they should be treated with respect and dignity. I am pleased to say that many of my colleagues for these many years have not been guilty of such sins. But there have been, and remain, a significant number of individuals, both in institutional and private practice, in and out of optometry, who could benefit from a reassessment of their positions and responsibilities.

Concepts Worth Considering

With this in mind, I offer the following perspectives on clinical teaching.

1) Teach it correctly the first time. If material changes, change with the times. If new or different techniques or methods are more efficient or appropriate, incorporate them into the syllabus and delete older or less effective material. It is incumbent upon teachers to keep up with new and alternative information and be open and honest enough to change accordingly. It is incorrect to pass outdated or mistaken concepts or methods to another generation. What was new in a text 30 years ago is old today and should be re-evaluated for its effectiveness and timeliness. This is especially true in the education of new practitioners who must learn material one way only to have to alter their methods appropriately in the future. This is unnecessarily confusing and time-consuming in an ever-expanding curriculum. For example, teaching a certain cross-cylinder test to first-year students in a particular manner was demonstrated to be of little value more than a decade ago, yet it remains in this form in some curricula. If you are even aware of the Humphriss technique, when was the last time you used it? It, too, remains in some curricula.

   When and how should curricula be changed? The first part is easy to answer – as often as necessary to stay current in the field and reflect the most efficient model of patient care delivery. The second part is more difficult to answer. Having worked on a curriculum committee at an optometric institution I am keenly aware of how difficult it is to make curriculum changes. The major obstacle is obtaining the cooperation of instructors. Each instructor feels that his or her course is infinitely essential to the proper education of students and, therefore, declines to allow even one hour of coursework to be eliminated from its material. This is understandable. Job security is important to everyone, and to admit material is not essential or is outdated is to admit, perhaps, that the individual teaching the class may not be essential.

   So, how to proceed? Maybe it is time for our schools to employ a modality used not only in private healthcare practice but in the business world in general – outside consultancy. The schools should hire people, perhaps successful private practitioners, to dispassionately evaluate what is and is not essential to produce good practitioners. These people should not be graduates of the school being examined. They should not be employees of any school. Our schools already tend to hire their own graduates, which prevents a healthy infusion of new ideas and methods into our training.

2) If you don't do it, don't teach it. Many people involved in clinical education are teaching or supervising methods with which they have no immediate experience. A clinical instructor who has no background in the implementation of contact lens care should not be instructing in a clinic where contact lens care is provided. A didactic teacher who teaches clinical methods who does not interact with patients has no frame of reference to know whether what he or she is teaching is appropriate in a real clinical encounter. Quite simply, a student should be taught to remove an appendix by someone who actually performs appendectomies rather than by someone who has read or heard about appendectomies.

3) Leave your ego at home. It is easy to know more than your students. Do not make this a source of pride to be dangled before them. A teacher is expected to know more than his students and it is this knowledge that should be passed along in an open, nonthreatening manner.

4) Allow for the fact that there might be alternate approaches to solving a problem. When confronted with alternative methods to handle a particular issue, be open to these concepts and consider allowing another person (student) to implement them as long as no foreseeable harm may arise from such action.

5) Customize your teaching. Explain material at a level that students can understand, not necessarily at the level at which you may converse with your colleagues. Students do not have the same level of knowledge or experience as do their teachers, and much material is new and potentially confusing. Furthermore, what is obvious to one student may not be obvious to another. Try to communicate with each student at whatever level is necessary to convey information effectively.

6) KISS – Keep It Simple, Stupid. It is easy to confuse and confound. It is not always easy to get to the simplest mode. Take a moment to consider the situation with which you are confronted and try to come up with the simplest explanation, diagnosis, answer or approach.

7) Allow, nay, encourage students to say "I don't know." Not to do so engenders fear, deceit, and fabrication. This should be followed by clear explanations and/or assignments for students to ferret out the answers to enhance their own education. Of course, this allowance should not be overly relied upon by students. The continued demonstration of ignorance cannot be tolerated.

8) Students can learn as much, or more, from mistakes and poor performance as they can from good episodes, if handled properly. Try to make every learning experience a positive learning experience by demonstrating how performance can be improved rather than harping upon how poorly things have already been done.

9) Do not spoon-feed students. They should be encouraged to learn for themselves. Give them the basics then ask and expect them to research and think about what they are doing. Students all too often learn things by rote in order to answer a question on a test and when asked how that information can be clinically applied have no idea. Try to ask questions that require thought and the assimilation of various pieces of material that must be incorporated into a whole in order to arrive at answers. Encourage research. MAKE THEM THINK.

10) Do not teach students merely to en-

sure they pass boards. While board scores seem important to school administrators, they are not necessarily advantageous to the public. Students who pass written tests do not necessarily become good clinicians. The current approach to board certification fails in this regard as it does not ensure a doctor can perform appropriately in the arena of patient contact. All too often students examine data as if contained in little boxes, ignoring other information in other little boxes that should be combined into a unified whole. Students should be trained to be efficient, effective doctors capable of integrating material from all disciplinary areas into cohesive assessment and treatment plans.

11) It is okay for students to be wrong. They are still learning. In that sense, each of us is still a student. If teachers think they have nothing more to learn, they probably should not be teaching. Excessive criticism and overbearing demeanor most likely engender a bad impression of the supervisor and not necessarily encourage the pursuit of knowledge.

12) Teachers can be wrong. They must be able to admit fallibility when it is appropriate.

13) Teachers can learn from students. It is just as important to listen as it is to talk.

14) Teachers and students do not necessarily have to like one another, but teachers must continue to teach and students must continue to learn. Personality conflicts and unhappy interactions are bound to occur at some point. In such situations the teacher must put aside personal prejudices and handle the educational process professionally. The student must be able to be mature and put personal feelings aside and concentrate on the matters at hand, be they didactic failures or poor clinical performance. The teacher must be able to present the facts of the instance as clearly and unemotionally as possible and not use his or her position of authority as the sole basis for demanding obedience.

15) Students should be allowed and encouraged to question everything. They should not be expected to accept a concept simply because the teacher says it is so. It is incumbent upon teachers to provide a rationale and a logical context for anything presented to the student. Teachers constantly challenge students and it is unwise and unfair to disallow challenges from students if presented honestly and maturely.

16) Sometimes students deserve to fail. This is included in this treatise because I have seen a number of students passed along because instructors do not have the heart or fortitude to fail them when it is appropriate or because an institution needs to protect its capitation funding. Failure should be accompanied by explanation and encouragement for improvement. However, when students really cannot meet certain professional or personal standards, it is unfair to them and to the public to allow them to continue in a program.

17) Discuss with, rather than lecture to, students whenever possible. They are people, have brains, and deserve respect.

18) When you become a teacher or supervisor, do not forget what it was like to be a student. This will make you a better and more compassionate teacher.

Improving, Not Hindering, the Educational Process

If all clinical teachers were committed to being thorough and treating their students like people by showing concern for them, listening to them, encouraging communication in two directions and promoting learning, the educational arena would be more effective, efficient, human and humane. Doctor (teacher), heal thyself.

Send Us Your Comments

Do you agree with Dr. Vogel? Have you had similar experiences? Did you come to the same conclusions? Send your comments to Dr. Aurora Denial at DenialA@neco.edu, and we will publish them in the next edition of the journal.

Energy Renewal Arrives Twice Yearly

Mark Colip, OD

When asked to select a "best day" in my career in optometric education, I was flooded with wonderful memories. As I reflected upon each — and tried to rank them by what my colleagues might consider special or worthy of their reading time — I found myself unsettled. What was important to me or the few close colleagues I had consulted would most certainly not be of interest to all. What to do?

I decided to try a different approach, realizing that I just might be stretching our editor's patience and treading on thin ice. I consider myself fortunate to have not one best day, but two, and they occur each and every year.

My first best day of the year occurs on new student orientation. After months of overseeing the admissions process, wading through stacks of files and applications and painstakingly working with ICO's Admissions Committee selecting the best candidates, I see the selected class arrive. I watch their faces and collective energy fill ICO's Lecture Center.

As I stand watching each student pick up a name tag, I reflect upon those I personally encountered during their process of applying. I reflect upon the tremendous effort they all put into demonstrating they were ICO material and worthy of joining our wonderful profession. In each of their eyes, I see many years of effort, and perhaps even dreaming, coming to fruition on this day. I can sense the energy as their enthusiasm fills the room and for some I can see passion for our wonderful profession already brewing. That is truly a best day for me.

My other best day of the year is commencement. ICO is fortunate to hold its commencement ceremony in Rockefeller Chapel on the University of Chicago campus. Rockefeller Chapel is a beautiful, gothic cathedral-inspired, towering stone structure that has served as the home to ICO commencement ceremonies for more than 25 years. Inside the chapel is a beautiful and massive pipe organ, and when I reach the back of the chapel to begin the processional, I still get chills down my spine as I recall my own proud commencement ceremony in that same place.

As we walk down the aisle during the processional, we look out at the 1,200 proud faces of the assembled parents, spouses, grandparents, siblings, aunts and uncles and supportive friends. Their rightful pride in their graduate's accomplishments is evident. Just past the audience seating, the processional passes the graduating class robed in their doctoral gowns. Three distinct velvet bands on their sleeves signify they have earned a doctoral degree. I see each graduate nearly bursting with pride, some noticeably emotional (or is that just me?). They seem to be reflecting upon the hours, days, weeks, months and years of dedicated study and the accomplishments that earned them the right to be in this particular grand location on this particular day in May.

During the ceremony, I have the distinct honor of announcing each new doctor's name as he or she steps forward to receive a diploma and participate in ICO's solemn hooding ceremony. I can see their pride beaming as they fully realize just what they have accomplished. I also see a twinge of anxiety as they contemplate the immense responsibility they are now charged with in executing their duties to their patients. When ICO's president, Dr. Arol Augsburger, proclaims the doctoral degree upon them, the previously solemn chapel erupts with applause of celebration, and hugs of congratulations are exchanged among the class members. Truly a jubilant moment in their lives.

During Commencement Day, I find I just can't hold back my own smile, which emanates in appreciation of these fine young people sharing part of their lives with me along their journey. I consider it a true privilege to be a part of such an incredible undertaking. I feel truly blessed to watch and observe as young college graduates transform themselves into highly educated and knowledgeable doctors of optometry over a span of four years.

Following the ceremony, I stroll around to offer my personal congratulations and observe as each new doctor poses for photographs with family members, friends and faculty and attempts to capture the energy and emotion of this wonderful day. My wish is that they will each be able to carry the energy from this day forward as they launch their new careers and face the many challenges that are no doubt ahead.

At the end of this glorious day, I find myself retrospective and exhausted. The day is symbolic of the closing of

(continued)

another academic year, and I know that in just three short months we will rev up to begin the journey with another class. I promised myself when I entered optometric education that the day I did not find these two days both exhilarating and fulfilling would be the day I needed to leave optometric education and return to full-time practice.

In closing, I would like to extend that challenge to all of my colleagues in optometric education. Students bring our educational institutions to life and they are deserving of every educator's 100% commitment. Students today require a great deal of energy as we fulfill our responsibilities to help them become the great doctors we know they are capable of becoming. It is up to each of us to find that energy within ourselves and apply it in our careers as educators on a daily basis. Fortunately for me, that energy renewal source comes twice a year without fail! Make it a great year!

Dr. Colip is Vice President for Student, Alumni and College Development at Illinois College of Optometry in Chicago.

Invitation to Participate

Upcoming Theme Editions

Implementing the Teaching of Critical and Clinical Thinking

In optometry, critical thinking related to clinical decisions and patient care is a specific outcome of the educational process. Many optometric institutions have initiated courses dedicated to teaching critical thinking, clinical decision-making and integration of knowledge. *Optometric Education* is planning a future theme edition that will focus on courses designed to achieve the goals of teaching critical thinking, clinical decision-making and integration of knowledge. **We invite all educators involved in these courses to participate in the theme edition.** To allow for additional time for outcomes assessment, the deadline to submit articles for this theme edition has been extended to **November 30, 2010**. Accepted manuscripts will include: innovative teaching methodologies, course description and assessment, research on how, when and why students learn about clinical thinking or teaching interventions that increased learning.

Scholarship

Scholarly contributions by faculty are a critical component of faculty development, promotion/tenure and delivery of optometric education. Most optometric faculty have minimal formal training in professional writing, research and publication. Scholarly contributions move education forward and can significantly impact the profession. *Optometric Education* is planning a future theme edition that will focus on scholarship. The theme edition is scheduled for publication in 2012. We are sending out this invitation early to allow for adequate time to design appropriate studies. **We invite all educators and administrators to participate in this theme edition**.

For additional information on the theme editions, contact Dr. Aurora Denial at DenialA@neco.edu.

Technology Can Help Students with Learning Disabilities Succeed

Geoffrey Goodfellow, OD, FAAO
Dominick M. Maino, OD, MEd, FAAO, FCOVD-A

Compared with elementary schools or high schools that cater to the masses, there may be a false perception that professional school programs don't need to worry much about students with learning disabilities. After all, we only accept the best and brightest into optometry school, right? In reality, disabilities know no boundaries, and some students with great talent may need extra assistance from our academic programs.

Although most students with visual, auditory, or physical disabilities may not seek out an optometric career path, some students with learning or other more subtle disabilities may very well already be in our classrooms. As those with disability are encouraged to seek out higher educational and career goals, we will be encountering these students with greater frequency in our classrooms, laboratories and clinics. This places upon us an important responsibility to provide the necessary tools and resources so that these students can be successful.

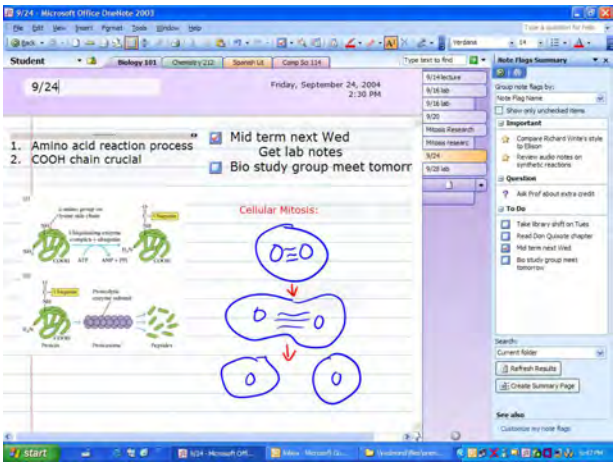
Accommodations like extended testing time or modified student schedules may top the list, but it's important to remember the ever-growing list of technology solutions that may also lend a helping hand. A literature search provides countless examples of studies that show technology's benefit to students with learning disabilities. Such assistance also tends to improve self-sufficiency for students who otherwise may be overly dependent on faculty, tutors, peers, or parents to help them get through our programs.

Here, we have compiled a list of options you and your students may find helpful.

Memory

A variety of tools are available for students with memory problems. Many software applications allow users to store notes, reminders, pictures and Web pages, as well as email, attachments and almost anything else in one spot. Users can move things around, organize materials in a way that works for them and, best of all, electronically search through their notes by remembering only snippets of text. Some of the newer tools are even capable of searching for key words that are part of photos and other scanned materials. Microsoft's OneNote program is part of the Microsoft Office Suite of software commonly available on most computers and is a great and easily accessible tool for our students to use. (Figure 1) The program Ask Sam (www.asksam.com) is another option.

Figure 1
Microsoft OneNote provides an easy way for students to gather information from many sources and organize it in a single location.



Dr. Goodfellow is assistant dean for Curriculum and Assessment and an associate professor at the Illinois College of Optometry. Dr. Maino is a professor at the Illinois College of Optometry. They invite your feedback about this and all ASCOTech columns and your suggestions for future columns. E-mail them at dmaino@ico.edu or ggoodfel@ico.edu. You can also visit www.MainosMemos.blogspot.com.

In addition, a variety of memory enhancement tools can provide automated reminders to students via cell phone or wristwatch display. Examples include Watch Minder (www.watchminder.com) (Figure 2) and My Email Reminders (www.myemailreminders.com). (Figure 3)

Listening and Reading

For students who have a difficult time integrating the sights and sounds of the classroom in real time, listening to playback of recorded lectures may be helpful. Some playback programs even allow one to adjust the playback speed so that the voice of a fast-talking professor can be slowed to a manageable pace. Many books are now available in audio format, which offers similar advantages. Even students without a learning disability may appreciate using these audio tools to become "Road Scholars" while making great use of captive commute time. Audio textbooks are sometimes more difficult to find than best-sellers, but the format is slowly growing.

Numerous Optical Character Recognition (OCR) programs read printed text or text on a Web page aloud to students. Kurzweil (www.kurzweiledu.com) is a popular supplier of text-to-speech resources in the education market. (Figure 4).

Writing

Similarly, speech-to-text tools may be just the thing for students who have difficulty writing or typing. With programs such as Dragon Naturally Speaking (nuance.com/dragon), the user speaks into a computer microphone and the computer converts the words into type. Users who may have been frustrated by this type of technology in its infancy should know it has been improved and definitely deserves another try.

Typing tools can also help students with writing-related learning disabilities. Text expansion applications allow a student to type a brief word into a word processor while the text expansion application automatically works behind the scenes to substitute that short word with a longer phrase. Imagine typing "RE" in MS Word and having "refractive error" show up on the screen. Software in this category includes Texter

Figure 2
Watch Minder can send automated reminders via cell phone or wristwatch.

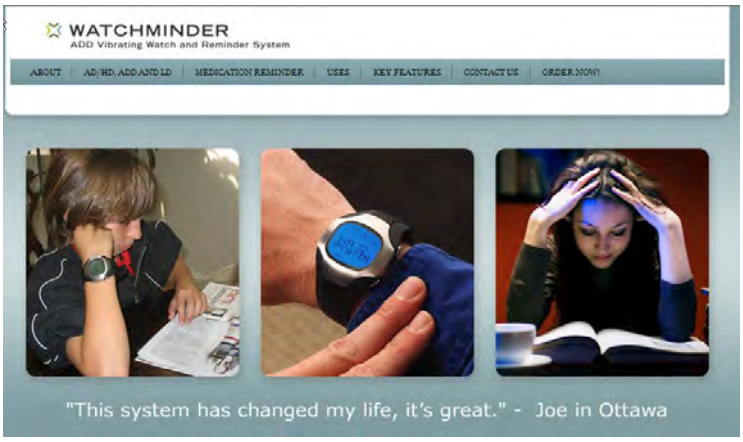
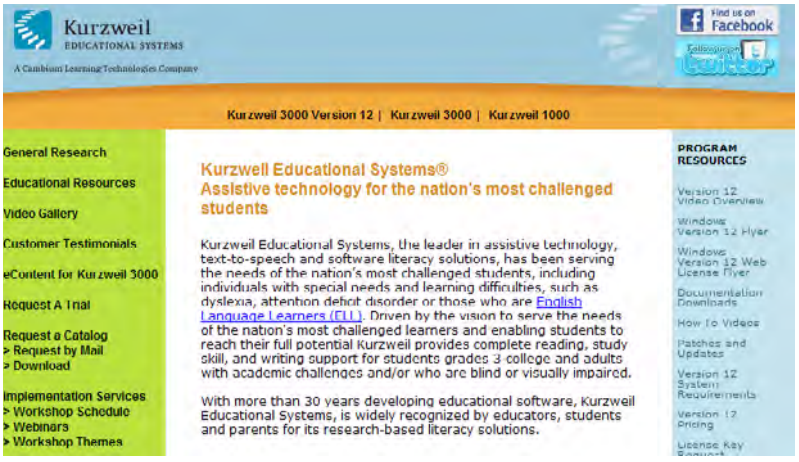


Figure 3
My Email Reminders is one of several memory enhancement tools available to students.

Figure 4
Kurzweil Educational Systems is a leader in text-to-speech software solutions.



(lifehacker.com/software/texter/lifehacker-code-texter-windows-238306.php), Typinator (www.ergonis.com/products/typinator) and Activewords (activewords.com).

When spelling is problem, phonetic spelling tools can be used. These allow the student to type the way a word sounds, and the software produces the correct spelling. However, today's great word processors that highlight typing/spelling errors in real time may make phonetic spelling software unnecessary.

Number of Resources Continues to Grow

As the rigors of the optometric craft continue to increase, assisting professional school students who have a learning disability can be challenging. However, a wide variety of technology tools can be very useful, and the list of resources grows daily as software developers work their magic.

If you know of other resources that help your students with learning disabilities, let us know about them by emailing us at ggoodfel@ico.edu and dmaino@ico.edu.

Meeting the Needs of the Optometry Student with ADHD

Elizabeth P. Heiney, MS

Abstract

This paper summarizes a presentation given at the 2009 American Academy of Optometry annual conference in Orlando, FL. Students with Attention Deficit Hyperactivity Disorder (ADHD) represent the largest group of students seeking disability services in college. The literature is only beginning to recognize the specific needs of these students in the college setting. While a portion of these students also pursue graduate degrees, the current literature examining the impact of graduate study on a person with ADHD is extremely limited. This paper expands the knowledge base regarding the challenges faced by the graduate student with ADHD, specifically those in an optometry program. Recommendations for educators that can be applied to the classroom as well as the clinical setting are explored.

Key Words: *ADHD, graduate students, optometry students, academic needs, accommodations*

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Introduction

Imagine sitting in a classroom, trying to complete an exam or take lecture notes. No matter how diligently you try to focus, other thoughts continuously interfere. You really want to focus, but your brain is just not cooperating. This is what it is like for students with Attention Deficit Hyperactivity Disorder (ADHD). Once believed to affect only children, ADHD is now understood to be a pervasive disability that continues into adulthood in 55%-75% of cases.[1] This translates to ADHD affecting up to 6% of the adult population.[2] Although ADHD can be associated with academic underachievement,[3] the number of students with ADHD seeking post-secondary education is increasing due to special education laws,[4] improved diagnostic procedures and increased awareness of the impact of this disorder on adults.[5] It is estimated that up to 5% of U.S. college students have ADHD.[6]

A portion of college students with ADHD also seeks graduate education. A literature search using the terms "graduate student" and "ADHD" in the Education Resources Information Center (ERIC) and Education Research Complete databases found no research that cited the prevalence rates of graduate students with ADHD. At this point, the literature regarding this population is limited to acknowledging that graduate students with ADHD continue to face challenges in the education setting and how the Americans with Disabilities Act (ADA) applies to these students.[7] Although educational researchers have not yet focused on optometry students, they have identified graduate students in other health professions, including medical students[8] and more specifically psychiatry residents with ADHD.[7] As these groups represent students in a health profession training program that includes both intense classroom instruction and clinical practice,[7] it is likely that their experiences are comparable to those of optometry students with ADHD. Considering the prevalence rates of ADHD in adults as well as the existence of students with ADHD in other health professions, it is expected

that a percentage of optometry students will have ADHD and will subsequently be at risk of having academic difficulty.

It is imperative that optometric educators understand how ADHD may affect students. Researchers suggest that professors and administrative personnel take a more active role in promoting the academic success of students with ADHD[3,9-12] by understanding the challenges that these students face as well as what role they can play in improving their success rate.[10] The ADA states that individuals with disabilities, including ADHD, must be afforded reasonable accommodations that allow them to perform at an acceptable level. To maximize outcomes, a collaborative approach between the student, administration and faculty, working within the boundaries of the ADA, should be sought.[7] The purpose of this paper is two-fold: 1) to inform optometric educators how ADHD manifests in students and impacts a student's education and 2) to provide practical recommendations that can be used to help optometry students in their success both in the classroom and in clinical settings.

Attention Deficit Hyperactivity Disorder (ADHD)

ADHD is characterized by a pattern of inattention, and/or hyperactive/impulsive behavior that manifests across multiple settings.[13] It causes significant impairment in the ability to filter out irrelevant information, sustain focus, delay gratification, think before acting and problem-solve.[10] ADHD currently is divided into three subtypes: 1) Predominantly Inattentive Type; 2) Predominantly Hyperactive/Impulsive Type; and (3) Combined Type. Inattentive symptoms include difficulty concentrating, poor attention to detail, difficulty completing tasks and forgetfulness. Hyperactive/Impulsive symptoms include significant motor agitation, difficulty awaiting turns and excessive talking.[14] While diagnostic criteria emphasize mainly the behavioral manifestations of ADHD, it should also be conceptualized as a cognitive disorder with implications for academic impairments. Strong evidence exists to support that ADHD affects the neurobiology of the prefrontal cortex,[5] specifically leading to deficits in executive functioning.[5,15] Executive functioning deficits include difficulty with time management, organization and planning.[15]

ADHD in Adults

While ADHD does not have an adult onset, many people are not diagnosed until adulthood. Hyperactive symptoms typically attenuate, but symptoms of inattention and impulsivity continue into adulthood.[1,16] In Adult ADHD, symptoms of inattention include difficulty sustaining attention to reading or paperwork, managing time, completing tasks and focusing and keeping track of important items. In adults, symptoms of hyperactivity include an inner sense of restlessness, a sense of overwhelm, excessive talking and fidgeting while seated. Impulsivity manifests as impulsive job changes, speeding while driving, frequent traffic accidents and a quick temper.[16] Other typical behavioral manifestations of ADHD in adults include missing appointments or deadlines, difficulty unwinding and more subtle motor agitation such as pacing or leg shaking,[1] cluttered workspaces, misplaced paperwork and difficulty prioritizing. Problems with organization create difficulties completing complex tasks at work.[16] Relationship problems and social skill deficits are also common.[14]

ADHD in the Higher Education Environment

Regardless of age, the education setting is challenging for individuals with ADHD.[11] In addition to the difficulties associated with ADHD, additional learning problems are common.[3] Despite these challenges, many seek postsecondary education.[17] Research indicates that college students with ADHD represent a unique subset of adults with the disorder who are likely to have higher cognitive abilities, a better academic record and more compensatory skills than the general population of adults with ADHD.[3,4] Nevertheless, these students continue to face significant difficulties with inattention, which lead to problems with note-taking, outlining and completing lengthy reading assignments.[4] Additionally, they face executive functioning deficits, including problems with time management, organization, follow-through, self-monitoring and problem-solving.[4,18] While these are not academic skills, per se, they are all necessary skills to be successful in the academic environment.[18] The college environment has minimal structure, requires a large amount of independent learning and gives students a large amount of autonomy.[12] This can be difficult to manage for students with ADHD as they must rely heavily on self-discipline to manage their time wisely.[6] Academic performance often depends on students' ability to complete long-term projects and educate themselves using multiple sources such as texts, lecture notes and library reference materials.[12] They must maintain focus during lengthy lecture classes and make appropriate decisions with minimal guidance from professors.[6]

These same skills are necessary in graduate school. While students may have been able to compensate for their deficits in an undergraduate program, the increased intensity and volume of graduate education may lead to new challenges. Students may find that previous compensatory measures are no longer effective.[7] Dr. DeDe Wohlfarth, a clinical psychologist and professor in the School of Professional Psychology at Spalding University, has been teaching both undergraduate and graduate students for 10 years. One of her areas of specialty is ADHD in college students. She maintains that ADHD manifests itself through academic work as well as interpersonal skills.[19] When asked about typical issues for graduate professional students with ADHD, she commented, "In graduate school, there is even less structure and even larger projects than an undergraduate program."

Graduate students are not only expected to learn basic concepts and information but also to think critically about this knowledge and apply it to patient care.[19] In addition to the academic side of graduate training, the clinical component can also be challenging for the student with ADHD. This includes working within a system of other healthcare professionals, being compassionate and appropriate with patients and communicating effectively with both patients and other professionals.[7] In the inter-

personal domain, Dr. Wohlfarth noted that social skill deficits, which are often disregarded in the undergraduate classroom, become an area for professional development for the graduate student. [19] She explains that blurting out or not focusing can lead to negative reactions from peers. [19]

In adherence with the ADA, institutions of higher education must provide a fair and equal education opportunity for students with documented disabilities, including ADHD. This is accomplished by providing students with appropriate accommodations. These accommodations allow students to complete their program requirements adequately but do not alter the requirements or take responsibility away from the student to demonstrate core competencies.[7] Accepted classroom accommodations for students with ADHD include extended time for testing, testing in distraction-free environments and note-taking assistance.[5] Since the graduate school population has not been well-studied, researchers can only speculate about what may be appropriate accommodations for graduate students. Researchers suggest close monitoring of student's performance, facilitation of learning strategies and providing a structured curriculum. To address possible challenges in the clinical setting, suggestions include direct observation, regular feedback, review of documentation and mentoring.[7]

Optometry Students with ADHD

Transitioning from an undergraduate student to an optometric graduate student can be challenging for many students because of the added volume and intensity of coursework. Time management and juggling the increased workload are two areas that were reported to be the biggest adjustments for first-year optometric students.[20] Since time management is a chronic problem for persons with ADHD, it is reasonable to posit that optometry students with ADHD will have difficulty in this area. As in undergraduate programs, these students may struggle with completing lengthy readings and other assignments on time or being able to synthesize a large amount of information in a short period of time. Additionally, optometry students report that a major difference between undergraduate and graduate training is the need to arrange time on the weekends to practice clinical techniques.[20] Again, the difficulties in time management that commonly interfere with daily life for a person with ADHD may affect an optometry student's ability to find time for practicing clinical techniques. Lastly, students will often be in a lecture class for four to five hours at a time.[20] The student with ADHD will likely have difficulty focusing for such an extended period of time.

As students progress through optometry school, their training becomes more focused on clinical practice.[20] Inattention as well as executive functioning deficits (e.g., problem-solving, planning and organization) may cause new challenges in the clinical setting. Critical thinking skills, including the ability to synthesize knowledge about optometric concepts and apply it to assessing patients' problems, are important for success in an optometry program.[21] To apply these skills, the clinician will likely need to ask appropriate questions to extract relevant information. The difficulties inherent to ADHD may cause problems for clinicians with ADHD, as they may become distracted by irrelevant information and/or may ignore important aspects of the patients' stories. The associated problems of ADHD thus indirectly affect critical thinking.

Documentation also requires tedious attention to detail, which can also be a weakness of a person with ADHD. The eye exam itself has the potential to become repetitive and understimulating for the clinician with ADHD, which may lead to errors in assessment and/or recording results. Executive functioning deficits also affect time management, a problem cited by many medical professionals.[22] It is likely that a student with ADHD will experience difficulties with time management, including problems with ending patient exams on time, completing documentation and staying focused and aware of time spent on activities. Organizational problems may manifest as incomplete or lost paperwork.

Lastly, interpersonal skills are necessary for working effectively with patients as well as other professionals. This includes appropriately demonstrating compassion, clearly explaining presenting problems or effectively gathering information. This also includes effectively navigating the larger healthcare system.[7] Persons with ADHD often interrupt others when they are talking, talk excessively and miss nonverbal cues.[16] This leads to frequent interpersonal relationship problems, which may translate into the clinical setting and potentially lead to difficulty building rapport with patients, working effectively with a supervisor and/or communicating effectively with other professionals. Additionally, the associated difficulties of poor time management and poor organization may negatively impact relationships with other professionals.

The Role of Educators and Administrators in Promoting Academic Success

Research has identified social support as an important factor in the academic success of the student with ADHD. Within the domain of social support is sensitivity from professors [9,10] as well as various disability support services.[4] First, becoming more aware of how ADHD manifests in college students will assist professors in being able to identify these students in their classrooms. This is not to say that it is the job of the optometric educator to identify students. However, the likelihood of college or graduate school being the first time a student encounters significant difficulty is high.[11,17] Therefore, an educator's awareness of how ADHD manifests may lead to an early diagnosis and an appropriate referral for evaluation.

Second, being sensitive to the issues related to the student's ADHD is helpful. Research has shown that a professor who is sensitive and understanding to the needs of the student with ADHD positively influences academic success. Conversely, students often sense a negative attitude from faculty regarding their ADHD. This leads to feeling unwanted and unaccepted and creates an additional burden for the student. Conveying empathy as well as encouraging students to seek disability support services is strongly recommended. The professor's respect and understanding for a student's need for accommo-

dations is an important factor in that student's success.[10] Students may have additional ways of compensating other than typical accommodations. For example, the student may doodle, fidget with a small object or even eat during a lengthy lecture to help maintain focus. The instructor's flexibility and tolerance of these methods also conveys understanding to the student. Dr. Wohlfarth strongly recommends that professors be flexible and willing to make accommodations in their classrooms.[19] "ADHD is a real diagnosis that requires accommodations to be on a level playing field," advised Dr. Wohlfarth.[19]

Due to the lack of available data on optometry students with ADHD, no set of accommodations has been defined at this point. However, other medical fields have identified accommodations that can impact the educational experience of students with ADHD. These include closely monitoring a student's progress through review of written work and direct observation.[7] This can be accomplished through mentoring, a positive relationship between the professor and student specifically geared toward becoming a successful optometrist. Within this relationship, the mentor can facilitate the development of learning strategies and provide direct feedback to the student. Determining appropriate accommodations should be a collaborative process specific to the individual student.[7] An ideal way to assess the individual needs of students is to provide individual meetings where the professor can truly listen to the student. These meetings can serve several purposes, such as creating built-in timelines and accountability systems for major projects, reviewing the student's performance and giving specific examples of behaviors that may be problematic. Dr. Wohlfarth suggests conducting formative evaluations, done on an ongoing basis instead of summative evaluations.[19] "Students need ongoing feedback given in a timely manner that allows students to improve," said Dr. Wohlfarth. [19]

Ongoing and frequent evaluations are also helpful in the clinical setting. As the purpose of clinical training in graduate school is to prepare students for the professional world, it is reasonable to provide these students with clear feedback throughout their learning experiences. This will add to the student's awareness of the problem as well as provide an opportunity for improving performance. As in the classroom setting, individual meetings in the clinical setting allow for clear expectations to be outlined and detailed feedback to be provided based on short-term performance. For example, the student may be unaware that his/her poor organization is reflecting negatively on overall performance. The student will likely need direct and straightforward feedback regarding this issue. The willingness of the supervisor or clinical faculty to help make a plan for remediating this issue can be very effective. One way to possibly minimize the difficulties that will arise in the clinical setting is to prepare the student for potential problems prior to beginning a clinical rotation. Talking with a student, walking him/her through a typical day and reviewing responsibilities can make a big difference. Role-playing a patient interview or doing mock examinations is another way to help the student with ADHD get a clear picture of what to expect.

The overarching role of the institution is to understand the ADA and to have a clear set of guidelines for handling students with disabilities. Per the ADA, reasonable accommodations provide the student with fair access to examinations and courses (when compared to nondisabled students) but do not cause undue burden on the institution or fundamentally alter the academic program.[7] As symptoms and severity of ADHD differ from individual to individual, the needs for specific accommodations will vary across individuals.[18] Therefore, meeting the specific needs of an individual student with ADHD requires collaboration between the student, faculty and administration.[7] The previously discussed accommodations should be considered a general guide that can be used to determine the needs of students on a case-by-case basis.

Conclusion

The education setting is the environment that prepares students for their future in the professional arena. Students with ADHD face a variety of difficulties in the academic setting that the average student does not. Although college students with ADHD are likely to have higher cognitive abilities and compensatory skills than the average adult with ADHD, they have more difficulties than the average student.[4] Even students who have learned to be successful in the undergraduate setting may find themselves struggling in the graduate arena.[7] Optometry school can be a difficult adjustment. The student with ADHD may face even more challenges and difficulties. Understanding and being sensitive to the specific difficulties these students face are key factors in promoting their academic success. Informed educators have the distinct advantage of being able to aid these students in gaining insight into their deficits and developing strategies that improve their performance. This is best achieved through a collaboration between the institution and the student. These efforts can make a significant difference in the academic performance of a student with ADHD and ultimately will positively impact his/her career as an optometrist.

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Diagnosing Reading Disabilities at a Graduate School Level

Sandra Rainwater-Lawler, MA
Jasmine Wong Yumori, OD

Abstract

Reading disability is the most common learning disability. While reading disabilities are commonly diagnosed by the fourth grade, symptoms of a well-disguised reading difficulty may manifest during graduate school, when more complex reading and writing skills are required. We report on a medical student reporting increased difficulty with academic tasks and review the process typically used in identifying individuals in graduate school with a reading disability.

Key Words: *Reading disability, dyslexia, academic accommodations*

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Background

Reading disability* is the most common learning disability. More than 80% of those identified as learning disabled have a reading disability,[1] and the prevalence of reading problems in the general population ranges from 3%-20%[2]. It is believed that individuals with reading difficulties "possess the intelligence and motivation considered necessary for accurate and fluent reading"[3] but have a fundamental deficit in the ability to translate individual letters and letter combinations into sounds; this is known as phonologic awareness[4]. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM IV), three main criteria are considered in the diagnosis of a Reading Disorder[5]:

- "Criteria A: The essential feature of Reading Disorder is reading achievement (i.e., reading accuracy, speed, or comprehension as measured by individually administered standardized tests) that falls substantially below that expected given the individual's chronological age, measured intelligence, and age-appropriate education.
- Criteria B: The disturbance in reading significantly interferes with academic achievement or with activities of daily living that require reading skills.
- Criteria C: If a sensory deficit is present, the reading difficulties are in excess of those usually associated with it."

An evaluation of a student's medical, developmental and family history is necessary to determine risk factors for a reading disability and to rule out secondary forms of reading difficulties. While genetic conditions[6], traumatic brain injury[6], low birth weight[7], visual, hearing or motor disorders and mental retardation can lead to learning difficulties (and thus reading difficulties) and need to be identified and addressed, they are not included in the federal definition of learning disabilities[8]. Along with personal medical and developmental history, family history is also important to consider. Individuals with a family history of language, speech or reading difficulties are at a higher risk of developing reading difficulties, with more prevalence among first-degree biological relatives[5]. There is

*The terms "reading disability" and "dyslexia" are often used interchangeably in the literature. [15]

an approximately 60% concordance of phonologic deficiency between identical twins[9]. Furthermore, 23%-65% of children with a parent who has a reading disability will also have a reading disability[10].

Although a medical examination may reveal signs of neuro-developmental delays, the neurologic examination of an individual with reading disabilities is usually normal[11]. This may be because other factors can also contribute to reading difficulties. Environmental factors such as poverty, an understimulating home environment, low parental education and inadequate instruction play a role in reading and are important to examine. Early identification of and intervention for children with reading disabilities is beneficial, and the prognosis is good in a significant percentage of cases[12]. Remediation, such as providing highly structured, intense, individualized instruction emphasizing phonologic awareness and phonics instruction, is crucial in early childhood.

While many individuals with reading disabilities are diagnosed by the fourth grade, well-disguised reading difficulty can become more noticeable, severe and debilitating in graduate school. As more complex reading and writing skills are required, and the demands for greater accuracy and speed of decoding increase, symptoms of reading disabilities can manifest. For older students, accommodations such as test accommodations (extra time for reading, reader, scribe, distraction-reduced test-taking environment), tape recorders in the classroom, alternative textbooks and instruction in word processing are helpful.

As optometrists and educators, it is important for us to better understand how individuals with reading disabilities, particularly those in a graduate level setting, are diagnosed and what resources and accommodations are available to facilitate their success. Furthermore, because of the changing dynamics of our educational system, such as fairer exam provisions and increased academic support, there has been a rise in the number of students with reading disabilities in higher education[13]. In the United Kingdom, the number of students in higher education with dyslexia increased from 0.74% in 1994 to 1.00% in 1996[14]. It is important for optometrists and educators to be knowledgeable about reading disabilities. We report on a case of a student in medical school that was self-referred for an assessment of learning difficulties.

Case Report

A self-referred 26-year-old Asian American male medical student presented to the Accommodations and Resource Center (AARC) at the Harris Family Center for Disability and Health Policy at Western University of Health Sciences requesting an assessment of learning difficulties. He reports that he is an excellent student and denied any special courses or instruction prior to graduate school. However, since his entry into graduate school he has had to request assistance from professors to develop memory strategies and worries that tutors have not been able to adequately address his concerns. He also explains that he often goes more in-depth than necessary when studying and feels he needs to know everything to feel confident. By report from the individual and his family, his medical history is nonsignificant with no history of injury, trauma or atypical illness. He attained developmental milestones at the expected stages and he grew up in an intact middle-to-upper-middle class English-speaking community.

At the Neuropsychological Assessment, the student completed the Wechsler Adult Intelligence Scale – Fourth Edition (WAIS IV) and Nelson Denny Reading Test (NDRT). The WAIS IV indicated his current level of intellectual functioning in the average range. His Verbal Comprehension Index score was recorded and demonstrated performance in the High Average range. However, on the NDRT, his performance ranged from Borderline to Average. His NDRT Reading Rate and Comprehension were in the Borderline range, more than two standard deviations and more than one-and-one half standard deviations, respectively, below his overall intellectual functioning, both significant differences. In contrast, his NDRT Vocabulary score was in the Average range, somewhat below expectation.

Based on this difference between his Average aptitude scores (and High Average score in the Visual Comprehension Index) and noncorresponding Below Average achievement scores with a negative medical, developmental and environmental history, a diagnosis of reading disability was given. To accommodate his reading disorder the student was provided with double time for exams, audiotaping of lectures, note-taker or provision of class notes and, whenever possible, early access to course material.

Discussion

Reading disability is a complex problem that requires early diagnosis, educational intervention and appropriate accommodations. Educators should be knowledgeable about signs of reading disability in their students. Signs of a reading disability in an adult individual include:

- deficits in reading comprehension
- low reading speed and accuracy
- difficulty with note-taking
- trouble organizing essays and expressing ideas in writing
- problems with spelling and grammar.[16]

Other behavioral signs to look out for include problems with:

- short term memory
- concentration
- distinguishing right from left
- self-organization
- visual perception.[13]

These signs may be particularly indicative of a reading disability if seen in an individual who excels in other academic areas such as math. Some students with a reading disorder may have been misidentified as lazy when in fact may be working harder than their peers to overcome obstacles and obtain the same grades.

If an otherwise normal student is suspected of suffering from a reading disorder, academic support such as tutoring and study skills instruction, including, for example, effective note-taking, essay planning, exam revision, referencing and time management, may be good first steps. At our institution, students suspected of having a learning disability such as a reading disorder may be referred to either AARC or our Learning Enhancement and Academic Development (LEAD) office. The LEAD Office focuses on providing academic-based counseling, tutoring services and skill development directed at time management, critical thinking, test taking

strategies and stress management techniques.[17]

If such support does not improve academic performance despite earnest effort, LEAD refers students to the Assistant Director of AARC for further determination of their needs (i.e., learning disability evaluation). During the initial evaluation with a psychologist, focus is placed on ensuring that the student has had a stable medical, developmental, environmental and academic background. As such, a thorough case history with the student is conducted through a structured interview and/or questionnaire and referral(s) to a neurologist and/or other specialists may be requested if appropriate. A review of old transcripts, classroom observation and a review of prior remediation strategies may also be performed.

If academic counseling and additional educational support do not fully resolve the student's reading difficulties, and a thorough history to rule out secondary causes of a reading disability such as medical, developmental and environmental causes comes back negative, testing is necessary to identify individuals with a reading disability. According to the traditional definition of learning disabilities, a learning disability is a diagnosis given to otherwise normal individuals with at least average intelligence who have achievement deficits[18]. Thus, diagnosis of any learning disability typically starts with a measure of ability or aptitude.

Aptitude measures ensure that the person has the basic cognitive ability to be able to perform. Common tests used to evaluate general intelligence functioning include the Wechsler Intelligence Scale for Children, WAIS, Woodcock-Johnson and Stanford-Binet[19]. In our case above, aptitude was evaluated using the WAIS IV. In evaluating students for a possible reading disorder, focus is often placed on the Verbal Comprehension Index score of the WAIS because it is considered a more accurate representation of reading function.

Once we establish that the person is of at least average intelligence, we look for a discrepancy between aptitude and achievement scores. Achievement is quantified by performance on specific educational tests. If an individual's achievement scores are significantly lower than we would expect based on aptitude testing, a disability is suspected. Three commonly used achievement tests are the Woodcock-Johnson, NDRT and Wechsler Individual Achievement Test (WIAT). The Woodcock-Johnson is commonly used because it has co-normed tests for measurements of aptitude and achievement. The WIAT, a nationally standardized, comprehensive achievement test, is often used because it is co-normed with the WAIS and thus allows comparison of both scores. Findings of a deficit between aptitude and achievement are supplemented and supported with results from below-average results on the NDRT, which is the most widely used reading test in education[20].

Additional assessment tests may be used to diagnose patients with a reading disability, such as tests that evaluate oral language skills. Specific oral language skills are evaluated within two main categories: higher level language skills and auditory processing/phonological awareness[19]. Educational testing within the realms of word reading and decoding, fluency, reading comprehension, spelling, written expression and handwriting may also be elements included in assessment. Common tests for evaluating adult individuals with reading difficulties are outlined in Table 1. It may be more difficult to detect a read-

Table 1
Commonly Used Tests for Evaluating Adult Individuals with Reading Disability

Test	Ages	Screening Parameters	Notes
General Intelligence Functioning(19): Measures aptitude; what is this person's capacity? Would he/she have the capability to perform at a higher level without a learning disability?			
Wechsler Adult Intelligence Scale Fourth Edition (WAIS IV): Similarities, block design, digit span, digit symbol	16 years and older	Global IQ, Verbal IQ, Performance IQ	Expected IQ of at least 85 in dyslexic individuals(22); co-normed with the WIAT
Stanford-Binet	2-23 years	Fluid reasoning, knowledge, quantitative reasoning, visual-spatial processing, working memory	
Sample of Educational Tests: Measures achievement; at what level is this person actually performing?			
Wechsler Individual Achievement Test (WIAT)	4-86 years	Basic reading, reading comprehension, math calculations, math reasoning, written expression, oral expression, listening comprehension	Co-normed with the WAIS
Nelson Denny Reading Test	9-16 years, adult	Vocabulary, comprehension and reading rate	
Gray Oral Reading Test: Passage reading	6-18 years	Oral reading skills (pronunciation, fluency, comprehension, reading rate)	Expected less than or equal to 82 in dyslexic individuals(22)
Wide Range Achievement Test (WRAT): Word reading, spelling	5-11 years, 12 years and older	Reading (recognizing and naming letters and words), spelling (writing symbols, names and words)	Expected less than or equal to 82 in dyslexic individuals(22)
Woodcock Reading Mastery Tests	5 years and older	Individual strengths and weaknesses in reading skills; word reading and decoding, reading comprehension	
Informal Reading Inventories (e.g., Bader Reading and Language Inventory, Ekwall/Shanker Reading Inventory)	Varied	Spelling, handwriting	
General Intelligence Functioning and Educational Tests			
Woodcock-Johnson	2-90+ years	Comprehension-knowledge, fluid reasoning, processing speed	Can measure both aptitude and achievement
Oral Language Skills(19)			
Clinical Evaluation of Language Fundamentals	5-21 years	Higher-level language skills	
Comprehensive Assessment of Spoken Language Test of Language Development: Primary or Intermediate Test of Adolescent and Adult Language	3-21 years	Higher-level language skills	
Comprehensive Test of Phonological Processing	5-24 years	Auditory processing/phonological awareness (phonologic awareness, phonologic memory, rapid naming, rhyming words and decoding skills)	

ing disability in older students because they may have developed compensatory skills and techniques. Furthermore, test norms may be limited to adolescents.

The student described in our case report was diagnosed with a reading disability because he presents with a negative medical, behavioral and environmental history, has difficulties persisting despite academic-based counseling, tutoring services and skill-building, and demonstrates adequate cognitive abilities (as identified through aptitude testing) but significantly lower performance in reading (as identified through achievement testing). A deficit of one-and-a-half standard deviations is considered a meaningful difference[21]. Notably, it is possible to diagnose a learning disability in an individual with below-average intelligence, but it is often difficult to find a significant difference between aptitude and achievement.

Academic accommodations allowed this student to better develop strengths to work through limitations from his disability. Besides allowing additional time for exams, audiotaping of lectures, note-taker or provision of class notes and, whenever possible, early access to course material, other resources exist to assist students with reading disabilities. Technologies such as ReadPlease and TextHELP software allow students to simultaneously hear and see text on their computer. More sophisticated software, such as Kurzweil 3000, allows printed material to be scanned and read aloud by the computer. Recordings for the Blind and Dyslexic, which is a library that provides audio recorded textbooks, is also a commonly used and often helpful resource. Readers for exams and alternative text are other academic accommodations designed to ensure equal access in the classroom. Specialized instruction may also be recommended to help the student learn skills that tap into natural strengths in order to compensate for areas of weakness.

While individual accommodations are important, support from educators is necessary to facilitate optimal student learning. As students with a reading disorder may read slower and with more difficulty than their peers due to difficulties with phonological processing, it is important for educators to avoid putting such students in a situation where this may be highlighted, such as asking the student to read text aloud in class. Other considerations to facilitate academic success for students with a reading disability include providing high-contrast course materials, avoiding putting too much information on one page, writing in shorter, simpler sentences, avoiding fancy, particularly italicized, fonts (12+ sans serif fonts such as Arial are preferred) and considering offering oral assessment opportunities[13]. Multimodal presentation and rehearsal of material to facilitate retention of new information, including use of different or novel presentation formats, may also be helpful.

While individuals with a reading disability may need more time to process and understand written material, they can still proficiently perform in environments with high reading and writing demands, such as within the healthcare profession. Recent study results indicate that degree classifications achieved by students with reading disorders were not significantly different from those of other students[13]. Additional workplace support, such as proofreading by colleagues, typing by administrative staff and using dictation software, may be advisable. Most employers are legally required to make such reasonable accommodations.

Conclusion

Reading disabilities are typically diagnosed by the fourth grade, but well-disguised reading difficulties may manifest in graduate school as reading and writing tasks become more complex. An evaluation to rule out medical, developmental and environmental conditions that can lead to secondary forms of reading difficulties is important, and academic-based counseling, tutoring services and academic skill-building need to be considered. If such resources do not fully resolve reading difficulties, testing administered by a trained professional is necessary to identify individuals with a reading disability.

Testing to diagnose a learning disability, such as a reading disability, typically focuses on ensuring that the otherwise normal individual has at least average intelligence (aptitude) but has achievement scores that are below expected levels. If such a deficit is found within reading, a reading disability diagnosis is appropriate, and accommodations should be provided to support the student. Individualized accommodations are essential to the success of the student's academic career and ensure students receive resources specific for their own unique circumstances. Optometrists and educators alike need to be aware of the signs of reading disability, how reading disability is diagnosed and what resources and accommodations are available to allow equal access in the classroom and thus facilitate success.

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Acute Ocular Trauma in a Child: A Teaching Case Report

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Abstract

Ocular injuries are common among children, especially boys. Nonpenetrating ocular trauma can cause various types of damage in the eye. The adnexa, anterior segment and posterior segment can all be affected. This damage can be mild to severe and transient or permanent. This case report of a nonpenetrating ocular injury of a young boy reviews the clinical findings and management.

Key Words: *Ocular trauma, closed globe, child, traumatic iritis, commotio retinae*

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Background

Trauma to the eye is a common cause of ocular morbidity encountered by eyecare providers. Nonpenetrating ocular trauma can manifest in many ways in both the anterior and posterior segments depending on the nature and severity of the trauma. The following case report discusses a young boy with ocular trauma and its sequelae. It is most appropriately used as a teaching guide for second-, third- and fourth-year students, as well as early residents, particularly those participating in urgent care clinics. For second-year students, even if they have not begun examining patients, it could be used as a review of ocular anatomy, as all portions of the globe can be affected in blunt trauma. Additionally, the case can be used to reinforce the uses of ocular health examination skills that second-year students learn (slit lamp, gonioscopy, tonometry and fundus evaluation). For upper-level students and residents examining patients, the potential sequelae of a trauma case will allow for the review of damage to nearly all structures of the eye and the discussion of complex management decisions encountered in these cases.

Student Discussion Guide

Case Description

Patient LH, a 10-year-old African American male, presented to our urgent care clinic with his mother on Saturday, Sept. 20, 2008. He reported having been hit in the right eye two days prior with a plastic toy sword. He was complaining of blurry vision, photophobia, redness and mild pain (2 on a scale of 10). He reported that the pain had improved since the incident, but the blur and photophobia had not. His ocular history was significant for vision therapy in our pediatric clinic for saccadic dysfunction and accommodative insufficiency in 2005. He wore no spectacle correction and had never been prescribed one.

Medical history was remarkable for attention deficit hyperactivity disorder, which was treated with dexmethylphenidate (Focalin, Novartis). An allergy to the antibiotic cefuroxime (Ceftin, GlaxoSmithKline) was reported, but no other allergies were known. Family history was positive for hypertension. Examination findings are noted in Table 1.

The patient was prescribed prednisolone acetate (Pred Forte 1%) q.i.d. OD and homatropine 5% b.i.d. OD and scheduled to return in five days.

Follow-up #1: 9/25/08

One week after the trauma, LH reported his eye felt much better. He no longer had blur or photophobia, but he still experienced some mild pain. His mother reported he had been taking the homatropine appropriately since the last visit. However, they were unable to obtain the Pred Forte until 9/23/08, so he had only been taking it for two days. See Table 2 for pertinent exam findings. The patient was told to continue taking the Pred Forte q.i.d. and the homatropine b.i.d. OD. He was scheduled to return in nine days, on a Saturday, so that he did not have to be taken out of school.

Follow-up #2: 10/4/2008

Sixteen days after the initial injury, LH reported that all of his symptoms had subsided. Despite instruction to continue the medication as before, the patient had only been taking the Pred Forte b.i.d. and the homatropine q.d. OD. See Table 3 for pertinent exam findings. The patient was asked to continue the current drop regimen (Pred Forte b.i.d. and homatropine q.d. OD) and to return in one week.

Follow-up #3: 10/11/2008

The patient returned 23 days after the trauma. He again had no complaints regarding his eyes. About four days prior, the patient's mother had decided to discontinue all eye drops, so at this time he was not being treated with any medications. See Table 4 for pertinent exam findings. At this time the medications were not re-initiated. The patient was asked to return in two weeks, but due to a scheduling conflict he was scheduled for a three week follow-up.

Follow-up #4: 11/1/2008

The final examination for this patient was 43 days after the trauma OD. He had no ocular complaints at this time, and he was not taking any ocular medications. See Table 5 for pertinent exam results.

Learning Objectives

At the conclusion of the case discussion, participants should be able to:

Table 1
Initial Presentation 9/20/2008

	OD	OS
Visual Acuity (sc)	20/50, pinhole 20/40	20/25
Pupils	ERRL, -APD	ERRL, -APD
Extraocular muscles	Full range of motion	Full range of motion
Confrontation fields	Full to finger counting	Full to finger counting
External	Ecchymosis of upper lid	Clear
Biomicroscopy: Conj	3+ perilimbal injection	Clear
Cornea	- NaFl stain, + fine keratic precipitates	Clear
Anterior chamber	3+ cells, moderate flare, no blood	Deep and quiet
Iris	Clear	Clear
Lens	Clear	Clear
Intraocular pressures (Goldmann)	17 mmHg	19 mmHg
Dilated fundus exam	0.2 C/D, - cells, pale (flat) area of retina inferior temporal	0.2 C/D, normal findings with all structures

Table 2
Follow-up #1 9/25/2008

	OD	OS
Visual acuity (sc)	20/25	20/25
Pupils	Dilated, nonreactive	RRL
External	Mild ecchymosis, improved	Clear
Conjunctiva	Trace injection	Clear
Cornea	Fewer keratic precipitates than previously	Clear
Anterior chamber	2+ cells, moderate flare	Deep and quiet
Intraocular pressures	13 mmHg	13 mmHg
Dilated fundus exam	White area still present, but improved	Normal findings

Table 3
Follow-up #2 10/4/2008

	OD	OS
Visual acuity (sc)	20/25	20/25
External	Clear, ecchymosis resolved	Clear
Conjunctiva	Clear	Clear
Cornea	Clear, - keratic precipitates	Clear
Anterior chamber	1+ cells, trace flare	Deep and quiet
Intraocular pressures	14 mmHg	14 mmHg
Dilated fundus exam	Clear, whitening resolved	Clear

Table 4
Follow-up #3 10/11/2008

	OD	OS
Visual acuity (sc)	20/25	20/25
Anterior chamber	Trace cells, no flare	Deep and quiet
Intraocular pressure	14 mmHg	14 mmHg

1. Describe potential clinical findings of ocular trauma, using the anatomy of the eye as a guide.
2. Understand the impact each potential complication from ocular trauma may have on the vision and prognosis.
3. Differentiate a ruptured globe from a closed-globe trauma.
4. Understand the short- and long-term management of patients with ocular trauma.
5. Correlate clinical findings with the patient history to determine diagnosis.

Key Concepts

1. Recognition of clinical findings with ocular trauma.
2. Management of clinical findings with ocular trauma.
3. Considerations in treating a potentially self-limiting condition.
4. Education and management of long-term sequelae of trauma.
5. Recognition of concomitant systemic disease implications with trauma.

Discussion Questions

A. Knowledge of Potential Clinical Findings
   1. What are the possible manifestations of closed-globe ocular trauma?
      a. Anterior segment
      b. Posterior segment
      c. Globe and adnexa
   2. Of the above, which are short-term or transient and which are long-term or permanent?
   3. Which potential trauma manifestations were ruled out by normal entrance tests?
      a. Pupils
      b. Extraocular muscle motility
      c. Confrontation visual fields
   4. What potential findings would be the most concerning for the patient in the long term?
   5. How would a ruptured globe from trauma be ruled out?

Table 5
Follow-up #4 11/1/2008

	OD	OS
Best corrected VA	20/20	20/20
Refraction	-0.25 DS	-0.25-0.50x180
Anterior chamber	Deep and quiet, -cell/flare	Deep and quiet
Intraocular pressure	15 mmHg	15 mmHg
Gonioscopy	Ciliary body in all quadrants	Ciliary body in all quadrants
Dilated exam with scleral depression 360°	No retinal breaks	No retinal breaks

B. Comprehension of Clinical Examination Results
   1. What is the differential diagnosis of the cells in the anterior chamber? What about the retinal whitening?
   2. What are the manifestations from trauma this patient exhibits? (What is your assessment?)
   3. Which portions of the case history and exam findings support the diagnoses from question 2?
   4. What should be the treatment plan? Is treatment necessary?
   5. How should the patient be educated regarding the benefits and side effects of the medications prescribed?
   6. Why were gonioscopy and scleral depression done at the last visit? Should they have been done sooner?

C. Consideration of Medical and Social Issues
   1. If this patient had a hyphema, what systemic conditions would need to be ruled out? Why?
   2. This patient had questionable compliance. How could this be dealt with?
   3. How should the patient and parent be educated for the prevention of future ocular injuries?
   4. What are the requirements for reporting suspected physical abuse in children?

Educator's Guide

Case Description

This case demonstrates a young boy with closed-globe trauma due to a plastic toy sword. The examination details are presented in the Student Discussion Guide. Below are the considerations and diagnoses for each visit.

Initial Presentation: 9/20/2008

Visual acuity was decreased OD, most likely due to the inflammation in the anterior chamber and the keratic precipitates. Pupil testing was normal, which rules out acute optic nerve damage. Extraocular muscle movements were normal without diplopia, which rules out a muscle entrapment in a blow-out fracture. The patient had ecchymosis of the upper lid OD, but no lid laceration. The cornea showed no staining, so no abrasion was present at this time. However, there may have been a small abrasion that resolved previous to the exam, as the trauma was two days prior and the pain level had been higher initially.

The keratic precipitates, perilimbal injection, cells and flare are indicative of a traumatic iritis (TI). No blood was noted in the anterior chamber, so there was no hyphema. If there were a hyphema, a diagnosis of sickle cell anemia would need to be ruled out, especially because the patient is African American. The iris showed no tears, and the crystalline lens

had no defects. Intraocular pressures (IOPs) were asymmetric, slightly lower OD than OS. This was likely due to the iritis. A significantly lower pressure OD may indicate a penetrated globe, which would need to be managed very differently from a closed-globe trauma such as this one.

Dilated examination showed only commotio retinae (CR) OD. Gonioscopy and scleral depression were not performed at this visit due to the traumatic iritis. They were deferred for one month after the injury.

The patient was diagnosed with TI and CR. Treatment was initiated for the TI due to the patient's complaints, although many TIs resolve without treatment.[1] The patient and his mother were educated about the side effects of the medications.

Follow-up #1: 9/25/2008

The patient had a slight improvement in the TI. More improvement may have been seen, but he did not take the Pred Forte until two days prior to this examination. The CR was resolving, but still present. Because there had only been a mild improvement in the TI, the current medication schedule was not changed.

Follow-up #2: 10/4/08

At this visit the CR had resolved completely. The TI was still present but improved. The patient was continued on the eye drops to expedite the resolution of the inflammation.

Follow-up #3: 10/11/08

At this time the TI was almost completely resolved. The patient had already discontinued the medications, and they were not reinstated because the inflammation was almost resolved.

Follow-up #4: 11/1/08

The purpose of this visit was to perform gonioscopy to rule out angle recession. In addition, scleral depression was performed to rule out a retinal break. Neither of these conditions was found, so the patient's parent was educated on possible long-term sequelae and encouraged to return annually for comprehensive exams.

Literature Review

Trauma is a leading cause of visual impairment in the United States. An estimated 2.4 million ocular injuries occur in this country every year. The majority of these patients are young, with 57% below age 30, and 80% being male.[2,3]

Ocular trauma can be either closed-globe, as this one, or penetrating. This is an important distinction, and a penetrating injury must be ruled out with an in-depth ocular examination. In penetrating injuries, one might find a full-thickness laceration to the sclera or cornea (positive Seidel's sign), a deep or shallow anterior chamber compared with the other eye, an irregular pupil, iris transillumination defects, low IOP or limited extraocular muscle motilities.[3] Subconjunctival hemorrhages are also a common finding after trauma – with or without a ruptured globe. If the subconjunctival hemorrhage is 360°, then exploratory surgery may be necessary to rule out a ruptured globe that is being masked by the hemorrhage. The diffuse subconjunctival hemorrhage may also be indicative of a retrobulbar hemorrhage, which may also require hospitalization and surgical treatment.[1]

Non-penetrating trauma to the eye can manifest in many ways. A nonexhaustive list of possible sequelae is shown in Table 6. In the cornea, closed-globe trauma can cause abrasions, scarring, persistent edema and endothelial blood staining (residual from hyphema).[2] The anterior chamber may manifest TI or hyphema, which would be of particular concern in a person with sickle cell anemia (more common in those of African descent) due to the increased likelihood for elevated IOPs and rebleeding caused by sickling of the red blood cells.[4] The anterior chamber angle may have recession of varying degrees. Trauma may affect the iris with tears or iridodialysis, and in some cases the patient is left with permanent mydriasis due to the injury. The crystalline lens may be affected with traumatic cataracts (anterior cortical or posterior cortical), which are often rosette-shaped. Lenses may also become partially or completely dislocated.[2]

In the posterior chamber, patients may have vitreous hemorrhage, CR, choroidal rupture, macular holes, optic neuropathies and retinal breaks (tears, detachment, or dialysis).[5] Orbitally, a blow-out fracture must be ruled out. This can be done with extraocular muscle movements, palpation of the orbital rim for fractures, palpation of the eyelids for crepitus, and comparing the sensation of the infraorbital areas.[1] All of these potential sequelae should be ruled out in a patient with a history of nonpenetrating ocular trauma. If iritis or hyphema is present, gonioscopy and scleral depression are typically deferred for two to four weeks after the trauma. However, if the IOP is uncontrollably elevated, then gonioscopy can be performed carefully.[1,3]

According to a retrospective study by Canavan and Archer, the most common initial finding after ocular trauma is hyphema, and the most common long-term consequence is angle recession, which occurred in 80.5% of the cases reviewed. This was followed by iris trauma and lens injury. This retrospective study was performed on patients who were admitted to a hospital, perhaps leading the findings to be skewed more to the severe as compared to a walk-in eye clinic. The same study also found that young males were the most likely group to have ocular injuries, and that they most commonly occurred during play and sport.[2] A small study of the acute injuries associated with "Airsoft" guns, performed by Ramstead et al in an on-call ophthalmology clinic, also found that the most common ocular manifestation was hyphema, followed by traumatic mydriasis, corneal abrasion, and lid contusion.[6]

The long-term concern in these patients is the risk for the development of post-traumatic glaucoma. The rise in IOP after trauma can be unpredictable and may occur immediately or years after the injury.[7] The potential etiologies of the IOP spike, and development of optic nerve damage indicating glaucoma, are many. Secondary glaucoma may develop from angle closure due to pupillary block caused by loosened or broken lens zonules resulting in lens subluxation. Secondary angle closure may also occur either due to 360° of posterior synechiae or due to direct obstruction of the trabecular meshwork from peripheral anterior synechiae. The latter is more often seen with chronic inflammation. Secondary open angle glaucoma may develop due to direct damage and subsequent scarring of the

trabecular meshwork from the injury. Additionally, there may be a reduction or elimination of the tractional effect of the ciliary muscle pulling the scleral spur, which can also reduce trabecular outflow. Finally, obstruction of the trabecular meshwork by inflammatory debris, lens particles or red blood cells from hyphema may occur.[7, 8] A study by Girkin et al. found that within six months of their injuries, 3.4% of patients developed glaucoma. The same study found that the highest risk for glaucoma development was with the presence of a hyphema upon initial presentation. Patients with visual acuity worse than 20/200 at baseline, lens injury and angle recession also showed high conversion to glaucoma within six months.[8] Because many patients develop glaucoma several years after the initial injury, these statistics may look different in a longer-term study. Fortunately, this patient had none of these risk factors, as there was no hyphema, only mildly reduced vision (20/50), no lens injury and no angle recession. Therefore, there is less likelihood of developing glaucoma in the future.

Differential Diagnoses

The two main clinical signs in this case were the anterior chamber inflammation (TI) and the peripheral retinal whitening (CR). Listed below is a differential diagnosis for each of these findings in the presence of trauma.

Differential diagnosis of anterior chamber inflammation:

- Rhegmatogenous retinal detachment
  - A retinal detachment can be caused by trauma. It may be accompanied by an anterior chamber reaction and may show pigment cells in the anterior chamber.
- Traumatic microhyphema
  - This is defined as red blood cells in the anterior chamber.
- Traumatic corneal abrasion
  - This manifests as a sodium fluorescein defect in the cornea. It may be accompanied by an anterior chamber reaction.
- Granulomatous uveitis due to systemic etiology
  - Mutton fat keratic precipitates accompany the anterior chamber reaction. A systemic cause is common, including syphilis, tuberculosis and sarcoidosis.
- Nongranulomatous uveitis due to systemic etiology
  - There are many possible systemic causes of anterior chamber reaction with fine keratic precipitates.
- Traumatic iritis (TI)
  - Defined as nongranulomatous inflammation due to trauma within the preceding few days.

Differential diagnosis of pale area of peripheral retina:

- Retinal detachment
  - Elevation of the retina would accompany a retinal detachment. There also may be a visible retinal break.
- Branch retinal artery occlusion
  - The whitening is along the path of an artery, and edema, cotton wool spots, narrowed arterioles and dilated venules may be seen.
- White without pressure
  - This condition is unrelated to trauma. It may be seen in multiple areas of the peripheral retina, and also may be present in the other eye. Retinal hemorrhages would not be present with this condition.
- Commotio retinae (CR)
  - An area of retinal whitening with a history of recent ocular trauma. Blood vessels are undisturbed, but retinal hemorrhages may be present.

Table 6
Possible Sequelae of Closed-Globe Trauma

Orbit/Adnexa	Anterior Segment	Posterior Segment
Lid laceration	Corneal abrasion	Vitreous hemorrhage
Lid ecchymosis	Corneal scarring	Optic neuropathy
Orbital fracture	Corneal edema	Optic nerve evulsion
Retrobulbar hemorrhage	Endothelial staining	Traumatic glaucoma
	Conjunctival laceration	Commotio retinae
	Subconjunctival hemorrhage	Retinal break
	Hyphema	Retinal detachment
	Iritis	Macular hole
	Angle recession	Choroidal rupture
	Iris sphincter tear	Artery occlusion
	Iridodialysis	
	Cyclodialysis	
	Mydriasis	
	Cataract	
	Dislocated lens	

Discussion

This section discusses the intricacies of this case, questions to promote debate, and other potential findings of ocular trauma that were not found in this case.

This patient was lucky enough to only manifest transient complications from his ocular trauma. He did not present with a hyphema, vision worse than 20/200, lens injury or angle recession. Therefore, according to the study by Girkin et al., his risk of developing post-traumatic glaucoma in the short-term is low[8]. However, due to his young age, he was advised to consistently have annual eye examinations with dilation, and to inform all of his future eye doctors of his history of ocular trauma.

Traumatic Iritis

LH presented with complaints of photophobia, blurred vision and mild pain.

His clinical findings showed perilimbal injection, cells and flare in the anterior chamber and asymmetric IOPs (OD<OS). These are classic symptoms and signs of iritis, and given the history of trauma it is assumed to have a traumatic etiology. In both traumatic and nontraumatic iritis cases, the IOPs tend to be lower in the affected eye due to a reduction in aqueous production from the inflamed ciliary body, but the pressure may elevate over time as inflammatory material obstructs the trabecular meshwork. However, if this occurs in a patient who is being treated with a corticosteroid, steroid response must be ruled out as the cause for the increased pressure.[3]

In both traumatic and nontraumatic iritis, the affected pupil tends to be smaller than the pupil in the nonaffected eye, but in some traumatic cases the pupil may be larger if an iris sphincter tear is present.[1] Unlike a nontraumatic iritis, a TI often resolves on its own if it is mild. In these cases, a topical cycloplegic alone may be used for patient comfort.[3] However, if unresolved, iritis may lead to posterior synechiae, blurred vision from keratic precipitates, corneal edema, increased IOP potentially causing glaucoma and cystoid macular edema.[1] Therefore, some advocate for aggressive treatment of significant inflammation. In this patient's case, the TI was moderately severe, and he was symptomatic at the initial presentation. Therefore, the decision was made to treat him with both a topical cycloplegic and a topical corticosteroid. The schedule of four times a day was selected for the steroid over a more aggressive therapy due to the relatively mild symptoms, as he complained of mild pain accompanying his photophobia and blurred vision.

With his inconsistent use of the medication, the iritis had mostly resolved 23 days after the trauma, and was completely resolved by the 43rd day. Does this information confirm that the patient should have been treated, or does it suggest that treatment was unnecessary? Also, what methods might have been employed to obtain better compliance by the patient and his mother?

Commotio Retinae

The patient also presented with CR. Fortunately, he had peripheral CR only, so it did not affect his visual acuity. This condition presents as a confluent area of whitening of the outer retinal tissue, and it is typically opposite the side of the impact due to the contrecoup effect of the trauma. The retinal blood vessels are unaffected, but intraretinal hemorrhages may accompany the retinal pallor.[1,9,10] When it is in the macular area, CR is referred to as Berlin's edema, and it can cause decreased visual acuity. In such cases, the CR can be measured subjectively with an Amsler grid or objectively with macular optical coherence tomography (OCT). The visual field may also be affected when CR is in the periphery.[10]

The underlying pathogenesis of CR is still debated, and there is no treatment. The patient is monitored for spontaneous resolution, typically occurring in several days. In this case, the retinal whitening resolved completely somewhere between seven and 16 days after the trauma. This coincides with one study that found resolution within 10 days.[11] The lesion typically resolves completely, but in some cases pigmentation remains or macular holes may occur.[11,12] In most cases, the vision returns to normal levels. However, in cases with more severe trauma, the damage to the photoreceptors and RPE is extensive enough to result in permanent vision loss.[11,12] A peripheral visual field may show persistent defects in cases with severe peripheral CR.

Corneal Abrasion

Corneal abrasion is another common transient finding in ocular trauma. It occurs when the corneal epithelium is compromised, exposing its basement membrane and superficial corneal nerves. Therefore, patients with corneal abrasions will complain of significant pain, photophobia and foreign body sensation.[13] They will have an isolated epithelial defect that stains with sodium fluorescein, and they may also have injection to the conjunctiva. The goal of treating corneal abrasions is to promote healing of the corneal epithelium and decrease patient discomfort. To improve comfort, patients are treated with topical cycloplegics to control ciliary spasm. Depending on the size of the abrasion, these eye drops may be used anywhere from just once (in-office) to multiple times daily.[3] Because the corneal epithelium is the main barrier to infection, patients with corneal abrasions are also placed on prophylactic broad-spectrum antibiotics until the lesion is healed. If the abrasion is large or if the patient is significantly uncomfortable, then either a bandage contact lens or pressure patching can be used overnight. This also helps promote healing of the epithelium, as either there is a buffer between the lid and cornea (with a bandage contact lens) or the lid is immobilized preventing re-abrasion from blinking (with patching). However, if the patient is a contact lens wearer or if the eye was scratched by something that may cause infection (e.g., vegetable matter), then neither contact lenses nor patching should be performed.[3] Additionally, topical nonsteroidal anti-inflammatory eye drops can be used to alleviate pain. However, topical corticosteroids and topical anesthetics are contraindicated because they slow the healing process.[3,13] These patients are watched closely until the cornea is re-epithelialized. Any patient with a bandage contact lens or patch should be seen within 24 hours, and other corneal abrasions should be seen within three days. Once the lesion has healed, the practitioner may educate the patient on the possibility of future recurrent corneal erosion, especially in the case of a large abrasion.[3]

Hyphema

As noted previously, hyphema is a common presenting sign of ocular trauma, though this patient was fortunate enough not to have it. Hyphema presents as blood in the anterior chamber, ranging from only a few red blood cells (erythrocytes) seen with a biomicroscope (microhyphema) to a completely blood-filled anterior chamber that can be seen without magnification ("8-ball" hyphema).[1] It is commonly caused by a tear in the ciliary body resulting in damage to the iris vasculature.[14] Patients present complaining of blurred vision and pain. If a TI is also present they may complain of photophobia as well. Treatment of these patients is focused on preventing re-bleeding while the blood reabsorbs and is guided by the amount of the anterior chamber that is filled with blood. It is generally suggested to hospitalize those with an "8-ball" hyphema and noncompliant patients (e.g., small

children).[4] Most other patients can be treated on an out-patient basis with strong topical cycloplegics and topical corticosteroids. The cycloplegic (i.e., atropine 1%) helps to immobilize the iris and ciliary body in an attempt to prevent re-bleeding. The corticosteroid (i.e., prednisolone acetate 1%) will also help prevent re-bleeding by stabilizing the blood-aqueous barrier.[4] Additionally, it will help resolve a concurrent TI. In cases where the IOP is elevated due to aqueous outflow being blocked by red and white blood cells, typically occurring with total hyphemas, topical glaucoma medications can be used, but prostaglandin analogs and miotics should be avoided.[1,3] In the case where IOP is normal or low in the presence of a total hyphema, the practitioner should investigate for a penetrating injury.[3] Patients with hyphema are also asked to limit activity and sleep with their heads elevated to promote reabsorption of the blood. Often a shield is recommended to protect the eye, but the patient should be able to see through it to monitor for a change in vision. They are warned not to take any medications that may decrease clotting of the blood, such as aspirin or other nonsteroidal anti-inflammatory drugs. They are monitored daily initially until improvement is seen. If IOPs cannot be controlled by topical medications, or if significant corneal endothelial blood staining is seen, then surgical evacuation of the hyphema is indicated.[1,4]

As previously mentioned, patients of African descent should be questioned as to their sickle status in the presence of hyphema, as these patients have an increased risk for re-bleeding and elevated IOP. Sickle cell anemia may cause elevated IOP due to the abnormally shaped erythrocytes having a higher likelihood to block the trabecular meshwork.[4] If a patient with sickle cell anemia has elevated IOP, carbonic anhydrase inhibitors and alpha$_2$agonists should be used with caution, due to their effects on erythrocyte sickling and iris vasculature, respectively. If an African American patient is unsure of his/her sickle status, blood work should be done to verify this. Additionally, any patient with a blood dyscrasia, bleeding disorder, or who is on anticoagulant therapy should be watched closely, and the primary care physician should be consulted.[3]

Angle Recession

Angle recession is a permanent sequela of closed-globe trauma, and it has been reported to occur in 70%-100% of eyes with hyphema.[3] It is defined as a rupture between the circular and longitudinal fibers of the ciliary body. This tear is usually symptomless, so it is the examiner's responsibility to identify it upon gonioscopic evaluation. With a gonio lens, the ciliary body will appear widened in one portion or 360° compared to the adjacent angle or the other eye. The exposed ciliary muscle appears light gray or tan as compared to the normal dark ciliary band, so it is typically an obvious distinction.[14] While angle recession does not increase the IOP, it does correlate with an increased risk for post-traumatic glaucoma. A reported 4%-9% of patients with angle recession of 180° or more of the angle will go on to develop glaucoma at some point, typically years, after the trauma.[3,15] Therefore, they should be monitored at minimum yearly.

Post-Traumatic Glaucoma

Post-traumatic glaucoma is the most significant concern after closed-globe trauma. It can be classified as either a rise in IOP soon after the insult, or late-onset increased IOP. These classifications have different etiologies.

As discussed previously, the etiology of an early-onset IOP increase can be pupillary block caused by lens dislocation or disruption of the trabecular meshwork due to injury, inflammation or obstruction. With the former, surgery is indicated to remove the lens. With the latter, the glaucoma is treated similarly to primary open angle glaucoma or secondary closed angle, depending on the mechanism of blockage.[10] The rise in IOP is typically related to the severity of the damage sustained from the trauma. The medications of choice in these situations are those that decrease aqueous production due to the decreased outflow: topical beta-blockers, alpha$_2$agonists, carbonic anhydrase inhibitors, and, possibly, corticosteroids.[14,15]

Even if the patient exhibits no signs of increased IOP initially, the risk for late-onset post-traumatic glaucoma exists. These patients develop glaucoma sometime after the trauma, often many years later. This type of glaucoma is often called "angle-recession glaucoma," as it can be seen among those with significant angle recession (though with low prevalence). However, this may be a misnomer, as the increase in IOP may not be caused by the angle recession itself. Instead, the IOP rises in response to the obstruction of aqueous outflow due to scarring and degeneration of the trabeculum that occurred after the initial trauma, and the recession is just an indicator of previous trauma.[15] This outflow obstruction can also be caused by the growth of a Descemet-like membrane over the anterior chamber angle.[16] There is some thought that these patients have a predisposition to decreased aqueous outflow, causing them to be more susceptible to glaucoma post-trauma.[17] They are also treated with medications to reduce aqueous production, as well as, potentially, prostaglandin analogs to increase uveoscleral outflow.[14] Miotics are avoided, and laser trabeculoplasty has been shown to have little effect on IOP reduction. Filtering surgery can be considered for patients not adequately controlled medically.[14]

It is due to the concern for the development of late-onset post-traumatic glaucoma that patients should be educated to obtain annual comprehensive examinations, and they should know to tell all future eyecare providers of the trauma.

This patient currently has no indications of permanent damage from his ocular trauma. Both his TI and CR resolved completely, and there are no signs of retinal breaks or angle recession. How often should he be monitored? With what tests should he be monitored? What education should be given to the patient and his mother regarding his prognosis?

Prevention of Pediatric Eye Injuries

Eye injury is the main cause of monocular visual disability and blindness in children in the United States. Developmental disabilities may result from such visual impairments which can lead to long-term financial and quality of life concerns.[18] This issue is of such importance that it is included in the

Healthy People 2020 initiatives: "to reduce visual impairment and blindness in children and adolescents age 17 years and under, and increase the use of protective eyewear in recreational activities and hazardous situations around the home."[19]

In one large study, looking at pediatric eye injuries treated in U.S. emergency rooms from 1997-2006, sports was the most common category associated with eye injury, followed by household cleaning chemicals, toys (not including toy guns), furniture and desk supplies.[18] Age-related patterns were also found in this study. Eye injuries related to sports, swimming pools/equipment, toy guns and recreational vehicles increased with age. Injuries due to household cleaning chemicals, furniture and baby items decreased with age.[18]

It is suggested that pediatric eye trauma may be largely prevented by the education of children, use of protective eyewear and increased parental supervision. These tactics may be tailored accordingly.[18] For example, the American Academy of Pediatrics and the American Academy of Ophthalmology strongly recommend protective eyewear for all participants in sports in which there is risk of eye injury. Protective eyewear should be mandatory for athletes who are functionally one-eyed and for athletes whose eyecare providers recommend eye protection after eye surgery or trauma.[20]

What are other examples of patient and guardian education related to ocular injury prevention?

Concern for Child Abuse in Pediatric Ocular Trauma

As primary care providers, optometrists may need to determine whether an ocular injury is the result of abuse. A misdiagnosis of child abuse can have serious consequences for a child and family. However, a child who is a victim of unreported child abuse can suffer further abuse and even death.[21] As optometrists, we have an ethical, moral and legal obligation to report suspected abuse in order to protect the child.

A detailed history is important in trauma cases.[21,22] It may be helpful to allow the parent to lead the history with a narrative of the injury.[22] Use direct, open-ended, non-leading questions when talking with the child.[22] Red flags that may alert the provider to possible abuse include a history that is inconsistent with the injury, no explanation offered for the injury, history that is inconsistent with the child's developmental level, and/or injury blamed on another child or sibling.[21] Additionally, conflicting histories given by caretakers, delay in seeking medical care, and doctor-shopping may be indicators of physical abuse.[22] If abuse is suspected, questioning the child and parent separately, if possible, may be helpful.[21,22] As in any clinical diagnosis, the examination findings should correlate with the history.

Healthcare providers are mandated by law to report suspected abuse. Providers are not required to prove the abuse occurred prior to reporting, and, in fact, they are immune from legal and civil liability when reporting concerns for child abuse. Furthermore, providers who fail to report concerns of child abuse to child protective services can be prosecuted.[22] Optometrists should be aware of their individual state reporting laws and child protective service contacts. In 2008, the U.S. Department of Health & Human Services published a report: Mandatory Reporters of Child Abuse and Neglect: Summary of State Laws. This may be found at: http://www.childwelfare.gov/responding/mandated.cfm. [22] Most states have toll-free numbers for reporting suspected abuse.[23] A list of child abuse reporting numbers may be found at: http://www.childwelfare.gov/responding/reporting.cfm. [24]

Conclusion

This case is representative of the types of trauma cases optometrists frequently encounter. It is important to be cognizant of the possible ocular effects of trauma and the potential long-term effects. Patients with nonpenetrating ocular trauma should be evaluated for the presence of subconjunctival hemorrhage, corneal abrasion, traumatic iritis, hyphema, choroidal rupture, blow-out fracture, traumatic optic neuropathy, retinal hemorrhages, commotio retinae, angle recession and retinal breaks. The patient's risk for the development of post-traumatic secondary glaucoma should be assessed, and the patient should be counseled on the risk for its development in the future, as well as future ocular injury prevention. In cases of pediatric trauma where physical abuse is suspected, optometrists are required to report the case to appropriate authorities for further investigation.

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Tobacco Dependence Education in Optometry: A Canadian Pilot Study Assessing Practices and Opportunities

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Abstract

Optometrists should be part of the healthcare team addressing tobacco prevention and cessation among patients. As part of a pilot Canadian study, we interviewed 18 optometry students and 11 community optometrists to identify the training they have received regarding tobacco use, dependence and cessation. Their training was limited to knowledge about tobacco-related ocular and systemic risks and some skills in asking about smoking behavior in patients older than 15 years. Their training left them lacking necessary: 1) knowledge about tobacco dependence and cessation, 2) skills in communicating tobacco advice, and 3) attitudes regarding their potential role in tobacco prevention and cessation.

Key Words: *Tobacco use, tobacco cessation, optometrists*

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Introduction

Tobacco use is a known preventable cause of premature death and a less known preventable cause of blindness. There is increasing evidence that healthcare providers can positively affect tobacco cessation among their patients. While optometrists are primary healthcare providers, their voice has been largely silent in health policy documents that guide healthcare providers about tobacco cessation. In view of these factors, we sought to identify some of the key behaviors and attitudes among Canadian optometrists and optometry students regarding asking patients about their tobacco use and making tobacco cessation referrals. This paper reports on the findings of a preliminary Canadian study that pertain specifically to the training optometry students and optometrists receive regarding tobacco use, dependence and cessation strategies.

Major Health Impact of Tobacco Use

Tobacco use includes not only smoking cigarettes but also less common tobacco practices such as chewing tobacco, sniffing tobacco nasally (dry snuff) and inserting tobacco between the lower lip and teeth (moist snuff). The vast majority of the research causally linking tobacco use to morbidity and mortality has focused on smoking cigarettes, in part because of its much higher prevalence. For example, while 17.9% of Canadians smoke cigarettes, fewer than 1% use smokeless tobacco.[1] Research linking tobacco use to eye disease has strictly addressed smoking cigarettes. Smoking is one of the most preventable causes of premature death globally.[2] While numerous diseases have been causally linked to smoking, the leading causes of premature death are coronary artery disease leading to myocardial infarctions and cerebrovascular accidents, lung cancer and chronic obstructive pulmonary disease.[2] Public awareness of the negative consequences of smoking is generally high for these diseases. For example, studies in the United Kingdom and Singapore reported that most surveyed patients knew that smoking causes lung cancer and heart disease (>85%) as well as stroke (>70%).[3,4]

While most patients understand that smoking causes premature death, the

proportion who understand smoking causes blindness is generally much lower, typically less than 10%[3,5,6] with one study[4] reporting 31%-37%. This limited awareness is a significant problem because smoking has been shown to cause several eye diseases through ischemic and oxidative mechanisms.[7] Smoking has been causally associated with age-related macular degeneration,[8-12] nuclear and posterior subcapsular cataract,[13-18] thyroid-associated ophthalmopathy,[19-21] optic neuropathies[22-24] and uveitis.[25,26]

Healthcare Practitioners Addressing Tobacco Use

The role of healthcare practitioners in clinical practice addressing tobacco use is supported by an increasing recognition that tobacco use and dependence is a preventable cause of morbidity and mortality and healthcare providers can be effective facilitators of tobacco cessation among their patients.[27-32] The U.S. Surgeon General's Web site provides a detailed position paper, "Treating Tobacco Use and Dependence: 2008 Update."[33] This document was developed by stakeholders from medicine, nursing, dentistry, pharmacy, epidemiology, public health and psychology. Unfortunately, optometry is notably missing as a stakeholder informant or as an identified user of the document. Optometry has also yet to be a stakeholder in the development of Health Canada's graphic warning labels for tobacco products. (Some of the labels under review are posted at the Tobacco Labeling Resource Centre, http://www.tobaccolabels.ca/). The exclusion of optometry has occurred despite the current review of a label addressing smoking and blindness. There are two key strategies healthcare practitioners, including optometrists, can use to effectively address tobacco use with their patients: 1) support tobacco cessation and 2) prevent patients from starting to use tobacco.

The justification for optometrists providing cessation advice is supported by several studies. First, Gorin and Heck[34] found that tobacco quit rates increase when patients receive advice from "any health care professional." Second, Thornton et al.[35] found other healthcare practitioners (e.g., pharmacists) are successfully including the link between smoking and blindness in their cessation advice. And finally, studies of patient perceptions show that quit advice is welcomed and expected.[36-38] Our literature search also revealed an encouraging pattern of calls for optometry to participate in tobacco cessation strategies.[39-44]

A number of tobacco cessation counseling strategies exist, but perhaps two of the most known are the 5A program promoted by the United States Public Health Service[45] and the ABC tool promoted by the New Zealand Smoking Cessation Guidelines Group.[46] The 5A program encourages practitioners to:

1. ask about tobacco use at every visit
2. advise those using tobacco to stop
3. assess the readiness of those using tobacco to attempt quitting
4. assist those using tobacco with treatment and/or referral
5. arrange follow-up discussions at subsequent visits.

The ABC tool reminds practitioners to:

1. ask patients about their tobacco status
2. provide brief advice
3. give evidence-based cessation support to tobacco users wishing to attempt quitting.

Healthcare practitioners may also play a role in tobacco use prevention; knowing the negative consequences of tobacco may help deter some youth from starting to use it. In fact, a study[5] of 260 British youth (16-18 years old) found that in comparison with lung cancer, heart disease and stroke, blindness was the least known but most feared consequence of smoking cigarettes. Such findings underscore the perceived importance of sight and point to a possible motivator in both tobacco prevention and cessation advice.

Tobacco use, prevention and cessation curricula within health professional schools and colleges are occurring in medicine,[47-54] nursing,[55-57] dentistry,[58,59] dental hygiene,[60,61] and pharmacy.[62,63] To date, only Hoppe[40] has described in the literature a curriculum in a U.S. optometry program, calling for smoking cessation education to become "an integral part of optometric clinical education." Hoppe described a two-hour module that followed the 5A program and included an informational handout packet as well as videotaped vignettes illustrating different ways to speak with patients about tobacco use.

Based on a review of the literature and anecdotal remarks of optometry students and optometrists encountered by members of the research team, we suspected there were notable training gaps regarding tobacco use and dependency both in the local Doctor of Optometry program and optometry continuing education courses. Our insufficient knowledge of the training optometry students and optometrists receive regarding tobacco prompted us to conduct this preliminary Canadian study and reflect on the resultant barriers and opportunities to optometrists addressing tobacco use and dependence among their patients.

Methods

Subsequent to institutional ethics clearance, focus groups were conducted with optometry students and community optometrists. The study occurred in the Waterloo Region of southwestern Ontario, Canada in the summer of 2009. The only English-speaking Doctor of Optometry program in Canada is located in this region.

Participants

At the time of the study, the potential participant pool included 51 practicing optometrists and 30 fourth-year optometry students (60 additional fourth-year students were away on external clinical placements). Recruitment goals were set at involving at least 12 optometry students and 10 optometrists. Recruitment methods involved an email, an information meeting and a letter for students. Optometrists received a phone call and information letter. Twenty interested students were scheduled into three focus groups (S1, S2 and S3) with seven, six, and seven participants, respectively. Two students dropped out of S2, leaving 18 student participants (15 women, 3 men). All students had completed a minimum of three years of university sciences before entering the four-year optometry pro-

gram. Eleven interested optometrists (7 women, 4 men) were scheduled into two focus groups (O1 and O2) with six and five participants, respectively. These optometrists had been practicing for approximately 20 years, on average, with an individual range from five to more than 30 years. All but one had graduated from the local Doctor of Optometry program. Participant identities were represented by numbers. For example, the seven members of student group S1 were numbered S1-1 to S1-7, and the six members of optometrist group O1 were numbered O1-1 to O1-6.

Focus Group Data Collection

The multidisciplinary research team, which drew from optometry, nursing and psychology, developed a set of interview questions and prompts for each participant group based on a consideration of relevant literature as well as clinical and/or research experience. The questions addressed attitudes, practices and training regarding smoking behavior and smoking cessation referrals in optometric practice. Focus group facilitators were experienced in tobacco control research. The student focus groups were facilitated by the study's principle investigator (RDK), and the optometrist focus groups were facilitated by a senior staff member in the University's Health Psychology Lab (KM). An additional research assistant (VZ) made field notes during the focus group discussions, which were audio-recorded and later transcribed verbatim.

Data Analysis

We followed an inductive qualitative framework approach[64] where data analysis informs theory (as opposed to more quantitative deductive approaches where data are applied to existing theory). Consistent with a framework approach, reading the focus group transcripts allowed the members of the research team to familiarize themselves with the data. Next, the team identified key issues, themes and concepts by which the data could be further examined. The team identified four broad themes to examine: current practices, rationalizations, barriers and opportunities. Data excerpts that fit with the identified themes were indexed in the transcripts and then rearranged into thematic charts. Finally, the thematic charts were examined with the goal of finding associations and explanations for the findings, a process referred to by Bryman and Burgess[64] as "mapping and interpretation." This paper examined the four themes as they pertained to training optometrists to facilitate tobacco cessation referrals.

Results and Discussion

Asking Patients about Tobacco Use

There was widespread agreement among the 18 optometry students that they were trained to ask adult patients about their smoking habits during a complete eye examination. As one student (S1-2) noted, "It's part of the standard [patient record] form … it should be asked pretty much every time they come in." Typical follow-up questions to patients, who reported smoking, were directed at determining how much they smoked daily and how long they had smoked. Several students asked patients if they had ever smoked. For example, one student (S3-1) pointed out, "Even if they say they don't smoke, I ask them if they ever smoked, like, did they quit? Cause they often answer 'No, I don't smoke' but … they quit like two years ago."

Further focus group discussions revealed limitations to asking patients about their smoking behavior. These limitations pertained to the clinic attended and patient age.

To date, the clinical training of these optometry students had been limited largely to rotating through a large on-site teaching facility with nine individual clinics. Full and partial eye examinations occurred in the largest (Primary Care) clinic, while most of the other clinics were referral-based, addressing specific areas of eye and vision care (e.g., contact lens, binocular vision, pediatrics, low vision, visual electrodiagnostics). The patient record used in each clinic was formatted to the perceived specific needs of the clinic. In the Primary Care (PC) Clinic, the interview section of the complete patient record included a series of 'yes' and 'no' ocular and medical history tick boxes, including one labeled 'Tobacco Use'. While the record indicated tobacco use, students asked only about smoking. Neither the PC Clinic partial exam patient record nor the patient records in the other clinics contained a tobacco memory cue. Thus, asking about tobacco use was implicitly compartmentalized in their training; they were prompted to ask about tobacco use during a complete eye examination but not during partial or other targeted areas of optometry care. For example, tobacco use might not be asked of the patients who were referred into the smaller clinics from external sites. The limitation of employing tobacco use questions to patients in the PC Clinic was typified by one student (S2-2), who said, "not for every exam; I think that's more for just in our primary care setting."

Further focus group discussions revealed some debate among the student informants regarding the patient age at which they should routinely start asking about tobacco use. The PC Clinic patients were at least 8-years-old because younger patients were seen in the on-site pediatrics clinic. Of the few students who were willing to specify an age, they had or thought they would routinely start asking patients who were 15- or 16-years-old. One student's (S2-2) comment was typical of other informants: "Yeah, I would feel uncomfortable asking like a 12-year-old … maybe 16." The Canadian Lung Association[65] reports that, on average, Canadian youth smoke their first cigarette before they are 13 years old, while Reid & Hammond[1] state that almost one in five Canadian youth, between 10 and 14 years, have smoked a cigarette. Thus, waiting to ask about smoking behavior until youth are at least 15 years old may miss identifying an important cohort of patients who smoke. In fact, the American Medical Association[66] has recommended that primary healthcare providers ask patients as young as 10 years old about their tobacco use to encourage both prevention and cessation. The optometry students agreed that asking youth about their tobacco use would only occur if their parents were not in the room; they assumed smoking questions could prompt tension or a lie if parents were present.

Two general approaches were taken by the 11 optometrists in the focus groups. At least half of the practitioners asked their patients about tobacco use only if they could tell their patients smoked (e.g., by smell) or if their patients

showed signs of eye disease that have been associated with smoking cigarettes. The remaining informants routinely asked first-time patients about their tobacco use, although this information might not be regularly revisited at subsequent appointments. For example, one optometrist (O2-1) noted, "I would say pretty much any patient usually over the age of 18, you'll bring it up. … If they're an existing patient then usually you just backtrack to the first [visit's record], just to see. You might ask if they've changed their habits. I'm not sure if it's a routine thing, like if we do it routinely or not."

Supporting Tobacco Cessation among Patients in Optometric Practice

None of the 29 informants had ever: 1) assessed the interest of their patients in changing their tobacco use, 2) made a referral to a tobacco cessation service, or 3) felt they knew how to make such referrals. As one student (S2-3) admitted, "I wouldn't even know what I would do if someone asked me." Most informants routinely provided risk advice for patients who smoked if they demonstrated eye diseases that were known to be causally linked to smoking; this was particularly true of age-related macular degeneration. A few of the students were hesitant to speak about smoking to their patients. There was a concern of going "too far" in discussing tobacco use with patients. Typical of other student informants, one optometry student (S1-6) stated, "I don't get into a big discussion with them but just as a 'just to let you know'."

The optometrists were more comfortable discussing the eye risks of tobacco use with patients but these discussions were triggered typically only by evidence of smoking-associated eye disease being present, and they did not proceed to advising patients to change their smoking behavior. As one practitioner (O1-5) explained, "The topic will come up if the eye health evaluation warrants talking about risk factors. Typically, if there is some macular change and I ask 'Are you a smoker?' they'll say 'yes'. Then they become very quiet and it becomes a topic they don't want to engage in. And I don't take it any further than that … I have no educational materials in my office [about] cessation-related programs because my best guess is that their physician has already been sitting on them on that topic."

This optometrist's approach and rationale were echoed by other practitioners in the focus groups; there was an assumption that tobacco cessation support and referral was a role best-suited to family physicians. The optometry students also wondered whether cessation support was within their scope of practice but they did appreciate that their responsibilities transcended the visual system. Reflective of this professional identity struggle was this student's (S1-6) comment about cessation referrals: "This sort of does seem to fall in the realm of family physicians and that sort of aspect of their healthcare rather than ours, which might be an issue … so the barrier of taking care of the whole person not simply their eyes."

Specific Optometric Training

Overall, the 29 focus group participants felt their training to date had provided useful knowledge about the risks of smoking but no knowledge of tobacco prevention, dependence and cessation strategies and no skill in communicating cessation or prevention advice.

The optometry students summarized where in their four-year Doctor of Optometry program they had gained knowledge or skills relevant to tobacco use. Systemic diseases linked to smoking were presented in a systemic disease course, while eye diseases linked to smoking were addressed in more than one eye disease course. Thus, the presentation of various health effects related to tobacco use was fragmented, potentially affecting student recall of material and shaping risk prevention messages delivered to their patients.

Most students specifically recalled learning about the association of smoking to age-related macular degeneration. Some recalled learning about the risk of cataract and the complications associated with diabetes, and no student cited learning any other eye diseases linked to tobacco use. The students also recalled learning prevalence and incidence disease data related to smoking in a public health course but doubted the utility of providing this information to patients. While the students indicated they had learned how to deliver bad news to patients in their communication course, they had not received training on risk communication related to tobacco use. They also discussed their lack of training concerning tobacco dependence, cessation, referral options and cessation communication. For example, they were unsure how they would assess interest to quit smoking among their patients. The following two comments reflected some of their perceived gaps. (S2-4): "So even having conversations [in class] so that you could understand where those patients … are coming from ... because I have … no concept of what that's like. So to tell someone just to quit, it's not that easy just to throw away your pack of smokes … So somehow gaining personal experience so that you could understand would be helpful." (S3-4): "We don't really know much about what's available in the community here or in the communities where we will be practicing and that's not something we've really learned about at all and we probably should."

While the optometry students wanted to receive further training during their program in these areas, they also pointed to continuing education courses as a useful vehicle for training optometrists. For example, one student (S3-2) suggested, "A few hours on smoking and the effects on the eye, and counseling your patient, and information to provide your patients, and programs out there for your patients, I think that would be useful for all optometrists."

The optometrists recalled their training experiences relevant to tobacco use and cessation strategies being limited to school or continuing education lectures about smoking risks to the eye. No training about tobacco dependence, cessation options or related communication strategies had occurred. Typical of this stance was one optometrist's (O2-4) comment, "There hasn't been any. I haven't attended any lecture where somebody says 'Okay, you have a smoker, this is the action plan, this is what you should give.' It's just information that you could give the patient and saying it's a risk factor but as far as any strategies, nothing."

Optometrists in this region were required to complete a minimum of 70 hours of continuing education each three-year period, typically through approved lectures, workshops or electronic courses. While there was a clear emphasis

on disease management in existing continuing education programs for optometrists, no attention had been placed on a focused approach to incorporating the requisite knowledge, skills and attitudes needed to address tobacco dependence, cessation and prevention in optometric practice.

While all the focus group participants felt they lacked relevant knowledge and skills relevant to tobacco cessation support for their patients, there was a clear interest in addressing this gap.

Implications

This preliminary study provides an indication of the training and perceived competencies of Canadian optometry students and optometrists when addressing tobacco use and dependence among their patients. Overall, the 29 focus group participants felt their training to date had provided useful knowledge about smoking risks but no knowledge of the behaviors associated with tobacco use, dependence, cessation or prevention strategies and no skills in communicating advice relevant to tobacco use and dependence.

We found that training related to tobacco use was not addressed comprehensively. Future optometry students would benefit from learning about all the sequelae of tobacco use in a lecture or lecture series rather than in the current fragmented presentation across several compartmentalized courses. While the optometry students were generally more comfortable than the established optometrists regarding asking patients about their smoking behavior in routine eye examinations, their training could be further enhanced. For example, optometry students may benefit from learning to broaden their tobacco use history questions to patients who are: 1) using smokeless tobacco (e.g., chew or snuff), 2) attending partial or targeted appointments, 3) younger than 15 years, and 4) accompanied by parents. Organizational changes to the on-site teaching clinic would be needed to support these educational initiatives.

Our findings identify the need for additional notable curriculum development in the Doctor of Optometry program we studied. Curriculum revisions could enable optometry students to: 1) gain knowledge about tobacco prevention, dependence and cessation strategies, 2) develop skills in communicating advice regarding tobacco use and dependence, and 3) acquire attitudes that perceive optometrists as one of the healthcare practitioners that can help their patients attempt cessation strategies. Only one other tobacco-related curriculum in an optometry program has been described in the literature[40]; it focused on providing tobacco advice strategies in optometric practice. The limited attention in the optometric education literature on tobacco dependence and cessation curriculum suggests the potential need for further curricular development and sharing among optometry programs. The limited optometric training found in this study regarding tobacco use and dependence raises the question of whether other addictive drugs and dependence are being addressed. While this was not the purview of this study, greater attention in optometric curricula to this broader issue may also be warranted.

The optometrists in this study also lacked similar tobacco dependence knowledge, skills and attitudes noted among the optometry student participants. Strong support existed among all the informants to develop professional continuing education courses in this area. This study may present the impetus for continuing education providers to develop suitable curricula for practicing optometrists.

Our findings are part of a broader preliminary study[67] examining the practice patterns, rationalizations, barriers and opportunities to optometrists making tobacco cessation referrals. These collective findings will be helpful in designing a national study of tobacco use and cessation practices in Canadian optometry. While this preliminary study points to areas where training needs to improve, we were encouraged by the interest of the optometrists and optometry students in finding ways to increase their role in tobacco cessation support for their patients.

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