The Journal of the Association of Schools and Colleges of Optometry

OPTOMETRIC EDUCATION

Volume 35, Number 3 Summer 2010

The Development of Entry Level Low Vision Rehabilitation Competencies in Optometric Education

Also inside:

- Yoda and Mr. Clean on TV and in a Digital Universe
- Optometric Student Gender Trends and the Importance of Diversity
- Vernal Keratoconjunctivitis: A Teaching Case Report

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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OPTOMETRIC EDUCATION

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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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SUMMER
2010

The Journal of the Association of Schools and Colleges of Optometry

Cover photo: courtesy of The Ohio State University College of Optometry

OPTOMETRIC EDUCATION is published by the Association of Schools and Colleges of Optometry (ASCO). Managing Editor: Virginia Pickles. 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. Postage paid for a nonprofit, tax-exempt organization at Rockville, MD.

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.

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Transitions Awards "Students of Vision" Scholarships

Supported by the Transitions Healthy Sight for Life Fund, the Students of Vision scholarship program awarded scholarships to optometry and opticianry students from the United States and Canada. This year's theme was "Focus on Children's Vision." Projects were judged by Transitions Optical representatives, eye care professionals, and marketing specialists. To encourage creativity and a wide range of interpretations, projects were accepted in three categories: Activity/Event, Multimedia, and Other. The Fund awarded $1,000 scholarships for first place. Additional winners received $500 scholarships.

"Switching the focus this year to children's vision enabled the students to take a creative look at how they would interact with young patients," said Carole Bratteig, professional development and education manager, Transitions. "We could not be more pleased with the entries received this year. I have faith that the next generation of patients will be in good hands with these students of vision."

Winning entries will be featured on the Transitions Healthy Sight for Life Fund website, www.HealthySightforLife.org.

Winning Optometry Entries:

- First place, Activity/Event: Nicole Pogue, University of Missouri–St. Louis
- Video of on-site program, Elementary School Presentation
- First place, Multimedia: Trung Tran, Southern California College of Optometry
- Video, "Jack Goes to the Eye Doctor"
- First place, Other: Doua Lor, Salus University
- Education piece, "Olly the Owl Healthy Eyes Fowl"
- Additional winners: Pravina Patel, Nova Southeastern University; Marilyn Zuniga, Illinois College of Optometry; Amy Lin, The Ohio State University; Naomi Aguilera and Leslie Rosenthal, Nova Southeastern University

B+L Sponsors Educational Series

The Academy of Vision and Eye Health Series, sponsored by Bausch + Lomb, is an educational series that promotes discussion of the latest trends and needs in vision care and the role of eye care professionals in protecting the eye health of their patients. The goal of the series is to challenge optometrists to think about the founding principles of optometry: providing superior vision and eye health to patients. Additionally, the programs discuss the art of refraction, optics, patient education and compliance, patient communication, and practice dynamics.

Programs have been held at Indiana University School of Optometry and Southern California College of Optometry. Each program has included members of the university faculty and local eye care professionals who provided their perspectives on how optometry is currently being practiced and how it may change with the optometrists of the future. Both programs were moderated by Tom Quinn, OD, MS, Athens, Ohio.

"This unique opportunity to participate in the B+L Academy of Vision and Eye Health Series allowed

educators and practitioners to share insights into the changes in practice prescribing habits," said Harue J. Marsden, OD, MS, Associate Professor, Chief, Cornea and Contact Lens Department, Southern California College of Optometry. "Many of these challenges have been gradual and often overlooked. This fresh perspective of integrating the changing dynamics of optometric education and clinical practice allowed me to reflect on how to integrate the two more comprehensively."

Dr. Rhonda Robinson, Indianapolis-based optometrist, said, "I think this is an important series because there's no question in my mind that, as a profession, we have really forgotten our identity. Who we are and what we do, first and foremost, is provide the very best vision for everyone who walks in our office. And I think somewhere along the way we have become desensitized as to just how important a responsibility that is."

According to the company, this series is designed to harness the rich and varied experiences of eye care professionals across the nation. It promotes engagement with and dialogue among the eye care professional community. The series is ongoing, and the next installment is in the early planning stages.

Vistakon Launches First SiHy Daily Disposable Contact Lens in U.S.

VISTAKON®
DIVISION OF
Johnson & Johnson
Vision Care, Inc.

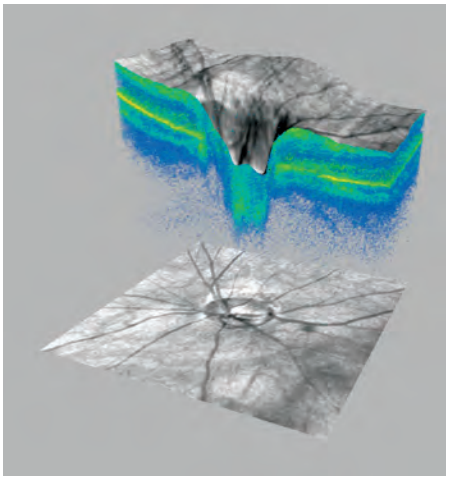
Vistakon, Division of Johnson & Johnson Vision Care, Inc., received FDA clearance to market narafilcon B, the first and only silicone hydrogel daily disposable contact lens in the United States. The company will market it under the name 1-Day Acuvue TruEye Brand Contact Lenses.

According to the company, an ongoing 1-year, 94-subject, randomized, investigator-masked, parallel group study compared patients wearing 1-Day Acuvue TruEye with patients who have never worn contact lenses. After 1 month of wear, 1-Day Acuvue TruEye was shown to have no significant effect on the ocular surface of the eye as compared to non-contact lens wearers across five of six contact lens-related measures associated with eye health. In addition, 1-Day Acuvue TruEye was shown to provide high levels of comfort from morning to night, comparable to wearing no lens at all.

Carl Zeiss Expands Diagnostic Capabilities

ZEISS

Carl Zeiss Meditec, Inc., expanded its glaucoma diagnostic capabilities with new software for the Cirrus HD-OCT. Software version 5, featuring optic nerve head analysis, provides automated identification of the optic disc and cup boundaries. The analysis is generated using the existing Optic Disc 200x200 data cube and a new proprietary Zeiss algorithm. This algorithm is designed to precisely measure the neuroretinal rim, while accounting for tilted discs, disruptions to the RPE and other challenging pathology. Optic nerve head calculations are presented in a combined report with RNFL thickness data. In addition, the boundaries of the cup and disc are displayed on the en face image, integrated with the RNFL thickness deviation map.



Allergan Receives FDA Approval for Zymaxid

ALLERGAN

Allergan, Inc., received FDA approval for Zymaxid (gatifloxacin ophthalmic solution) 0.5%, a topical fluoroquinolone anti-infective indicated for the treatment of bacterial conjunctivitis caused by susceptible strains of the following organisms: *Haemophilus influenzae, Staphylococcus aureus, Staphylococcus epidermidis, Streptococcus mitis group*, Streptococcus oralis*, Streptococcus pneumonia.* Zymaxid is the highest concentration gatifloxacin ophthalmic solution on the market in the United States.

According to the company, the efficacy of Zymaxid was assessed in two multicenter, double-masked, randomized dual-arm comparison studies involving 1,437 patients receiving either Zymaxid or vehicle. In the clinical studies, the efficacy of Zymaxid was defined as complete clearance of conjunctival hyperemia and conjunctival discharge, and when all bacterial species present at baseline were eradicated. Results of these studies demonstrated that at day 6, complete clearance of conjunctival hyperemia and conjunctival discharge was achieved in 58% of patients (193/333) treated with Zymaxid compared to 45% (148/325) in the vehicle group.

** Efficacy for this organism was studied in fewer than 10 infections.*

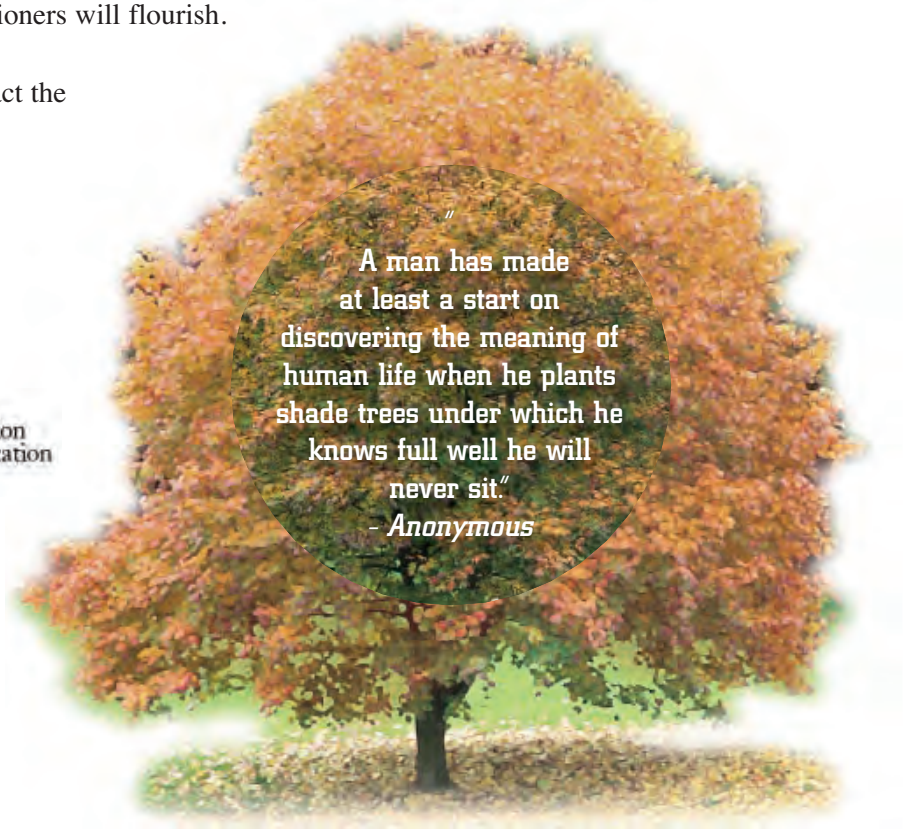
Have you thought about the future of Optometry?

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

Thank You, Dr Hoppe!

The Past and the Future

Aurora Denial, OD, FAAO

Two weeks ago, I assumed the responsibilities of editor of *Optometric Education*. In preparation for this new role, I spent the past year working with and learning from Dr. Elizabeth Hoppe.

Dr. Hoppe became the editor of *Optometric Education* in 2001. Although she has had many accomplishments as editor, one of her most significant was to broaden the number of contributors to the journal. Among the innovative ideas she introduced were two new features, the opinion-based "Think Tank" and the personal essay "My Best Day in Optometry." With Dr. Barry Kran, she developed and promoted "Teaching Case Reports," a format that combines a case report with significant educational guidelines. The goal of the teaching case report is to capture that teachable moment that often occurs in the clinical setting. In addition to offering educators the opportunity to have their teaching methodology peer-reviewed, this new format offers all clinicians the opportunity to contribute to the educational literature.

While supporting and advancing the mission of the journal, Dr. Hoppe was also an avid contributor to the journal. During her tenure as editor, she wrote eight articles for the journal, and over the course of her career, she contributed 13 articles. In 2007, she was the recipient of the Dr. Lester Janoff Award for Excellence in Writing. I look forward to future contributions to the journal from Dr Hoppe.

Working with Dr. Hoppe over the past year was a great learning experience. When interacting with authors, she had an amazing ability to detect and highlight positive qualities while providing the important critical feedback needed to produce high-quality educational manuscripts. Her ability to provide this feedback in a relaxed, supportive environment is a characteristic I will strive to attain and continue. In addition to learning about the skills needed to be an effective editor, I found working with her was always fun.

I would like to thank Dr. Hoppe for all her hard work and patience over the past year, as well as the time, energy, and leadership she has contributed to the journal. She has had an enormous impact on the optometric educational literature base, which ultimately has impacted the profession.

In addition to working with Dr. Hoppe over this past year, I have met several significant goals. In an effort to reach out to faculty to provide information about the journal and to receive feedback on how the journal can support and advance education, I completed a series of visits to several optometric institutions. I plan to continue these outreach efforts until I have visited all of the schools and colleges of optometry.

I am also happy to report distribution of the link to the journal has been expanded to include the executive directors of the 50 state societies, 30 optometric international institutions, Veteran's Administration hospitals and several other organizations, such as World Council of Optometry. The journal was highlighted with an informational poster at the American Academy of Optometry annual meeting in 2009, and we will be participating in the World Council of Optometric Education Meeting in September.

The development of theme issues is a way of guiding and focusing information on important topics. Future themes will focus on the challenging student, implementation of critical thinking, and the importance of scholarship.

This issue of the journal explores several important topics. Dr. Rebecca Kammer and coauthors report on the process of developing competencies and consensus in low vision education. This paper also illuminates the changes in the delivery of low vision rehabilitation and the impact of the changes on optometric education.

Dr. Shilpa Register explores the changing gender trends in optometry and their impact on the profession. She discusses lessons we can learn from other professions and how these trends affect optometric education.

Dr. Trinh Khuu and I offer a teaching case report on vernal keratoconjunctivitis. This report combines an interesting case with specific educational guidelines.

Finally, we are able to move forward because of the past. The Association of Schools and College of Optometry's Resolution (page 85) to Dr. Hoppe expresses appreciation and good wishes. A collage of Dr. Hoppe's contributions to the journal is displayed on page 86.

RESOLUTION

Elizabeth Hoppe, OD, MPH, DrPH

Whereas, Dr. Elizabeth Hoppe, Founding Dean at the College of Optometry at Western University for Health Sciences, former Associate Dean of Academic Affairs at the New England College of Optometry, and former faculty member at the Southern California College of Optometry, has worked passionately and tirelessly to advance the profession of optometry through optometric education; and

Whereas, Dr. Hoppe has supported the Association of Schools and Colleges of Optometry in numerous capacities, including service as chair of a Critical Issues Seminar on Defining Entry Level Competencies, which led to the development of a Model for Entry Level Determination; and

Whereas, Dr. Hoppe has served ASCO on the Financial Affairs Committee, the Academic Affairs Committee, the Evidence-Based Health Care Task Force, as Board Liaison to the Optometric Informatics Special Interest Group, and as a presenter and mentor at the Summer Institute for Faculty Development; and

Whereas, Dr. Hoppe served with distinction for 5 years as Editor of *Optometric Education*, the journal of the Association of Schools and Colleges of Optometry, during which time she advanced the mission of the journal while upholding the highest editorial standards; and

Whereas, During her tenure as Editor, Dr. Hoppe introduced innovative new columns and departments to engage readers, spark interaction and create an environment conducive to open exchange among optometric educators on timely and important topics; and

Whereas, Dr. Hoppe was a recipient of the Dr. Lester Janoff Award for Writing Excellence in 2007 and has selflessly mentored authors in pursuit of editorial excellence; and, therefore, be it

Resolved, That the Board of Directors of the Association of Schools and Colleges of Optometry expresses its earnest and deeply felt appreciation to Dr. Hoppe for her commitment to optometric education and her tireless efforts on behalf of ASCO and the ASCO journal, *Optometric Education*; and, therefore, be it further

Resolved, That the ASCO Board of Directors extends its warmest best wishes to Dr. Hoppe for her continued personal and professional success.

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The Journal of the Association of Schools and Colleges of Optometry
OPTOMETRIC EDUCATION
Instilling Ethics and Professionalism in Today's Optometry Students
Barbara McGinley, M.A.
Nancy B. Carlson, O.D., FAAO
Elizabeth Hoppe, O.D., M.P.H., Dr. PH, F.A.A.O.
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David A. Heath, O.D., Ed.M. (Co-Chair)
Elizabeth Hoppe, O.D., M.P.H. (Co-Chair)
Morris Berman, O.D., M.S.
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Beth Schultz, O.D., M.S., F.A.A.O.
What Were They Thinking? Surveying Study Practices of Entering Students
Barbara McGinley, M.A.
Nancy Carlson, O.D., F.A.A.O.
Elizabeth Hoppe, O.D., M.P.H, Dr.PH., F.A.A.O.

Think Tank ...

"What challenges do optometric educators face when integrating low vision education with entry level competency and how can we overcome these challenges?"

A significant challenge is clinically educating students to the appropriate level of low vision care. It is rare to find an externship that truly does entry level low vision care; most "low vision" externships perform advanced low vision care. The new graduate then looks at low vision as an "all or none" practice pattern. She/he sees the ideal, advanced low vision clinic that includes a wealth of interprofessional providers, extensive (and expensive!) equipment and thinks, "I can't manage/afford to do that, especially in my entry level practice." The graduate then slowly becomes less comfortable in low vision, which perpetuates the polarization. The challenge for educators is to find clinical practices that perform entry level low vision, or to encourage practices to begin to include low vision and to have these sites specifically include this practice modality in their externship program.

Kierstyn Napier, OD, FAAO
Chief of Low Vision Rehabilitation
Western University of Health Sciences
College of Optometry

Low vision education is of major importance for our profession. As the population ages and life expectancy increases there is a huge need for more low vision specialists nationally and internationally. Low vision is one area in which optometrists often take the lead role.

Low vision education includes classroom instruction and clinical experience. When first encountering a patient with low vision needs, students typically become overwhelmed. The initial fear can be a barrier for teaching. However, it can be used as an opportunity to encourage students to learn more about the causes of a disease, the necessary testing, and the appropriate management. Delivering a high level of patient care and providing a good educational experience in a busy clinical setting is challenging. It may be necessary to bring the patient back at a later time. A follow-up visit provides an opportunity for students to learn more about the condition and its proper management. Clinical instructors who are not low vision specialists are also challenged to review the management possibilities for the patient and to consult with other instructors who are more knowledgeable about the subject. This, in turn, teaches the students the importance of seeking help and reviewing knowledge that may have been obtained in the past. It is in the instructors' hands to turn the students' feelings of fear into an exciting, challenging learning experience and to provide appropriate patient care.

Marcela Frazier, OD, MHP
Assistant Professor
University of Alabama at Birmingham
School of Optometry

My biggest challenge is convincing students that basic low vision care is part of primary care optometry in the broadest sense of the term. Students tend to believe that any low vision rehabilitation is "specialty work," best provided by those with advanced training. Just as prescribing vision correction, addressing accommodative disorders, fitting gas permeable contact lenses, and diagnosing and treating primary open-angle glaucoma all fall within the realm of the primary care optometrist, so too does providing some degree of low vision care.

Optometrists, by definition, are eye care generalists, and as such should demonstrate entry level competency in all aspects of optometric clinical care. Once I get my students to "buy into" the concept of full-scope optometry that includes some degree of low vision rehabilitation, it becomes a more meaningful experience for them.

Joseph J. Pizzimenti, OD, FAAO
Associate Professor
Nova Southeastern University College of Optometry

Even at the mention of the words "low vision," most students already have a negative connotation in their minds. Taking a closer look at why this might be and how educators can counteract these feelings is crucial to bringing low vision back to the primary care arena. Two areas need to be addressed to better allow students to feel more prepared to treat this patient population.

Taking a patient history is an art form. This is true in all aspects of vision care, but its importance in the area of low vision cannot be underestimated. Not only does the low vision history include visual and medical history, but it also is necessary to inquire about the patient's visual needs as well as his social history. The saying goes, "See one, do one, learn one." This should be the principle used in learning how to take a proper case history. This process should be implemented in the laboratory portion of a low vision course in the form of patient history demonstrations. Using fellow upper level students who are currently in the clinic, faculty members, or even hired actors to play the "patient" roles will allow real-life scenarios. These sessions can be taped and reviewed, either with each student or as a class, to complete the learning experience. This type of exercise can help guide students in determining the questions to ask and the types of devices that might benefit the patient. A role-playing exercise should also cue students to the need for specialty referrals, such as orientation and mobility training or psychological evaluation.

Another major issue is the disconnect between how low vision is taught in the classroom and how it is practiced. The disconnect is caused by a subject that makes students cringe, math. In the classroom, low vision is taught in a rigid manner. There are formulas for everything from calculating the power of the required magnification to determining the working distance for a certain power reader. Even though I was among the throngs of students who were turned off by having to memorize formulas after having left optics behind, this basic understanding of the math of low vision is the foundation for treating patients. First, there needs to be greater use of case presentations with real-life scenarios in the classroom to cement the need for understanding and using the math they have had to learn by rote. Second, in the clinic, we must get back to reinforcing the long-forgotten formulas and how to use classroom knowledge to offer the best treatment for patients.

Although many clinicians might argue that low vision is not primary care optometry, this could not be farther from the truth. Treating the many facets of vision is the foundation of the profession. As we cannot choose the patients who walk into our offices or clinics, we must be prepared to assist them with all of the tools at our disposal. The use of low vision devices can change the outcome of patients' lives, economically, academically, and socially. Optometric educators must do all they can to show students the power of this primary care aspect of the profession.

Marc B. Taub, OD, MS, FAAO, FCOVD
Chief of Vision Therapy and Rehabilitation
Residency Supervisor, Pediatric and Vision Therapy
Southern College of Optometry

New Optometric Education Diplomate Program

In May, the American Academy of Optometry Board of Directors approved the first Optometric Education Diplomate Program. This is an exciting opportunity for all optometric educators. The Diplomate status implies achieving a level of recognized competency and distinction in a particular area of study. Now optometric educators will have the opportunity to gain this recognition. Criteria for the Diplomate Program are posted on the Academy's website. Congratulations to the Optometric Education Section for this initiative.

Ask the Next Question

Elizabeth Hoppe, OD, MPH, DrPH

Like many optometric educators who have been teaching for a while, I can think of several "best days" that have happened over the years. As I am completing my term as editor of this journal and embarking on the next exciting phase of my career in optometric education, I want to take this opportunity to reflect on one of my *first* best days. This memory has stayed with me as a source of inspiration and an important reminder for about 20 years.

Early in my faculty career, I spent a fair amount of time as a preceptor for third-year students in the primary care service. I always enjoyed working with these students, who were taking their first steps transitioning from the classroom to patient care. I took pleasure in helping them translate their book knowledge into solid clinical skills. One of the areas where I spent the most time was in helping to develop the students' communication skills. We did role-playing to practice patient education skills and to improve basic instructions for performing the different parts of the examination. We wrote and practiced scripts to provide information about common eye conditions. One area on which we worked particularly hard was enhancing history-taking skills.

I found that students were quite proficient in reciting a list of history questions. What they lacked, however, was the ability to handle the information they received. They had not yet developed the skill set or the comfort level to enable them to probe more deeply when necessary. It was a challenge for them to gain a better understanding of the information patients presented during the initial case history portion of an examination. It was not unusual for a student to report a "positive history of cancer" for a patient but not be able to describe when, what type of cancer, what type of treatment, and most importantly, how the *person* is doing now. One of my first "best days" took place in this context.

My bright and eager third-year student performed an excellent ocular health assessment of the anterior segment and reported the patient had significant staining on the inferior portion of both corneas. Although a number of causes may be associated with this sign, for some reason, based on the findings, it occurred to me the staining might be associated with nocturnal lagophthalmos. From past experience, I had noticed that many of my patients who presented with these signs were undergoing significant stress in their lives. I instructed the student to return to the examination room and ask the patient how she was sleeping at night and if she was experiencing anything particularly stressful.

Some time later, the student returned with a detailed story. When she asked the questions, her patient broke down in tears. About a year previously, the patient's daughter had been in a terrible car accident. The daughter sustained multiple severe injuries, including a significant traumatic brain injury. As a consequence, the patient was now caring for her impaired daughter and her young grandson on a 24-hour basis with no support services. The stress was just too much for her to bear, and she was experiencing a number of physical symptoms as a result, not the least of which was difficulty sleeping.

The student was understandably overwhelmed by the patient's circumstances and certainly had not expected her "routine" examination to take this dramatic turn. In this teachable moment, I had a conversation with my student, emphasizing these critical points: 1) when you open the door to receive information from a patient, you have to be prepared to deal with the situation further; 2) as a primary health care professional, it is your job to care for the whole patient; and 3) as a health care professional you are in a much better position to navigate the complexities of the health care system and health care services than your patients are.

Coincidentally, I had recently attended a community-based public health networking event. I recalled learning about an adult day care program at a rehabilitation hospital that provided care for individuals with traumatic brain injury. I dug through the papers in my office until I uncovered the brochure from the program. With my support and guidance, the student presented the information to her patient, provided the phone number, and encouraged her to call.

A few weeks later, toward the end of the term, I told the student it was time to follow up. The student pulled the patient's record and found time in her schedule to call the patient and touch base on what had transpired. The patient had indeed followed up on the

(continued)

referral. She enrolled her daughter in the program and was now transporting her to the center on a daily basis. This gave the mother and her daughter some much-needed support, and it allowed the grandmother to take better care of her grandson. It was still early in the process, but the patient was already experiencing some benefits to her overall health because she knew that her daughter was getting improved access to care.

This was a valuable learning experience for the student and for me. It started with making a clinical observation and asking a question. It involved creating a safe and comfortable environment for the patient to talk about an important issue. It involved listening with compassion. It involved taking the time to help in some way. I know this experience helped me become a better doctor and a better teacher. I hope it helped shape the career of the student who was involved.

All these years later, if I ever encounter the same situation, I will handle it differently. Now, I have a better understanding of interprofessional care, and I have better access to other professionals working together in the same health care team. I also have a deeper appreciation for the role optometrists play in rehabilitation of traumatic brain injuries. Next time, I might not be the one who finds the community resource. Instead, I might be the one to introduce my patient to members of an interprofessional team, who can all work together to coordinate her daughter's care. That is exciting to think about for the *next* 20 years!

Dr. Hoppe is Founding Dean at the College of Optometry at Western University for Health Sciences.

Invitation to Participate
Upcoming Theme Editions

Implementing the Teaching of Critical and Clinical Thinking

In optometry, critical thinking as it relates to clinical decisions and patient care is a specific outcome of the educational process. Many optometric institutions have initiated courses dedicated to teach critical thinking, clinical decision-making, and integration of knowledge. *Optometric Education* is announcing a future theme issue, which 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 issue**. To allow for additional time for outcomes assessment, the deadline to submit articles for this theme issue 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 announcing a future theme issue, which will focus on scholarship. The theme issue is scheduled for publication in 2012. We are sending this invitation early to allow for adequate time to design appropriate studies. We invite all educators and administrators to participate in this theme issue.

For additional information on the theme issues, contact Dr Aurora Denial, deniala@neco.edu

Yoda and Mr. Clean on TV and in a Digital Universe

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

Faculty are often called upon to play multiple roles within our educational universe. At the beginning of the day, we don the garb of the clinician and preceptor, and later, we may put on the laboratory coat of the researcher. The next day, we may be scheduled to teach a course and a laboratory, serve on an institutional committee, and hold office hours. In the middle of the week, we may go to a private practice where we integrate all the latest science into the art of optometry during our direct patient care experiences. The week may not be over yet, because on the next day, we may see one or more students with a wide variety of problems that require our person management skills and psychology degree (by life experience) to calm a distraught second year student.

But wait! There's more! On the next day, we fly out to Missoula, Montana, to give an invited lecture for the state association's annual meeting. The following week we're scheduled to participate in the American Academy of Optometry meeting, presenting a poster, and soon after that, we are taking the College of Optometrist in Vision Development Fellowship examination. We finally return to our respective academic institutions and realize the research manuscript we haven't started to write yet is supposed to be submitted for peer review today!

Our lives are busy and complicated but certainly worth the living. Making significant contributions to science, clinical practice, and our college community is all in a day's work for the academic. Our institutions frequently rely on us to be content experts. If you haven't been asked, forced, or cajoled into being interviewed by the ubiquitous media, you will. Fear not, this article will help prepare you.

The role of faculty and the media

We recently asked Dr. Elizabeth Hoppe, Founding Dean of the College of Optometry at the Western University of Health Sciences, her opinion of the role of faculty and the media, and why faculty should get involved with the media. According to Dr. Hoppe: "Media access has changed dramatically with new venues on websites, blogs, and social networking sites. Video clips are shared around the world, sometimes with unpredictable results. Media participation and interaction by faculty has the potential to positively affect the public's perception of the institution and can have significant and far-reaching impact. Faculty who interact with the media can increase student recruitment, faculty recruitment, research collaborations, fundraising, improve patient care delivery, and boost referrals for specialty care."

How to prepare for a media interaction

Jennifer Sopko, Director of Communications and Media at the Illinois College of Optometry (ICO), has these tips for interacting with the media:

- **Know what is expected.** How will the interview be used? Will it be live or taped? Will you or the institution be the focus or is the interview to be included in a larger story?
- **What's your point?** Decide before the interview what your main point is and try to convey that throughout the interview.
- **Remember the audience.** When answering questions, think about the family sitting on the couch. Talk to the audience, not to the reporter.

Dr. Goodfellow is an associate professor and 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. Are you a media content expert? Tell us what you are doing. We want to hear about it. E-mail dmaino@ico.edu or ggoodfel@ico.edu. Please visit http://www.MainosMemos.blogspot.com.

- **Keep it simple.** Try to avoid using industry jargon or technical language. Deliver your message in a way that the general public can understand.
- **It's OK not to know.** If you don't know the answer to a question, offer to look into it or refer the reporter to another source. Try to avoid "no comment" or giving a deliberately vague answer.
- **Be yourself.** Relax and be conversational.
- **Credibility is everything!**

Toni Bristol, a public relations and marketing expert at Expansion Consultants, Inc., agrees with Ms. Sopko and adds these points:

- **Flag your key message.** Tell the reporter what your main points are by prefacing your statements with, "The most important thing for your viewers to know is …"
- **Dress appropriately.** Strive for a professional, somewhat conservative look. For on-camera interviews, wear colors that light up your eyes. Avoid distracting clothing. Don't wear heavy makeup or jewelry that will catch the light. If you wear eyeglasses, your lenses should have an AR coating, and your frames should not block your eyes from the camera (Figure 1).

How do your colleagues prepare

American Optometric Association Board of Trustees member, media spokesperson and one of *Vision Monday*'s 50 Most Influential Woman, Dr. Andrea Thau recommends that you have no more than three main points and that you repeat them at least three times. She also recommends that you always mention optometry, doctor of optometry, and whomever placed the media piece or the organization you represent (ASCO, AOA, COVD, AAO, etc.). In addition, she says, do not assume you will be asked the question you want, but be ready to respond to their questions by weaving in your message.

ICO faculty member and public access television talk show host, Dr. Janice Jurkus agrees. To be prepared, she says, be sure to know the topic you'll be expected to discuss and always be honest. She also suggests that you speak in short, declarative sentences using "sound bites," avoid run-on sentences, and don't say "ahhhh" too much. Finally, she says, "If you are being photographed or appearing on TV, look either at the interviewer or at the camera. Do not look down or around the room." ICO's Dr. Valerie Kattouf adds, "Keep your responses brief and avoid 'doctor' language while coming across in a natural, unscripted, and conversational manner."

Figure 1
When interacting with the media, always dress professionally and conservatively.

Who, what, when, where, how and why?

Any good 1950s movie about newspaper reporters always emphasized that, as a reporter, you needed to know who, what, when, where, how, and why, and then verify the facts even if you were quoting your mom. We can use these key words as guidance for our interactions with the media.

• *Who.* Today the "who" of potential media that need our content expert skills is endless. Not only do we have television, radio, and newspapers, but we now have social digital media, such as Facebook, MySpace, Twitter, YouTube, and SOVOTO. We have digital encyclopedias written by readers and blogs that attract national and international followings. One of modern day's digital conundrums is not that we have limited information, but that we have access to way too much information without appropriate filters in place.

Radio and television interviews often are live, which means your message goes out to the target audience immediately. You only get one shot to convey your points in a clear way. Newspaper and magazine interviews, however, are generally a little less formal, which gives you more opportunity to think about your words and to rephrase as necessary to deliver your message. The one drawback with this medium is that your words can often be misinterpreted by the writer who assembles the final story. I (GG) have had my comments taken out of context on occasion, and it is considered professionally unacceptable to ask to edit the final manuscript before it is published; however, some authors will extend the courtesy of reviewing the manuscript for any errors prior to publishing.

• *What.* What can you, as a faculty member, contribute to this somewhat riotous cacophony of frenzied media output? Quite a bit, actually. If your institution's public information team does not come to you, you should go to them. Start with what you know and then take a look at the current "hot" media topic. Perform a Google search or set up a Google and/or PubMed alert to stay informed about topics being discussed in

the realm of cyber media and to receive the latest published research. If any topics fit your content expert résumé, then present your idea to your public information people, explaining how your knowledge can benefit the institution and its many constituents. Even if your institution's public information staff does not understand the importance of your topic, or if your topic does not fit into their established timetable, do not give up. Consider contacting your public information people about once every quarter with an idea. This will demonstrate that you want to help and you have a genuine interest in how the media perceive the institution.

• *When.* Periodically throughout the year, various media, especially television and radio, designate a week or two to count their viewers and listeners. You may want to time your message to occur just before or during a "sweeps week." Also, consider timing your news releases, blog messages, Facebook page updates, and other media outreach efforts to coincide with special events, such as the Olympics to talk about sports vision, or the release of the next 3D blockbuster movie, an opportunity to discuss binocular vision problems that can interfere with enjoying this new technology (Figure 2).

• *Where.* It often makes little difference if your institution is in a big city or a small college town. Content is king when it comes to the new media. Your message can just as easily go national from Big Rapids, Michigan, as it can from New York City.

• *How.* Drs. Hoppe, Jurkus, Kattouf, and Thau, as well as Ms. Sopko and Ms. Bristol have provided some great tips on the "how." We suggest you approach the media and the public from the standpoint of, "If I wanted to impress my mom, how would I do it?" or "I want to discuss this topic in such a way that my mom could understand it easily." If you do this, the message you want to get across will be heard and understood by the vast majority of those whom you are trying to reach.

• *Why.* Why should you become involved with the media? Dr. Hoppe notes, "Faculty members who represent their institutions well in the media will increase their value to the institution." When you interact successfully with the media, you also feel a sense of accomplishment and a renewed belief that what you do matters to others. It provides an opportunity for you to give back to the profession in a positive manner.

Yoda and Mr. Clean?

If you've read this far, you must be wondering about the title of this article. One of my west coast colleagues often refers to me (DM) as Yoda (of Star Wars fame). I would like to think he calls me this because of my extensive knowledge base, sage advice, and air of quiet authority. However, from time to time when looking in the mirror, I notice that I am assuming a physical form similar to that of my Jedi friend (i.e., short, round, and fuzzies growing about my head).

As you can imagine, I have the perfect face for radio! If you have a similar physiognomy, plan on your public relations career to be in radio, print, and digital media … or just get on TV anyway. We all know that on TV we look heavier, and with HDTV, every facial nook and cranny shows up (Figure 3). The bright side is that when people see me in real life, they tell me how much younger and thinner I appear! On the other hand, my clean cut, handsome but follicly challenged coauthor has a face for all media (Figure 4)!

Figure 2
Timing is everything for Dr. Dominick Maino who discusses binocular vision dysfunction related to the release of Avatar with ABC-TV Health Beat producer Christine Tressel.

Figure 3
Dr. Valerie Kattouf experiences a true "close up" as she demonstrates the cover test while the camera looks on.

Finally, as Dr. Arol Augsburger, President of the Illinois College of Optometry, notes, "Talking to the media is no different from interacting in many social or business settings. We all must manage our messages, whether we are talking to reporters or not. We are all marketing our messages daily. In every conversation we have, we either market ourselves well or badly, but we are marketing!"

Now that you know the who, what, when, where, how and why of it all, it's time to get busy. Talk to your public information people. Start a blog and a Facebook page. Tell your story.

Figure 4
Dr. Geoffrey Goodfellow discusses the new Illinois Children's Vision Law on the ABC-7 news.

WHAT YOUR COLLEAGUES ARE DOING

In the Media

AOATV 3D Movie Vision Syndrome
http://www.youtube.com/watch?v=5NUYtkIUCCs

WLS TV Healthbeat Report: The 3-D Dilemma
http://abclocal.go.com/wls/story?section=news/health&id=7298893

AOA News
http://www.slideshare.net/DMAINO/maino-aoa-news-3-2210

Facebook

Michigan College of Optometry on Facebook
http://www.facebook.com/pages/Big-Rapids-MI/Michigan-College-of-Optometry/316876455569?v=wall

Southern College of Optometry on Facebook
http://www.facebook.com/pages/Memphis-TN/Southern-College-of-Optometry/300445971137

New England College of Optometry on Library Facebook
http://www.facebook.com/pages/Boston-MA/New-England-College-of-Optometry-Library/25189318659

Illinois College of Optometry on Facebook
http://www.facebook.com/pages/Chicago-IL/Illinois-College-of-Optometry/400752138798

Blogs

News From the AOA
http://newsfromaoa.org/

National Network of Libraries of Medicine
http://nnlm.gov/gmr/blog/2009/07/06/jerry-dujsik-retires-from-illinois-college-of-optometry/

University of Missouri–St. Louis Blog
http://blogs.umsl.edu/news/category/college-of-optometry/

MainosMemos
http://www.MainosMemos.blogspot.com

YouTube

SUNY PSA
http://www.youtube.com/watch?v=TrgcFH9cZ44

Southern California College of Optometry
http://www.youtube.com/results?search_query=southern+california+college+of+optometry&aq=f

Illinois College of Optometry on YouTube
http://www.youtube.com/results?search_query=Illinois+college+of+optometry&aq=f

Patient Care: Management Beyond the Textbooks

• *ASCO Student Award in Clinical Ethics* •

Laura Gengelbach

Introduction

As health care providers, optometrists are expected to follow a code of ethics as they provide care for their patients. How regularly do we actually consider what this entails? Earlier this year, I encountered a case, which brought up a series of ethical issues.

Presentation and History

A 47-year-old white man reported to a Florida eye clinic with a complaint of blurred vision. Although he had no insurance and limited funds to cover the examination fees, he opted to pay cash for an examination because of the serious nature of his condition. The findings of his complete eye examination follow.

Patient J.R.'s main complaint was blur in the superior aspect of the vision in his right eye. He also noted a black spot in the superior field of vision in his right eye, which became apparent when he was using a computer. The patient reported no ocular pain. The onset of his symptoms occurred 2 to 3 weeks prior to the examination. He had not noticed any floaters or flashes of light and reported that he had not experienced trauma to the eye or head. The patient's medical history was unremarkable, and the patient was not currently taking any medications.

J.R.'s entering corrected visual acuity as measured by projected Snellen chart was $20/25^{-}$ in the right eye and $20/25^{+}$ in the left eye, with his best corrected acuity being 20/25 in the right eye and 20/20 in the left eye. Pupils were round and reactive to light with no afferent pupillary defect. Gross confrontational visual fields and extraocular motility were normal in each eye. Examination of the anterior segment revealed normal findings and the patient's intraocular pressure by Goldmann tonometry was 8 mmHg in the right and left eyes. During the fundus exam, the right eye was found to have significant hemorrhages and cotton wool spots in the inferior hemisphere of the posterior pole, with the absence of macular edema. The overall fundus findings were indicative of a branch retinal vein occlusion (BRVO), and the patient's condition was diagnosed as such. Knowing the potential systemic implications of this condition, we also checked for bruits in the carotid arteries, which resulted in normal findings.

"A physician is obligated to consider more than a diseased organ, more even than the whole man - he must view the man in his world,"

-Harvey Cushing

Management/Discussion

My attending optometrist and I had to decide the proper treatment and management of patient J.R., keeping in mind his limited financial resources. In this situation, we could not forget what we as optometrists have pledged to do. The oath we pledge upon graduation from optometry school states:

"I will provide professional care for those who seek my services, with concern, with compassion and with due regard for their human rights and dignity. I will place the treatment of those who seek my care above personal gain and strive to see that none shall lack for proper care."[2]

I believe we proceeded in a manner that honored and fulfilled this oath.

Part of what is included in providing professional care with concern and compassion is providing good patient education. In health care, it is key to provide patients with a clear understanding of their conditions and treatment options so they can make the most informed choice possible. In J.R.'s case, we opted to take fundus photos to document the vein occlusion, as we felt it would be useful to provide an accurate baseline of the retina and constructive for patient education. We were concerned about the serious nature of any possible underlying systemic health risks associated with the vascular occlusion and found the fundus photos useful in this education. We decided not to charge the patient for these photos because they were not indispensable for the care of his BRVO, and we were fortunate to have the discretion to do so.

Dr. Gengelbach, a 2010 graduate of Illinois College of Optometry, is the winner of the ASCO 2010 Student Award in Clinical Ethics. The award, funded by Ciba Vision, was begun by ASCO's Ethics Educators Special Interest Group to develop greater interest in ethics among optometry students.

Our next step toward providing the best possible care for our patient was to consult a retina specialist in our clinic. We sought his advice as to whether or not our patient needed laser treatment based upon our clinical assessment and the fundus photos. He agreed to provide his expertise pro bono and evaluated the case for the benefit of the patient. We all agreed that no immediate treatment was necessary due to the patient's good visual acuity and lack of macular edema.

We contacted J.R.'s primary care physician, scheduled an appointment for him as soon as possible, and sent a letter explaining our findings and recommendations to run blood tests to evaluate possible underlying disorders that may have led to the BRVO. This was in accordance with what the Florida Statutes state regarding optometric standards of practice, which include:

"A licensed practitioner shall advise or assist her or his patient in obtaining further care when the service of another health care practitioner is required."[3]

Not only are we ethically called to take interest in our patients' systemic concerns, but in Florida, we are legally bound to do so as well. We then scheduled a 1 month follow-up appointment for J.R.

The legal issue discussed above serves as an interesting ethical consideration in itself. Certainly, not all laws are ethical, but health care providers have an obligation to adhere to the laws that pertain to the practice of their professions, particularly when these laws are clear, in the patient's best interest, and unarguably ethical.

Despite our patient's limited financial means, we managed J.R.'s condition as indicated, as we would for all patients, and according to our ethical duty. We were able to provide a high level of care that included fundus photos and a retina specialist's evaluation at no additional cost for the visit. We made decisions along the way to place our patient's medical welfare above the financial gain of the optometric practice. Understanding that some of our clinic population have significantly low incomes, our clinic has allocated a percentage of the budget for pro bono cases, enabling us to provide care to all who are in need, regardless of their ability to pay. Providing equal care to all patients regardless of socioeconomic status would be a major ethical underpinning in any ideal health care system.

We received our patient's blood work 1 week after his initial visit with us. It revealed high levels of total cholesterol and triglycerides, the probable culprits that caused his venous occlusion. As a result of our evaluation and management, J.R. is now working closely with his primary care physician to control his hypercholesterolemia properly before he has any more serious complications. He is scheduled to see us for a 6-week follow-up examination.

Conclusion

This case illustrates that providing ideal patient care can often be a multifaceted challenge. Our final plan for management of J.R.'s condition was based upon a blend of our optometric knowledge, our ethical duties, state legislation, and perhaps just plain compassion for others. In our optometric oath, we are called upon to strive to see that none shall lack for proper care, which encompasses much more than performing an examination. We must see that our patients receive care regardless of their financial situation. We also need to provide frank and understandable patient education with multidisciplinary referrals when appropriate.

Optometrists are frequently the gatekeepers for our patients' health. Optometrists are in a unique situation because often patients are more willing to come to us for their visual needs before visiting other health care providers. We have a responsibility to use our knowledge and training to address not only our patients' ocular concerns, but also their systemic conditions when they manifest through our testing. To best care for our patients, we must remember that we are one part of a large team of health care providers who are responsible for caring for the total health and well-being of our patients.

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The Development of Entry Level Low Vision Rehabilitation Competencies in Optometric Education

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Tracy Matchinski, OD
Roanne Flom, OD

Abstract

The purpose of this study was to determine entry level vision rehabilitation competencies for graduating optometrists and to examine the level of agreement about those opinions using consensus methodology. A mixed methods consensus approach to define competencies in entry level low vision rehabilitation was used. The study extended 6 months, incorporating online surveys and a 2-day meeting. Twenty entry level low vision competencies were approved by the Association of Schools and Colleges of Optometry in 2009. A 2-level approach to the education and practice of low vision may be a solution to the call for trained doctors who can meet the growing need in the current low vision landscape.

Key Words: *Low vision rehabilitation, optometric education, competencies, consensus methods, entry level low vision.*

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Dr Jamara is a Professor of Optometry at the New England College of Optometry and a Diplomate of the American Academy of Optometry Low Vision Section.

Dr Kollbaum is an Associate Clinical Professor and Chief of the Vision Rehabilitation Service at Indiana University School of Optometry.

Dr Matchinski is the Low Vision Class Coordinator and Chief of the Low Vision Rehabilitation Service at the Illinois College of Optometry.

Dr Flom is a Professor of Clinical Optometry and Chief of the Vision Rehabilitation Service at The Ohio State University College of Optometry. She is a Diplomate of the American Academy of Optometry Low Vision Section.

Background

In 2004, the American Optometric Association approved a definition of vision rehabilitation as:

"The process of treatment and education that helps individuals who are visually disabled attain maximum function, a sense of well-being, a personally satisfying level of independence, and optimum quality of life. Function is maximized by evaluation, diagnosis, and treatment including, but not limited to, the prescription of optical, non-optical, electronic and/or other assistive treatment options. The rehabilitation process includes the development of an individual rehabilitation plan specifying clinical therapy and/or training in compensatory approaches."[1]

This definition is part of a comprehensive and complex rehabilitative medicine model that involves the creation of an individual rehabilitation plan for each patient based on a medical evaluation provided by the doctor and a plan of treatment provided by therapists.[2] Although some training in these procedures is provided in the schools and colleges of optometry, current curriculum hours and the training of the instructors limit the extent to which graduates can realistically be prepared to practice at this level.

A low vision curriculum model was proposed in 1982 by the Association of Schools and Colleges of Optometry (ASCO)[3] with recommendations for a significant increase in the number of faculty and hours of instruction. This plan proposed that optometry students be exposed to 30 hours of didactic lecture, 20 hours of laboratory time, and 120 hours of direct patient clinical experience in the area of rehabilitative optometry.

In 2008, a non-published survey of low vision educators at an ASCO low vision special interest group meeting revealed that all 19 of the schools and colleges of optometry in the United States, Canada, and Puerto Rico provided a curriculum in rehabilitative optometry.[4] However, the number of lecture (median 28 hours), laboratory (median 8 hours), and patient contact hours (median 49

hours) varied considerably from school to school. The content of the curricula at the schools was also varied and was often driven by the training of the individual instructors, national board examination content, and general accreditation criteria.[4] There were outliers in this survey in that five schools only offered low vision clinical exposure as an option to their students.

With the growing demand for expanded training consistent with the current, more comprehensive low vision rehabilitation model, there is concern that the curricula in the schools and colleges may not have the resources to produce the required highly skilled and knowledgeable low vision providers. Postgraduate educational opportunities for optometrists seeking greater expertise include 14 low vision residency programs. It is unlikely, however, that this number of residencies can support the necessary number of doctors who would be trained in the rehabilitation medicine model to meet the growing demand of patients with vision impairment. A dichotomy exists between the skills and experience required to implement a highly complex model of vision rehabilitation and the current and varied low vision optometric curriculum. A coordinated effort among the vision rehabilitation educators to reach consensus about the specific elements of vision rehabilitation curricula for entry level or comprehensive level care would seem warranted.

The definition of visual impairment established by the Centers for Medicare and Medicaid (CMS), requires a diagnosis of best corrected visual acuity of less than 20/60 or certain visual field defects for coding and billing of vision rehabilitation. There are, however, many patients who experience visual impairment and functional difficulties, yet have better than 20/60 visual acuity. This is important because the primary goal of low vision rehabilitation is to restore functional ability in patients with permanent vision loss.[5] By applying measured prevalence rates of visual impairment and blindness in the United States to 2000 census data, it is estimated that approximately 1.5 million Americans over the age of 45 have less than 20/60 visual acuity, and 240,000 new cases of visual impairment and blindness occur each year.[6] With the aging population, the number of people with visual impairment is expected to double over the next 25 years.[6] It is also estimated that another two million Americans have best corrected visual acuity in the better eye that is worse than 20/40 but better than 20/70.[6] These patients are classified with mild visual impairments that negatively impact their daily functioning, but they may not qualify for rehabilitation under the CMS guidelines for visual acuity. In a small pilot study of the potential of low vision clinical trial sites, six optometric low vision clinics recorded patient characteristics over a 30-day period.[7] This study showed that approximately 78% of all patients (n=163) who were considered "low vision" by the doctors met the ICD-9 classification for moderate visual impairment or better based on visual acuity of better than 20/200, and more specifically, 36% had acuity better than 20/70. These findings suggest a need to revise the current model to include a multi-tiered approach to low vision rehabilitation. All patients with visual impairment could be triaged and managed within the profession of optometry, using a well-defined, two-level approach to vision rehabilitation based on a patient's level of visual impairment. Clearly defined referral criteria and education of comprehensive vision rehabilitation services would be critical when more complex care is needed.

The concept of levels of low vision rehabilitation was introduced in general ophthalmology in the United States through the efforts of the Vision Rehabilitation Committee of the American Academy of Ophthalmology through the SmartSight initiative.[8] The first level in the initiative called on ophthalmologists to refer at 20/40 level of vision, provide a simplified model of care in the second level, and provide a complex rehabilitation model in the third level.[8] The International Council of Ophthalmology also supports three levels of training (competencies) or curriculum for low vision rehabilitation including basic, standard, and advanced level goals.[9] The goal of a two-tiered approach for optometry would be to have 100% of optometrists providing entry level low vision care (levels one and two in SmartSight) in-office and then referring for complex care.

In 2008, the Low Vision Intervention Treatment (LOVIT) trial recommended early intervention while patients are waiting for more complex treatment.[10] This suggests a high priority should be placed on preparing optometry graduates to provide early intervention in rehabilitating low vision patients. The definition of entry level or primary low vision care and the features of a suitable education to provide care at that level should be established, and serious effort should be exerted to ensure the adequate preparation of graduates. Optometric educators need to explore the feasibility of teaching entry level low vision rehabilitation for all graduating optometrists (i.e., primary vision rehabilitation care), which necessitates the defining of entry level competencies.

The Low Vision Educators Special Interest Group (SIG) was formed in 2006 through the Association of Schools and Colleges of Optometry (ASCO) and consists of representatives from every school and college of optometry in the United States, Canada, and Puerto Rico. The direction and goals of the SIG were determined through group discussions and polls during initial meetings held at the meeting site of the American Academy of Optometry. A common theme surfaced: The low vision curricula at the schools and colleges had not evolved to consistently address the educational competencies required for our graduates. There was concern that the depth and breadth of the classroom, laboratory, and clinical experiences were not adequately tailored to the needs of graduating optometrists. As a result, the SIG undertook an effort to define and develop specific entry level competencies for graduating optometry students, with the idea that such a document would have the potential to serve as a foundation for faculty in creating or maintaining the vision rehabilitation educational curricula in the schools and colleges of optometry. In particular, the group considered it unrealistic to provide graduates with the highest levels of competency in this complex field given the limitations of the standard 4-year optometric curriculum and the number of patient encounters that can be made available to interns. The low vision educators instead decided to develop a solid set of entry

level competencies, with the idea that they might later address more advanced levels of competency that might require postgraduate residency training.

Purpose

The purpose of this study was to determine entry level vision rehabilitation competencies for graduating optometrists and to examine the level of agreement about those opinions using consensus methodology. The specific questions addressed in this study include:

1) What are the most important competencies in the education of vision rehabilitation for the optometric graduate as determined by a steering committee of educators?
2) What are the opinions of the vision rehabilitation faculty at all schools and colleges of optometry regarding those competencies?
3) How do expert opinions change between rounds and influence the final level of agreement (consensus) regarding those competencies?
4) What are the opinions of the faculty (experts) with regard to the effectiveness of the methods used to gain consensus?

Methods

A mixed methods approach was used for the study, consisting of consensus methodology of quantitative estimates through qualitative approaches.[11] Such a hybrid process can be complicated in design and data analysis, but the steering committee chose this method with the intention of developing trust and dedication while exploring the opinions of optometric faculty at the ASCO institutions.

Consensus methodology

This study primarily utilizes the Delphi method but incorporates some aspects of the nominal group technique in a hybrid methodology with qualitative and quantitative design characteristics.

The Delphi method is designed to gain opinions from members of a group and work toward a consensus without the influence or time delay of extended discussions and personality interplay.[11,12] It is an iterative process that usually starts with presentation of background information on the topic in question and a period of idea generation. The ideas are organized by the investigators and formatted into a rating scale questionnaire where a group of experts are asked to rate and may also be asked to comment on each idea anonymously.[12] The investigators analyze the results of the ratings, inform each expert of the collective responses, and administer at least two more rounds of questionnaires until a list of ideas is formulated or consensus is achieved.

One of the criticisms of the Delphi method is that it forces consensus by not allowing experts to participate in open discussion.[11] In this study, a modification of the process that borrows from the nominal group technique (NGT) was utilized to allow for a deeper exploration of areas of disagreement or for clarification of comments.

The NGT also utilizes a panel of experts, but it is completed in person with a facilitator guiding the process. The experts silently generate ideas about the topic of inquiry, the ideas are listed for all to view and are discussed by the group. Then each expert selects and ranks the top ideas in order of priority. Group discussion is held after rankings are reviewed by the facilitator, and a second round of ranking is completed. The process may continue until a final endpoint is achieved.[12]

Participants

The ASCO Low Vision SIG steering committee members were the investigators in this study and also participated as experts in each round of the Delphi process. In later rounds, the primary educators of vision rehabilitation curriculum at each of the schools served as the Delphi experts. Twenty-two experts were invited to participate in round 2 online. At the time of the study, there were 16 schools and colleges of optometry in the United States and three member or affiliate schools in Puerto Rico and Canada. All low vision educators (appointed by respective deans as the contact person) were e-mailed the link to the initial Delphi survey. Reminders were sent weekly for several weeks to the educators who did not respond. In addition to the ASCO college representatives, one representative of an affiliated Veteran's Affairs (VA) low vision residency program was included. An in-person meeting included 14 experts at 13 schools and colleges and one VA externship site. Three other participants in the 2-day meeting, who did not act as Delphi experts but participated in group discussions, included the ASCO board representative and two vision rehabilitation faculty from the represented colleges.

Procedures

Initial items (competencies) were drafted by steering committee members through a compilation of background preparation, literature review, and curriculum review of the five schools represented by the committee members.

The Delphi method was employed through the use of an online survey site through round 2. Each item or tentative competency utilized Likert ratings with "0" representing "not important at all" and "10" representing "very important for minimum competency." Anonymous comments were also solicited for each item and a final item requested ideas for additional themes. Between each round, the steering committee revised items based on rating scores and comments gathered from the survey system. The mean for each item represented the level of priority of the item for inclusion as a competency (group opinion), and the standard deviation represented the level of agreement.

Rounds 3 and 4 were conducted at a stand-alone meeting in July 2008 to which all low vision educators (experts) were invited. A modified NGT was employed through the use of a group facilitator (the first author), small work groups, and large group discussion. The Delphi online survey system was used to gather opinions after the group discussions. One key deviation from the typical NGT process was that items were not ranked in priority but were individually rated by importance (scale of 1 to 10). Small working groups each revised four competencies and reported revisions to the whole group for discussions and final revisions. The group then rated items anonymously online. Round 4 included a review of means and standard deviations for each item and collectively; final revisions included language consistency and uniformity of competency structure. For a

summary of methods for each round, see Figure 1.

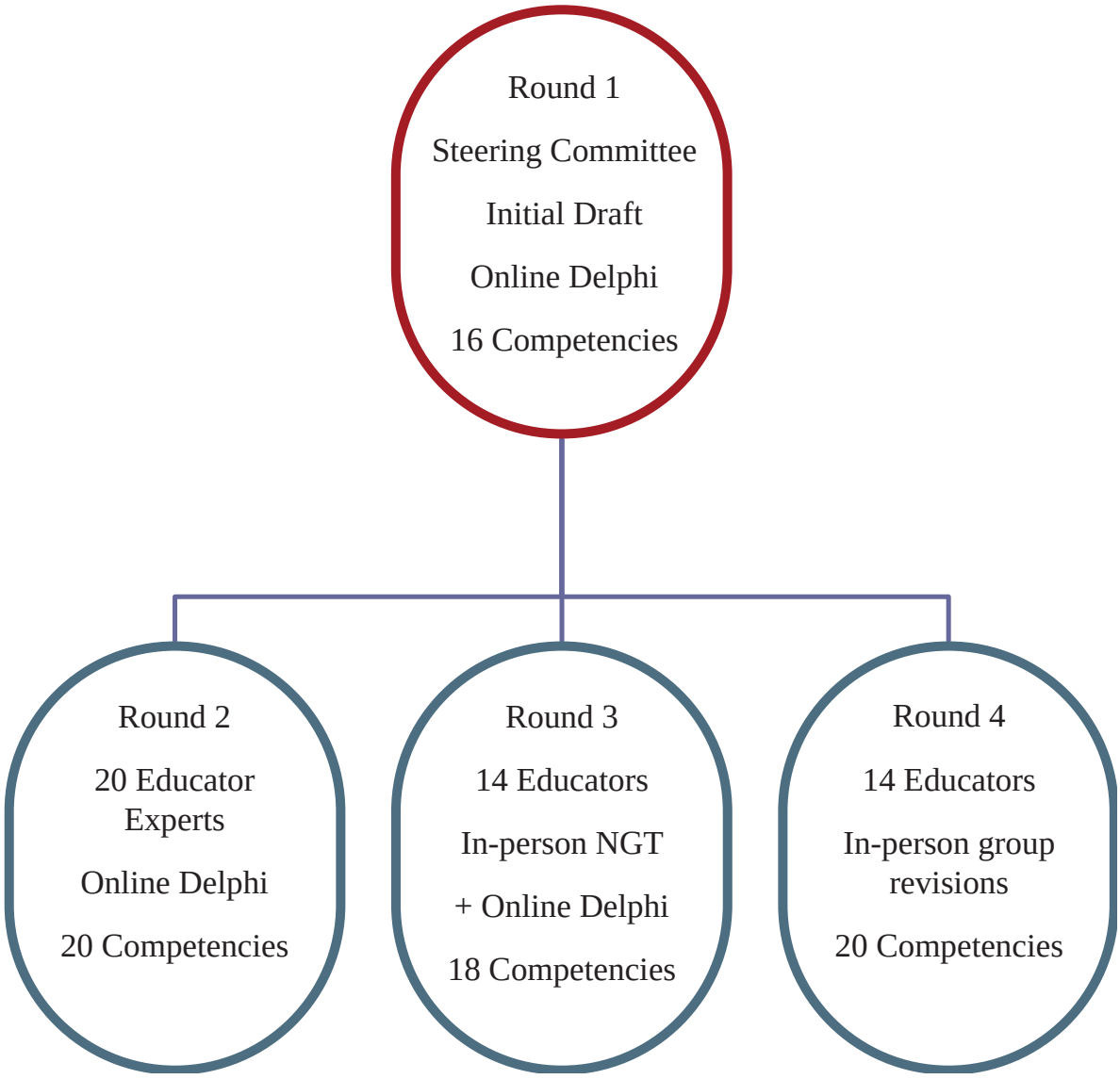
During the week following round 4 (in-person meeting), the experts completed a brief online survey about the overall effectiveness of the process, the competencies were reviewed by a few of the educators for minor editing for consistent terminology and were then sent to the American Optometric Association (AOA) Vision Rehabilitation Section Chair for comments. Minor comments and suggestions were gathered and integrated into the final document. The document was distributed by e-mail to all members of the Low Vision Rehabilitation Educators SIG for final comments and approval. The final competencies were then submitted to the executive committee of ASCO for official acceptance.

Results

Round 1

The mean was a measure of central tendency and, therefore, represented the level of agreement of the experts item by item. No criteria were predetermined for level of agreement; however, after evaluating the results of the initial survey, the group considered a score of 8 or above to indicate strong agreement that the item should remain as a competency. The standard deviations were also reviewed and

Figure 1:
Summary of methods by round



represented the spread or the amount of disagreement of the experts. The initial draft of 16 competencies from the steering committee is shown in Table 1. Four items were noted for extremely low scoring (<8, SD>1) and three items for extremely high scoring (9 or greater, <1.0 SD). All items were reviewed with comments to better understand any necessary deletions, revisions, or preservation.

The steering committee reviewed the poorly rated items to determine if some key points were salvageable rather than eliminate the entire concept. For example, if an item was not entry level, the issue was discussed by conference call to determine if there was a clear division of the topic into two levels, and then an item was drafted to capture the entry level idea. Items were more specifically defined, and redundancy was eliminated (e.g., items 1 and 2 from Table 1 developed into different items in 1 and 2 of Table 2), and more were added to the list (20 total competencies). New items included use of electronic magnification and knowledge of how to refer and sign a plan of care for occupational therapists.

Round 2

A revised list of 20 competencies was sent to 22 experts. Twenty experts (including the five steering committee members) responded to the online survey with 18 schools and colleges represented. Six items were noted for extremely low scoring (<8, SD>1), and three items for extremely high scoring

Table 1
Round 1 steering committee competency development.

	Competency	Mean	St Dev
1.	Understand and be sensitive to the psychological and emotional aspects of visual impairment and be able to describe challenges commonly encountered by individuals with visual impairments.	8	0.63
2.	Be sensitive to psychological and emotional aspects of visual impairment and be able to describe challenges commonly encountered by individuals with visual impairments.	8	0.89
3.	Be able to describe functional implications of various visual system pathologies and diseases.	8.2	0.75
4.	Be able to describe significant co-morbidities that impact low vision rehabilitation	7.8	1.17
5.	Be able to perform appropriate visual acuity testing at both distance and near for visually impaired patients.	9.8	0.4
6.	Be able to describe low vision assessment techniques (e.g., ETDRS, Bailey-Lovie, Feinbloom charts)	9.2	0.75
7.	Be able to examine the visually impaired patient: history, ocular inspection, refraction, visual acuity, reading assessment, fields, contrast sensitivity, and other vision functions.	8	1.79
8.	Be aware of various visual field tests and their purposes and be able to select appropriate visual field testing based on patient profile.	8.2	0.4
9.	Be able to assess eccentric viewing postures and skills, patient motivation, scanning ability (for patients with restricted fields).	6.4	1.36
10.	Be able to prescribe simple but appropriate rehabilitative therapies and optical devices to help the patient meet their goals. (e.g., magnification, illumination).	9.4	0.8
11.	Be able to describe various low vision aids and the optics of low vision devices.	7.4	1.36
12.	Demonstrate low vision devices and educate low vision patients on the uses and limitations of these devices for patients with low complexity vision loss (i.e. low powered hand and stand magnifiers, high reading addition lenses, low powered telescopes).	9	1.26
13.	Be able to describe visual field enhancing techniques for hemianopic field loss.	6.6	1.62
14.	Develop an understanding of the interdisciplinary approach to low vision rehabilitation, including the role of the O&M instructor, social worker, psychologist, educator, rehabilitation counselor, audiologist, occupational therapist, and ophthalmologist.	8.2	1.33
15.	Be able to evaluate visual acuity and visual field for determination of level of visual impairment for determination of legal blindness or disability.	9	1.26
16.	Understand the local licensing regulations and be able to assess a patient for vision requirements for those regulations and complete appropriate driving documentation when necessary.	8.4	1.5

(9 or greater, <1.0 SD). A scatterplot of the 20 items (Figure 2) shows the overall distribution of the opinions and the extent of the agreement through the means and standard deviations, respectively.

Round 3 (In-Person)

Following small group and corporate revision processes according to a modified NGT, 14 experts (including the five steering committee members) responded to the online survey, with 13 schools and colleges and one VA externship site represented. A scatterplot of the 18 items (Figure 3) demonstrates a stabilization of group opinion as seen by the clustering toward the right of the figure with high means (close to 10) and low standard deviations. Seventeen items had means above nine, and 16 items had standard deviations less than one. This indicated strong agreement and priority for the inclusion of the majority of the items.

Round 4 (In-Person)

Online anonymous ratings of items were presented to the full group on the last day of the in-person meeting. Through full group participation, most items were revised with minor changes, while several were subject to

Figure 2:
Round 2 Scatterplot of 20 items representing level of priority (means) and level of agreement (standard deviations)

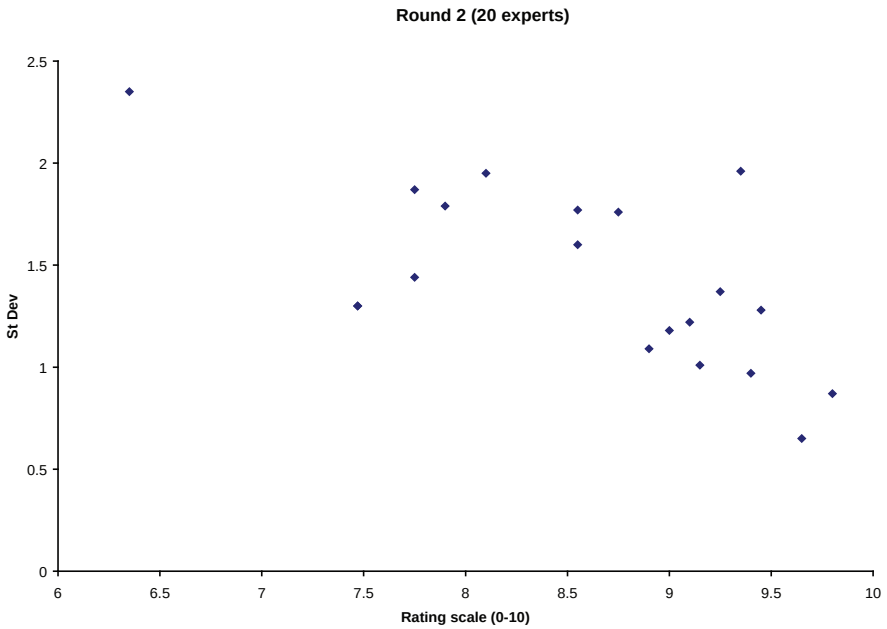
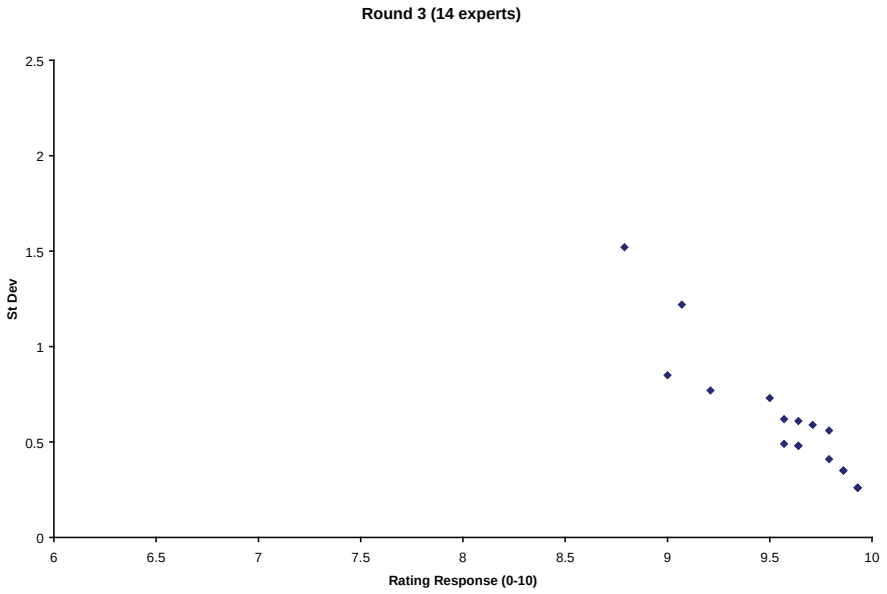


Figure 3:
Round 3 Scatterplot of 18 items representing level of priority (means) and level of agreement (standard deviations)



major group revision. Examples of major changes included items 1, 2, and 11 in Table 2. Item 11 addressed the concept of predicting magnification and understanding the optical principles of low vision devices. Two new items were added at the end of the consensus process regarding considerations for examining pediatric and special populations (final item 15) and about identifying agencies that can offer support and information to patients with visual impairment (item 19).

Final Follow-up

A few comments suggesting wording consistency were collected by e-mail within 2 weeks after the meeting. The list of final competencies was introduced to the AOA executive committee, and no major changes were recommended. The final list was submitted to the appropriate ASCO committee and ultimately to the board for approval. Official approval occurred in June 2009.

A final brief online survey was issued to all the experts prior to leaving the in-person meeting. The first question was: "How would you rate the effectiveness of this meeting overall?" The scale for rating extended from 0 (not effective) to 10 (extremely effective). All 14 experts responded. The mean was 9.5, and the standard deviation was 0.5, indicating a positive assessment of the meeting. One expert commented, "I felt that this meeting was highly effective and that we accomplished the stated objectives that had been set for the meeting. I am encouraged that we have laid the groundwork for the development of appropriate and effective standards for low vision education in all academic institutions and the momentum is definitely there to ensure that we will accomplish our objectives."

Another item asked: "How do you feel about the organization and structure of the meeting?" The scale extended from 0 (did not meet expectations) to 10 (exceeded expectations). Again, the mean was 9.5, and the standard deviation 0.5. Most experts thought the meeting was efficient and well-organized. One statement expressed the collective thought: "Very well organized overall. …Liked the interaction and collaboration aspects of the discussions ... no one

Table 2
Round 4 Final competencies

1.	Be able to apply epidemiologic aspects of visual impairment, appropriate terminology and classifications of visual impairment in order to communicate with patients, the public and other health care providers.
2.	In addition to performing a standard case history, be able to ask basic questions about symptoms, functional difficulties, and rehabilitation goals to anticipate the level of care that patients with visual impairment may require.
3.	Be able to recognize functional implications, hereditary factors and prognoses of common causes of visual impairment and explain them in language understandable to patients, families and other care providers.
4.	Be able to recognize psychological factors (e.g. depression, grief, motivation) that may affect adjustment to vision loss and the potential for rehabilitation.
5.	Be able to recognize pertinent social factors (e.g. social support system, education level, vocation, physical environment) and how they may influence the rehabilitation plan and process.
6.	Be able to recognize significant physical and neurological co-morbidities (e.g. Parkinson disease, stroke, dementia) that influence low vision rehabilitation and modify evaluation strategies and rehabilitation.
7.	Be able to perform visual acuity testing at both distance and near on patients with visual impairment using appropriate charts with proper documentation (e.g. working distance, eccentric viewing, illumination).
8.	Be able to perform trial lens refraction and modify refractive techniques for the patient with visual impairment (e.g. bracketing, hand held Jackson cross cylinder).
9.	Be able to recognize common symptoms of contrast sensitivity loss, screen for loss, recommend basic modifications (e.g. filter, lens, lighting and environmental options) and refer for comprehensive low vision rehabilitation when indicated.
10.	Be able to detect scotomas of the central visual field, understand their impact on visual acuity and visual function, and educate patients about their implications for activities of daily living.
11.	Understand basic optical principles of low vision rehabilitation devices and be able to predict magnification levels needed to achieve patient goals.
12.	Be able to prescribe basic optical and non-optical low vision rehabilitation devices, provide training in their use, and refer for comprehensive low vision rehabilitation when indicated.
13.	Be able to recognize availability of and indications for use of adaptive technology (e.g. video magnification, software) and refer for comprehensive low vision rehabilitation when indicated.
14.	Be cognizant of rehabilitation strategies for visual field deficits (e.g. sighted guide technique, orientation and mobility, visual field enhancement devices and equipment, scanning training) and refer for comprehensive low vision rehabilitation when indicated.
15.	Develop an understanding of the special considerations for examining children, the elderly, and the multiply handicapped and educate about referral options and potential for rehabilitation.
16.	Understand relevant vision standards for driving, provide necessary assessment and documentation, and refer for comprehensive low vision rehabilitation, driver evaluation/training, and medical evaluation when indicated.
17.	Be aware of the criteria for legal blindness determination and be able to educate patients on the basic social and legal ramifications of legal blindness certification.
18.	Understand that the needs of patients with visual impairment may require professional collaboration and be able to coordinate care with available rehabilitative, educational and social service resources.
19.	Identify governmental, private and consumer organizations that offer support and information to individuals with visual impairment (e.g. NEI, Veterans Administration, state rehabilitation agencies, foundations for the blind, consumer advocacy groups and support groups).
20.	Be familiar with third party reimbursement for low vision rehabilitation services and materials.

person "taking over"... actually finished a major task w/many leaders in one room ... enjoyable group!" The other items in the final survey asked open-ended questions about the future actions of the groups and about how they would make changes at their schools in response to the meeting. The responses may be explored in a future paper.

Discussion

In summary, data were collected for four rounds over 6 months through online survey administration in quantitative and qualitative format. In-person small groups and corporate discussion also accomplished opinion-gathering and formation of tangible competencies. The expert opinion changed between rounds, with the final round gaining consensus for all items, with the majority of the mean ratings in the nine or above range and less than one on standard deviations. Overall, the experts were pleased with the organization and structure of the process and commented on the efficiency of the process due to the amount of work completed through the rounds of the consensus methods.

From start to finish, the development of the final draft of competencies maintained some key elements, but invaluable discussion occurred regarding several concepts, such as field enhancement, driving standards, comprehensive rehabilitation models, and depth of teaching and terminology for optical principles.

Both the quantitative analysis using descriptive statistics and the qualitative analysis of comments were useful for converging on consensus. Comments from the online survey process were gathered between rounds and provided the context for the statistical performance of the items. The comments could be grouped into themes of recommendations for revisions: 1) Statements that the competency was not entry level (i.e., should belong to comprehensive low vision rehabilitation); 2) The competency was too broadly stated; or 3) The item was redundant from another stated competency. The general agreement for the importance of a category or theme was obvious from the comments, which helped determine if a competency needed to be eliminated vs. dramatically revised. The specific choice of wording was usually the basis for disagreement with the majority of the competencies early in the process.

Eight items were similar in content from the first round. Between-round comparison is shown in Figures 4 and 5. Figure 4 demonstrates the changes from round 1 through round 3, showing the changes in group opinion for first round items 3, 4, 5, and 12. Visual acuity testing appeared to have high consensus throughout the rounds, although the specific choice of words changed significantly throughout the rounds. The competency related to co-morbidities (item 4 in round 1) started as a weaker scoring item and lost some agreement in round 2, but in round 3, the revisions were significant enough to maintain the concept as a final competency (Table 2, item 4).

Figure 5 demonstrates similar changes in the other four items from round 1 (13-16). The ratings for item 13, field enhancement, changed dramatically and reached final consensus that entry level would necessitate that the graduate be cognizant of techniques, devices, and when to refer (Table 2, item 14). Two of the items regarding issues related to driving and legal blindness determination were debated relative to international standards (one school from Canada was represented), and revisions included generic language while maintaining the core competency.

Figure 4:
Changes in group opinion from round 1 through round 3 for first round items 3, 4, 5, and 12.

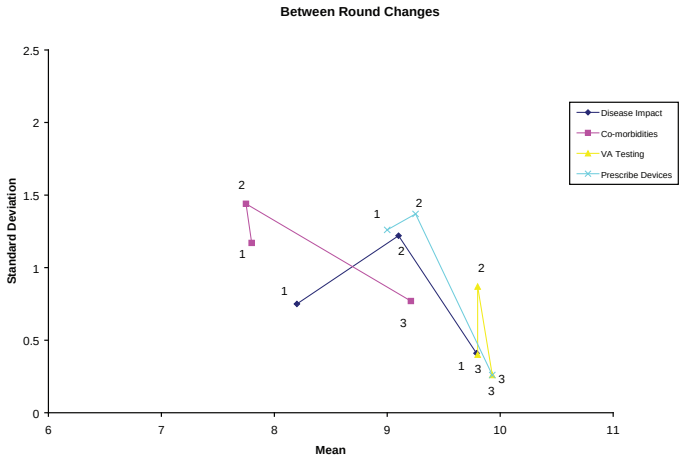
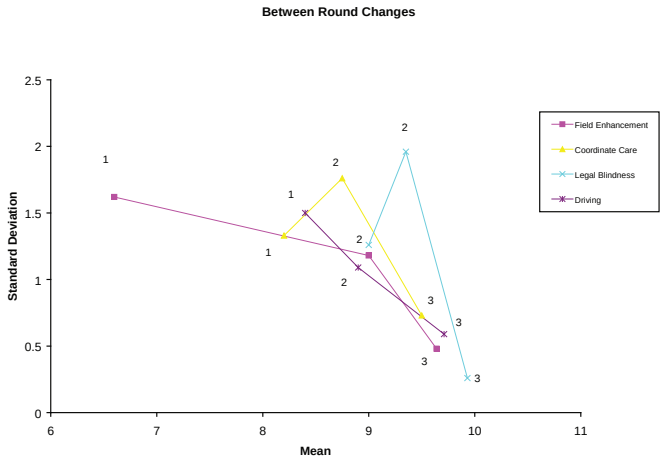


Figure 5:
Changes in group opinion from round 1 through round 3 for first round items 13-16.



Limitations of the expert decision-making process should be considered, because they could affect the stability or reliability of the final consensus decision. Two possible processes could have occurred during this study. The *halo effect* is when an expert changes opinion radically throughout the rounds, seemingly to conform to the group opinion. Conversely, the expert who never budges on opinion may be damaging to the final result, as well. The Delphi process does not typically include a comment phase or an open discussion phase to explain why experts vote the way they do. Therefore, with the hybrid design of an open meeting to discuss issues, all opinions were sought in a friendly environment by the facilitator, and group consensus did seem to be achieved with all extreme opinions explored.

Expert dropout is another area of concern. In this study, dropout did occur due to the modified nature of holding an in-person meeting rather than following all rounds online with the original experts. While all of the experts in the later rounds were involved in the original online voting process of round 2, the group discussion aspect was valued more than the traditional Delphi anonymous methods.

Educational Policy

The comprehensive low vision rehabilitation curriculum recommendation in 1982 offered extensive recommendations for specific instructional hours and faculty resources. The high level of curricular commitment this would have required may have led to its incomplete adoption.[3]

The development of a well-defined set of entry level competencies in vision rehabilitation care reported here may allow for schools and colleges to evaluate their programs individually and to determine what curriculum adjustments may be warranted to best meet the needs of graduating optometrists at their particular institution. Additionally, these entry level competencies may have implications at the national level in the context of AOA policies and in the consideration of specialties within optometry as an outgrowth of the recent development of board certification procedures for optometrists.

Practice Implications

Since the consensus process in 2008, the vision rehabilitation educators have met twice, and the outcome has been the creation of objectives for each of the competencies. The purpose of writing the objectives was to provide measurable guidelines for the educators to more easily integrate the competencies into their curricula. Future work at educator meetings will include sharing and brainstorming ideas for teaching strategies of each of the competencies. It would also be helpful to create a study that measures the level of implementation of the competencies accomplished by the educators over time. Another large project for the educators is the development of advanced competencies for comprehensive low vision rehabilitation. Studies should also be performed to test the effectiveness of primary low vision care on patients with early stages of vision loss.

Some optometric educators have been concerned that too often low vision rehabilitation has been taught as an option to be practiced by only a few and that to practice well requires residency training or equivalent clinical experience not typically available to optometry students. With a lack of clear direction in their work, some low vision rehabilitation educators may have been left to focus on simply offering inspiration, training the most interested, or dispensing large quantities of unfocused information to entire classes.

The number of students who pursue further training or practice comprehensive rehabilitation is estimated by the Low Vision Educators SIG as less than 10% per class year. With approximately 1400 optometry graduates in the United States per year, 140 doctors interested in vision rehabilitation would not seem sufficient to change practice patterns significantly. In a recent investigation of low vision practice patterns, Owsley initially identified 1228 low vision service entities in the United States (any type of provider).[10] Of the 608 entities responding to the census survey, 79.6% or 484 had an optometrist providing some or all of the services. If the proportions hold true to the remaining entities that did not respond to the survey, an estimated 1000 optometrists are providing low vision services. This number is consistent with the number of AOA low vision members, although this does not account for optometrists who are not AOA members.

Another limiting factor is the distribution of low vision rehabilitation services nationally. Owsley and colleagues reported a low density of service providers on a population basis in the southern United States.[10]

Current practice patterns and understandings of patients' needs suggest that 1000 optometrists cannot adequately meet the demands of the estimated 1.5 million people with impaired vision, much less the additional 2 million who have mild vision loss. The Low Vision Educators SIG aspires to have all graduating optometrists meet competencies in entry level low vision rehabilitation or primary low vision care, with the potential that 1000 or so new and fully equipped optometrists would become available to serve the public each year.

To further facilitate the increased provision of low vision rehabilitation, research is needed to establish more clearly the most efficacious and cost-effective models of vision rehabilitation for private outpatient vision rehabilitation.[14] With the development and utilization of entry level competencies, graduating optometrists should be familiar with the concept of two levels of care, especially since many of the competencies contain a directive to refer for comprehensive vision rehabilitation. In this way, the competency structure itself encourages students and educators to consider advanced rehabilitation. Not only are expectations set for the care of patients with early vision loss, but expectations are created for referrals to colleagues who practice comprehensive rehabilitation.

Overall, this project has utilized novel techniques to allow optometric educators to define competencies in entry level low vision rehabilitation or primary low vision care that may have substantial implications for the education and practice patterns of optometrists in serving the needs of people with impaired vision.

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Optometric Student Gender Trends and The Importance of Diversity: The Impact Of Women in a Male-Dominated Profession

Shilpa J. Register, OD, MS, FAAO

Abstract

This paper discusses the gender trends of optometry students in the United States. The optometric profession began as a white male-dominated profession and has transformed into a diverse profession of women and men with varied ethnicities. This transformation can be seen specifically over the past 36 years. How will this demographic shift change the optometric profession? Although the answer to this question is unknown, our profession needs to be ready for the possibility of changes.

Key Words: *Trends, optometric education, optometric demographics, gender, diversity*

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Introduction

Concepts of diversity in educational experiences can involve three types of diversity experiences: structural, classroom, and instructional.[1] Classroom and instructional diversity are defined as curriculum-related activities and social activities for educational purposes.[1] Hu and Kuh define structural diversity as the demographic composition of the student body, which may be institution-specific.[1] Structural diversity enhances student learning and moral development by enhancing general knowledge, discipline-specific knowledge, and writing skills.[2] Specifically, students had self-reported gains in writing skills, general knowledge, and knowledge within their discipline.[2]

Diversity experiences have been shown to influence a student's development of principled moral reasoning, which is based on the application of universal moral principles instead of societal authority.[3] Principled moral reasoning assists in a student's identity development and traverses into behavior, judgments, and actions, thereby indirectly influencing student life and professionalism.[3] It enhances a student's ability to make ethical decisions that may affect his or her life or the lives of others in society through decision-making in relation to academic dishonesty or medical ethics, which has become an increased concern for institutions and professions alike.

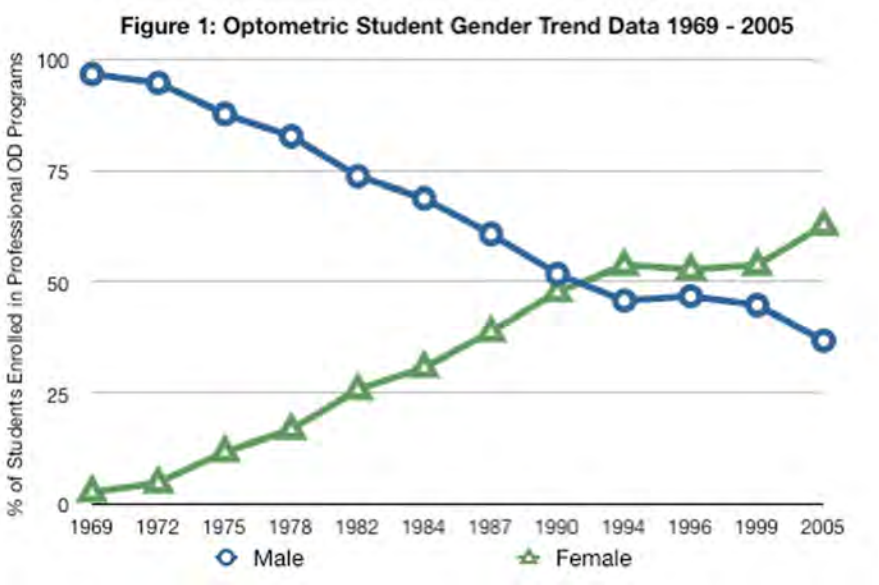
Diversity experiences have the potential of being instrumental to educational institutions because all students can be involved in diversity experiences, regardless of demographic characteristics.[2] It is unknown if diversity experiences alter the gender gap experienced by students because there were no comparative data to establish change over time.[4] Data show, however, that men are more affected by curricular and co-curricular diversity experiences, including women's studies classes and racial and ethnic classes.[4]

Diversity experiences can have positive and negative influences on students and can cause discomfort to some, depending on their level of readiness and previous exposure.[5] Diversity experiences also lead to heightened cultural awareness, which can challenge students to transition into higher orders of consciousness,

as defined by Kegan.[5] This transition into higher orders of consciousness leads to subsequent identity development, which is an overarching goal of the college experience and adult development. Therefore, diversity experiences are an important means to promote students' development during their college experience.

To better understand how optometry students are being affected by diversity, we must first analyze our educational demographics. It is also important to understand the changes that have occurred over the years with respect to diversity, specifically gender, to determine their effect on the profession's future. The purpose of this paper is to heighten awareness of diversity and raise questions about the future of the optometric profession. As educators, we have an untapped opportunity to assist and support students through their identity development during their college experience in optometry schools.[1]

Figure 1



Discussion

In the 1950s and early 1960s, there was a wide disparity in career choices between genders, but this gap began to narrow because of federal legislation, such as Title IX.[4] Furthermore, a student's choice of major was not always directly related to his or her career choice.[4] In the early 1970s, Title IX was passed by the federal government with the intention of ending gender discrimination in education.[4,6] Title IX mandated that schools could not deny students the opportunity to participate in any educational activity based on gender.[6] This allowed women to enroll in vocational education, in which they were historically restricted.[6] Although legislation was passed, this alone did not effect immediate change. As expected, there was a delay in the impact of this legislation on enrollment numbers, as supported by the data reflecting enrollment in optometric institutions.

The optometric profession began primarily as a white male-dominated profession[7]; however, recent analysis shows a dramatic shift in gender over the past 36 years. The population data were collected from archived and current Association of Schools and Colleges of Optometry (ASCO) survey results representing U.S. schools and colleges of optometry.[8,9] ASCO conducts annual surveys of its member schools to gather applicant, enrollment, graduate, and financial data. These surveys represent self-reported data from individual ASCO member schools.

According to ASCO, graduates of the professional optometric program from 2006-2007 were 62.8% women and 37.2% men.[10] From 1969-1970 graduates were 3% women and 97% men.[7] The trend data in Figure 1 show a dramatic shift in gender representation over the past 36 years, with 1992-1993 representing the pivotal academic year of the majority/minority shift.[7]

The gender trend data show a positive slope of 2.04 from 1969 to 1994 for women and then a stabilization, represented by a zero slope, from 1994 to 1999. The positive slope in the gender trend data can be due to economic, social, and political factors. After 1999, there is an increase of 1.5 in the slope; however, the data spans only 6 years, which is not sufficient to forecast future gender trends. The trend may continue to diverge, stabilize, or converge. Each of these possibilities would impact the optometric profession's demographics and culture.

These data reveal a pivotal shift in the demographics of optometry students in the early 1990s. The majority of students in optometry school in the mid to early 1990s were born between 1967 and 1971, representing Generation X.[11] Generation X students frame their college experience and subsequent identity development around contributing factors they experienced, such as the emergence of AIDS, the fall of the Berlin Wall, the Challenger space shuttle explosion, and the crash of the U.S. stock market.[11] Furthermore, these students have been shown to delay enrollment, to work full-time, to be responsible for care of dependents, and to value financial independence.[11] This generation's emphasis on financial independence helps support the development of female independence that frames Generation X-ers' career and education choices. Both male and female Generation X-ers view technology, customer service, and degree attainment from radically different points of view as compared to other students.[11] Their educational and consumer values can also affect student identity development and principled moral reasoning.

Nationwide, women have begun dominating college campuses, comprising approximately 60% of the student body in 2008.[4] Furthermore, data analyzing financial concerns and goals from the early 1960s until 2006 show that wom-

en were more concerned about finances and, therefore, a higher percentage of women were setting goals to ensure financial security.[12] Data also show that women have achieved higher GPAs as compared to men, which has affected overall academic success, including graduate or professional school admission, scholarships, and awards.[4] These data help to support the influx of women in health professional schools, specifically optometry, due to the financial benefits, competitive programs, and career stability that optometry offers.

Today, there are more women pursuing graduate and professional degrees leading to an equalization of college representation between genders.[4] Data show a convergence in degree aspirations between men and women, although the specific academic and career choices may differ between genders.[4,13] Gender equality within professions has been shown to positively enhance and expand a profession's status.[14] Other studies have shown that feminization of professions can lead to a reduction in overall pay for the profession.[15] The contradictory data may be attributed to different professional practices and settings.

Adams studied the dental profession in Canada and found minimal differences in men's and women's practice characteristics; however, there was a difference in practice type and income.[15] The Canadian dental profession has seen an influx of women into its dental schools, which has significantly shifted their professional demographics.[15] It is forecasted that in several years, more than half of the graduates in law school, dental school, and medical school in Canada will be women.[15]

Analysis of U.S. students' career aspirations reveals other professions, such as law and medicine, have shown a trend similar to that in optometry.[12] Both professions experienced a gender shift around the early 1990s when more women than men were interested in careers in law and medicine.[12] It is unknown if this shift has affected students' choices and interests in specialties within law and medicine. In addition to professional demographic and practice changes, students serve as the foundation for future faculty, which has a direct impact on educational institutions.

Current optometric faculty demographics must first be analyzed and compared with past trends to understand the full extent of changes in the optometric profession. According to the most recent ASCO Faculty Survey from 2009-2010, approximately 55% of faculty members are men, and 44% are women, with an annual increase of 0.3% in male faculty and 29% in female faculty.[16] These data support a faster increase in women represented in optometric faculty.

A closer look at the gender distribution in academic institutions shows another interesting dynamic. There is a higher percentage of men than women in the more experienced ranks, such as professor (77%) and associate professor (61%), compared with less experienced ranks, such as assistant professor (44%) and instructor (27%) in U.S. optometry schools.[16] If the faculty with current ranks of assistant professor and instructor continue to progress in their careers and normal attrition of current faculty occurs, it is plausible that there may be equalization of men and women distributed throughout all ranks over the next decade. A similar trend is seen when analyzing clinical faculty data at academic optometric institutions.[16]

There is also evidence that the number of women who are leaders across professions has increased. For example, one can look at the demographics of the Consultation Group on Interprofessional Professionalism (CIPP). The CIPP was established in 2006 through the efforts of the American Physical Therapy Association (APTA) to support collaboration between professions. The group consists of representatives from more than 20 professions, including but not limited to optometry, dentistry, medicine, veterinary medicine, and pharmacy.[17] The leadership within the CIPP consists of 31% men and 69% women. This movement is further demonstrated in optometry when reviewing recent statistics that show the percentage of men (81%) versus women (19%) who are administrators at ASCO member schools in dean/president positions, as well as chief academic officer positions.[16,18] If the gender shift in health care students continues, it is plausible that the faculty and leadership demographics also may change to reflect a similar breakdown, which is closer to the current student demographics.

Conclusion

Faculty will ultimately define and shape the future of the profession and optometric education through implementation of different teaching and learning styles. Teaching and learning styles differ between gender, cultural background, socioeconomic status and many other factors.[4] There is insufficient research to determine the reasons for the shift in gender in optometry students; however, the following factors may be considered: benefits and flexibility within the optometric profession, change in goals and aspirations of men and women, changing roles of parents, and changes in access to higher education for men and women.[19]

Unfortunately, the future cannot be predicted; however, the optometric profession needs to be ready to manage the unexpected, specifically with regard to the gender shift. This information may also help to analyze how students are exposed to diversity experiences during their optometric education. Student affairs professionals must be aware of these possible consequences to provide necessary support to students as institutions strive to fulfill ASCO's diversity programming goals, such as "promoting diversity and encouraging member institutions to embrace diversity in their policies and programs, thereby reflecting and serving a multicultural society."[20]

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Vernal Keratoconjunctivitis: A Teaching Case Report

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Abstract

Vernal keratoconjunctivitis (VKC) is a relatively rare ocular disease that affects the cornea and the conjunctiva. Due to its chronic and potentially debilitating nature, early diagnosis and effective treatment are crucial. It strikes mostly children and early adolescents. Clinicians must understand the clinical signs, symptoms, and treatment alternatives to mitigate the disease progression. This teaching case report reviews the diagnosis, management, and treatment options for patients with VKC and demonstrates the importance of the clinician's role in taking a careful case history and in modifying treatment throughout care.

Key Words: *Vernal keratoconjunctivitis, allergic conjunctivitis, atopic keratoconjunctivitis, giant papillary conjunctivitis, superior limbic keratoconjunctivitis*

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Background

This case involves a 12-year-old African-American child, who presented with vernal keratoconjunctivitis (VKC). The case reflects the decision-making process used in the diagnosis and treatment of a red, itchy eye. It is appropriate for use with third and fourth year students. The case highlights the importance of obtaining a complete, accurate, precise, and relevant database during the examination. Additionally, the case demonstrates the metacognitive thinking and flexibility that clinicians utilize in the diagnosis and treatment of disease. The condition analyzed, vernal keratoconjunctivitis, is an allergic and inflammatory conjunctivitis that falls under the same umbrella class as seasonal rhinoconjunctivitis, atopic keratoconjunctivitis (AKC), and giant papillary conjunctivitis (GPC). A quick diagnosis is warranted because this disease can be uncomfortable, incapacitating, and potentially sight-threatening. Its clinical presentation often resembles other ocular conditions. Therefore, it is important for students and clinicians to be able to accurately diagnose and treat this condition

Student Discussion Guide

Case Description

Patient JS, a 12-year-old African-American boy, presented to the health center eye clinic on Aug. 27, 2005, with a complaint of bilateral red, itchy eyes for several weeks. He was seen and referred by the pediatrician at the health center. He was accompanied by his mother, who reported his last comprehensive eye examination was approximately 1 year ago. He did not wear spectacle correction. His mother reported that the pediatrician started him on erythromycin 0.5% ophthalmic ung (Ilotycin) once daily OU but switched him to olopatadine 0.1% ophthalmic solution (Patanol) b.i.d. OU after 5 days of minimal relief with erythromycin. His mother was concerned because the redness and tearing appeared to be worsening. She was worried that these symptoms were caused by a recent introduction of cats to their home. The boy reported crustiness upon awakening in the morning, as well as a watery discharge. Ocular history was unremarkable. Medical history

was positive for G6PD deficiency, seasonal allergies, asthma, and eczema. The patient was allergic to aspirin and sulfur. Other than olopatadine, he was not taking any medications.

The impression at this visit was allergic conjunctivitis. Allergic conjunctivitis was determined from the itchy symptoms and the presence of hyperemia, chemosis, watery discharge, and mild papillae. Since the patient had come to the clinic already using olopatadine 0.1% b.i.d. OU, and it offered little relief, the mother requested an alternative eye drop. The mother insisted on a change of medication despite extensive education regarding the length of time required for the olopatadine to achieve therapeutic levels. The patient was then switched from olopatadine to ketotifen (Zaditor) b.i.d. OU. Ketotifen was chosen because it is an over-the-counter (OTC) alternative to olopatadine and has a similar efficacy profile. The patient was advised to stop rubbing his eyes and to use cold compresses whenever his eyes felt itchy. The patient was asked to return to the clinic in a week or sooner if the symptoms worsened.

Follow-up #1: 9/24/2005

The patient and his mother missed their 1-week follow-up appointment but returned 1 month later on Sept. 24, 2005. The mother reported no changes to the patient's medical history since the last eye examination. The boy reported that his eyes were still red upon awakening but that the redness improved as the day progressed. He reported no associated discharge but some crustiness remaining in the early morning. He also had symptoms of itchiness and mild tearing. Despite what was prescribed and recommended, the mother asked the patient to stop ketotifen b.i.d. a few weeks prior because she noticed no improvement in his symptoms.

The diagnosis was changed from allergic conjunctivitis to VKC OU. The diagnosis of VKC was supported by the presence of large cobblestone papillae on eversion of the superior lids, as well as superior limbal Horner-Trantas dots. Figures 1 and 2 represent the clinical signs but are not the actual patient's findings.[1] At this time, the patient was prescribed loteprednol 0.5% ophthalmic suspension (Lotemax) q.i.d. OU

Table 1
Initial presentation: 8/27/2005

	OD	OS
Distance visual acuity sc	20/25	20/20
Pupils	Pupils equal, round, and reactive to light (PERRL) negative afferent pupillary defect (APD)	PERRL-APD
Pre-auricular nodes	None palpable	None palpable
Significant anterior segment findings	Grade 1 inferior follicles/ papillae Grade 2+ hyperemia Inferior chemosis	Grade 1 inferior follicles/ papillae Grade 2 hyperemia Inferior chemosis
Lid eversion of superior lids	Grade 1 papillae inferior nasal aspect of superior lids and grade 1 follicles	Trace papillae inferior nasal aspect of superior lids and grade 1 follicles
Fluorescein staining	None	None
Intraocular pressures (GAT) @ 1:35 p.m.	15 mmHg	14 mmHg

Table 2
Follow-up #1: 9/24/2005

	OD	OS
Distance visual acuity sc	20/20	20/20
Pupils	PERRL-APD	PERRL-APD
Pre-auricular nodes	None palpable	None palpable
Significant anterior segment findings	Inferior follicles and papillae in conjunctiva Grade 1+ hyperemia Superior limbal Horner-Trantas dots	Inferior follicles and papillae in conjunctiva Grade 2 hyperemia Superior limbal Horner-Trantas dots
Lid eversion of superior lids	Grade 2 cobblestone papillae	Grade 1+ cobblestone papillae
Fluorescein staining	None	None
Intraocular pressures (GAT) @ 12:11 p.m.	14 mmHg	14 mmHg

Figure 1:
Cobblestone papillae

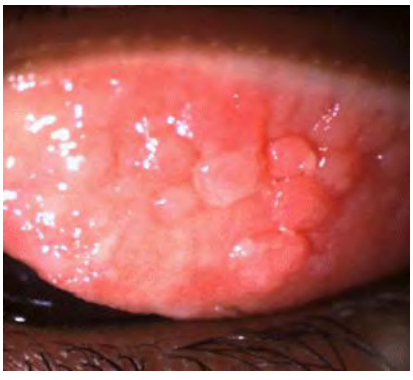
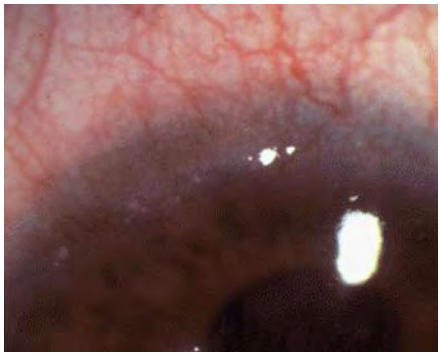


Figure 2:
Limbal Horner-Trantas Dots



and was reminded to shake the bottle before each instillation. The mother and the patient were educated on the condition and were given an informational handout on VKC. They were advised on the characteristics of loteprednol, including its propensity to increase intraocular pressure with prolonged use. They were educated on the importance of follow-up visits to monitor for progression of the disease, as well as for elevation of intraocular pressure. They were advised to return in 1 week or sooner if the symptoms persisted.

Follow-up #2: 9/30/2005

The patient and his mother returned 1 week later on Sept. 30, 2005. The patient was still using loteprednol 0.5% ophthalmic suspension q.i.d. OU with the last drop instilled at 6:30 a.m. that day. He reported significant improvement in symptoms.

The patient was asked to continue loteprednol 0.5% ophthalmic suspension but to start a taper schedule of three times a day for 1 week, two times a day for 1 week and then once a day for 1 week. He and his mother were advised to return in 4 weeks or sooner with any worsening symptoms.

Follow-up #3: 11/22/2005

At the 2-month follow-up visit, all ocular signs and symptoms had resolved. The patient had since tapered and discontinued loteprednol in both eyes.

The diagnosis at this visit was resolved VKC OU. The mother and the patient were educated on the chronic nature of the condition and on the possibility for recurrence, remissions, and exacerbations over time. They were asked to return to the clinic at the earliest onset of symptoms or prior to the allergy season next year so the patient could be started on a preventative eye drop, such as cromolyn sodium.

Key Concepts

1. The pathophysiology of allergic ocular diseases
2. The assessment of hallmark symptoms in diagnosing VKC
3. The role of epidemiology and differentiating VKC from other forms of allergic or immunologic ocular conditions
4. The importance of appropriate follow-up care
5. The significance of approaching diagnosis and treatment with flexibility and a willingness to revise the diagnosis and treatment plan as needed

Table 3
Follow-up #2: 9/30/2005

	OD	OS
Distance visual acuity sc	20/20	20/20
Pupils	PERRL-APD	PERRL-APD
Pre-auricular nodes	None palpable	None palpable
Significant anterior segment findings	Few inferior follicles and papillae Trace hyperemia Superior limbal Horner-Trantas dots	Few inferior follicles and papillae Trace hyperemia Superior limbal Horner-Trantas dots
Lid Eversion of superior lids	Grade 1 cobblestone papillae	Grade 1+ cobblestone papillae
Fluorescein staining	None	None
Intraocular pressures (GAT) @ 3:45 p.m.	13 mmHg	14 mmHg

Table 4
Follow-up #3: 11/22/2005

	OD	OS
Distance visual acuity sc	20/20	20/20
Pupils	PERRL-APD	PERRL-APD
Pre-auricular nodes	None palpable	None palpable
Significant anterior segment findings	All clear	All clear
Lid eversion of superior lids	Clear	Clear
Fluorescein staining	None	None
Intraocular pressures (GAT) @ 2:10 p.m.	13 mmHg	13 mmHg

Learning Objectives

1. To identify and list the basic signs and symptoms of VKC
2. To describe the demographics, including age, sex, race, and location or origin of the disease
3. To be able to differentiate between other similar clinical entities
4. To understand management and treatment options at various stages of the disease process.
5. To describe and understand the underlying immunological cause of VKC

Discussion Questions

A. Knowledge, Concepts, Facts, Information Required for Critical Review of the Case

1. Describe the classic signs and symptoms of allergic eye disease versus VKC and discuss how they differ.
2. Describe the immunological classifications of allergic and inflammatory ocular diseases.
3. Discuss the disease process at the cellular level, relating the

ocular structures and physiology to the signs and symptoms of VKC.

4. Discuss the general risk factors for VKC and compare them with the patient's individual risk factors.
5. Determine the differential diagnosis in this case based on analysis of case history, risk factors, and demographics.
6. Describe the pathophysiology of the disease process.
7. Describe the mechanisms of action of the pharmaceutical agents involved.
8. Discuss how the recent acquisition of a cat impacted the case?

B. Generating Questions, Hypothesis, and Diagnosis

1. What diagnostic tests were used in this case to diagnose VKC?
2. How were the clinical findings and information analyzed to rule out or support the potential differential diagnosis in this case?
3. What evidence or information is needed to diagnose VKC?
4. How does one differentiate between VKC and other diseases, such as AKC or allergic conjunctivitis?
5. After analysis of the information, what is the best possible diagnosis at this time?
6. Is the diagnosis logical?
7. At this time, are there other diagnoses one should consider?

C. Management

1. What are the classes of medications used to treat VKC?
2. What is the goal of treatment and care for the patient?
3. What is the prognosis for a patient with VKC?
4. What is an appropriate follow-up schedule?
5. What happens when symptoms worsen or do not improve?
6. When should treatment plans be modified?
7. What preventative environmental measures can be useful for managing VKC?
8. What is the role of a physician or allergist in the management of patients with chronic allergic disease?

D. Critically Assessing Implications, Patient Management, and Psychosocial issues

1. What are the implications of treatment versus no treatment? Consider cost, time, side effects, convenience effect, and quality of life.
2. What are the consequences associated with noncompliance to the treatment plan?
3. What pertinent information should be used to educate family members regarding the condition?
4. Discuss appropriate responses to a patient's or family member's anxiety toward the ocular condition, perceived medication failure, long-term disease consequences, risks associated with medications, etc.

Educator's Guide

The educator's guide includes the necessary information to discuss the case.

Literature Review

Vernal keratoconjunctivitis is an allergic and inflammatory conjunctivitis that falls under the same umbrella class as seasonal rhinoconjunctivitis, atopic keratoconjunctivitis, and giant papillary conjunctivitis.[2,3] The term keratoconjunctivitis is appropriate to use because VKC can affect the cornea and the conjunctiva. It can involve either the superior tarsal or limbal palpebral conjunctiva or both (mixed).[2,4] Interestingly, the limbal (bulbar) form of the disease is more prominent in tropical climates and in dark-skinned races, while the tarsal form is more prevalent in temperate areas and in lighter-skinned races.[2,5] VKC can lead to cornea changes in the form of shield ulcers. A shield ulcer is an ulcer commonly found on the superior cornea as a result of the mechanical abrasion of the lids to the cornea.[2] Although it can occur unilaterally, VKC is typically a bilateral disease and can affect one eye to a greater extent than the other.[6]

VKC predominantly affects African Americans and shows a 3:1 gender predilection toward boys.[6] Although it can occur at any age, it is most common in patients between 3 to 25 years of age, with 7 years as the average age of onset. It can last anywhere from 5 to 10 years.[6] VKC often strikes during warm, temperate weather; hence, the term vernal meaning spring-time is used. The term is a bit of a misnomer, however, as patients can get it year round and can have recurrences during other seasons.[5] For instance, approximately 23% of patients have the perennial form, and more than 60% of patients have additional recurrences in the winter.[7] Patients often have associated medical history of atopic diseases.[8] For instance, more than 50% of patients have concurrent medical history of asthma, rhinitis, or eczema, with asthma being the most common atopic disease associated with VKC.[4,7] It is uncertain if family history plays a role in the disease process, as only 35.3% of VKC patients have a family history of allergic diseases.[5]

The hallmark symptom of VKC, like all allergic eye disease, is itching.[5] Symptoms of VKC vary and can include foreign body sensation, tearing, photophobia, and thick ropy discharge.[5,8-10] A foreign body sensation results from conjunctival surface irregularity and mucous secretions, while severe pain is usually caused by a compromised cornea, typically from superficial punctate keratitis, epithelial macroerosions, or ulcers and plaques.[5]

Patients often present with signs of conjunctival redness, giant papillae, pseudoptosis, and superficial keratitis.[11] Hallmark signs include cobblestone papillae (greater than 1 mm and up to 7-8 mm in diameter) and Horner-Trantas dots, which are gelatinous limbal infiltrates.[4,6,8,9] The papillae enlarge and have a flat-topped polygonal appearance similar in appearance to cobblestones.[2] Limbal VKC is characterized by mucoid nodules that have a round, smooth surface surrounded by discrete, white superficial spots around the limbus.[2] Persistent or recurrent limbal disease could lead to pannus or corneal

opacification (pseudogerontoxon).[12,13] A pseudogerontoxon is a lesion that resembles a small segment of arcus senilis and is sometimes the only indication of prior allergic eye disease.[13] Punctate keratitis, followed by macroerosions, plaques, and subepithelial scarring can also be seen. Punctate epithelial erosions can evolve into corneal shield ulcers in advanced cases.[8,12] The ulcers and scarring can cause irregular astigmatism that may lead to a reduction in best-corrected visual acuity.[11] Neovascularization of the superior cornea as well as blepharitis and maceration of the lids can ensue.[8] Cataracts and steroid-induced glaucoma are more serious complications that can also result from VKC.[8] A quick diagnosis is warranted, as this disease can be uncomfortable and incapacitating. The severity of symptoms, such as extreme photophobia, often forces children to live virtually in the dark.[5]

Most studies note that the size of the cobblestones is directly related to the persistence or worsening of symptoms, with larger papillae having a worse long-term prognosis.[4] There are mixed findings in the literature regarding the form of VKC with the worse prognosis. Some studies state that the bulbar form of VKC has a more severe long-term prognosis while other sources indicate the tarsal form does.[4,9] Horner-Trantas dots in the limbal form of VKC are formed when degenerated eosinophils aggregate in the peripheral cornea.[9] In extreme cases, vernal shield ulcers can be formed by abnormal mucous, fibrin, and serum deposition on the superficial corneal epithelium.[9] These epithelial erosions are caused by a combination of the inflammatory chemicals and mechanical rubbing of the papillae over the cornea.[9]

Diagnosis of VKC is usually made by obtaining a careful case history, conducting a thorough physical examination, and on clinical judgment based on the signs and symptoms. Conjunctival scrapings, which demonstrate the presence of infiltrating eosinophils, may be necessary for some difficult cases.[8] Total and specific immunoglobin E (IgE) determination is not entirely useful, however, because more than 50% of patients with VKC present with negative findings.[8]

Differential diagnoses and treatment options for VKC:

- Allergic conjunctivitis, both seasonal and perennial, is caused by the typical immunoglobin E (IgE)-mediated reaction to environmental allergens, such as grass and tree pollens, mites, mold, and animal dander.[14] Patients with the diagnosis often have concurrent allergies, including runny nose, sneezing, and asthma. Symptoms include itchy, watery eyes.[11] Signs include red, edematous eyelids, chemosis, and conjunctival papillae. Olopatadine, ketotifen, azelastine (Optivar) and epinastine (Elestat), which are antihistamine medications that have significant mast-cell stabilizing effects, are commonly used to eradicate the symptoms.[15]
- Atopic keratoconjunctivitis (AKC) is far less common than seasonal allergic conjunctivitis and can be potentially blinding when left untreated. Patients often have atopic dermatitis or eczema and present with eyelids that are red, scaling, and weeping.[14] Although papillae are also found in AKC patients, they are usually smaller than in VKC. The conjunctiva usually has a milky edema.[6] The signs are more prominent in the lower conjunctiva, different from VKC, in which the signs are more prominent in the upper conjunctiva.[16] Treatment for AKC involves antihistamine creams, corticosteroid creams, cromolyn sodium eye drops, and cold compresses.[15]
- Giant papillary conjunctivitis (GPC) is an allergic response that is not considered a real allergic disease, but rather a chronic microtrauma.[14] It affects the upper lids more than the lower lids. Although there are different causes for GPC, including irritation from prosthesis, foreign body, or exposed sutures, the most common is mechanical irritation from soft contact lenses.[6] Signs include itching, ropy discharge, blurry vision, and pain with contact lens use.[6] Treatment usually involves discontinuing contact lens wear and using artificial tears and topical agents, such as cromolyn sodium, lodoxamide (Alomide), olopatadine, and steroids, such as loteprednol (Lotemax or Alrex).[6]
- Superior limbic keratoconjunctivitis (SLK) is a chronic inflammatory disorder affecting mostly middle-aged women. A large percentage of patients, approximately 20% to 50%, have an associated thyroid dysfunction. Patients present with foreign body sensation, burning, photophobia, and mucoid discharge. Signs include papillary hypertrophy of the superior tarsus, hyperemia of the superior bulbar conjunctiva, papillary hypertrophy at the limbus, and punctate epithelial erosions of the superior cornea.[2] Close inspection usually reveals a sectoral inflammation and injection of the superior bulbar conjunctiva.[15] Treatment involves tactics to alter the abnormal mechanical interaction of the upper eyelid and the superior corneal limbus. This may involve topical medications, such as artificial tears, occlusion of the upper puncta, and soft contact lens wear. In resistant cases, thermocauterization of the superior bulbar conjunctiva, as well as resection of the superior limbal conjunctiva may be performed.[2]

Discussion

Ocular allergies are a detriment to society. Their prevalence is increasing worldwide, and they are known to affect more than 20% of the population in the United States. Severe forms, such as VKC, hinder vision and quality of life.[17] Numerous factors, such as genetics, air pollution, pets, and household dust can contribute to ocular allergies.[17] Ocular allergies are not only distressing to patients but they have contributed to increased health care costs. For instance, the health care cost related to allergic rhinoconjunctivitis has been reported to be $5.9 billion in the United States, with 25% of this cost resulting from medication use.[17]

The ocular allergic response is complex. It results when the conjunctiva is exposed to an environmental allergen and binds to specific IgE on the conjunctival mast cells.[11] This immediate response lasts clinically for 20 to 30 minutes.[14] This causes enhanced tear

levels of histamine, tryptase, prostaglandins, and leukotrienes.[14] Mast cell degranulation induces activation of vascular endothelial cells and other cellular responses, which lead to the recruitment phase of inflammation. This leads to the late phase, which corresponds to the clinical inflammation characterized by the ocular signs and symptoms of allergic conjunctivitis.[14]

Treatment of VKC requires a multilevel approach that includes patient education, environmental strategies, pharmacologic and sometimes surgical intervention. When children are involved, parents must be educated about the nature of the condition, its possible duration, and potential complications of the disease.[5] Practitioners should stress the chronic, recurrent, and resolving nature of the condition.[4] In addition, environmental strategies can involve removing the offending agent, changing climate, or avoiding triggers, such as sun, wind, or salt water.[5,8] Because changing climate, such as moving to a different location may be difficult, an easier lifestyle modification can be the frequent use of sunglasses, hats with visors, or swimming goggles.[5] Other options can include avoiding parks, especially during the warmest hours, not playing with flowers or plants, and frequent hygiene such as hand, face, and hair washing.[4,5] The use of cold compresses and nonpreservated artificial tears also can offer relief and dilute the allergen on the ocular surface.[4,17]

There are several pharmacologic treatment options for VKC, including topical therapies. Treatment choice depends upon the severity of the disease process. Initial therapy can include mast-cell stabilizers. Among these, cromolyn sodium, lodoxamide and nedocromil sodium (Alocril) are used early and should be used continuously throughout the season to reduce signs and symptoms.[5] These drugs require a loading period in which they must be applied before exposure to the antigen. Thus, compliance could be an issue because patients may find it difficult to adhere to a strict and frequent dosing regimen before experiencing an allergic reaction. Also, their slow initial onset of action makes them a less ideal first drug of choice.[17]

In addition, antihistamines such as levocabastine hydrocholoride, are effective in relieving ocular inflammation and itching. However, they necessitate frequent dosing of up to four times daily due to their limited duration of action. This frequent dosing could decrease compliance.[17]

Decongestants, such as oxymetazoline hydrochloride, tetrahydrozoline hydrochloride and naphazoline hydrochloride, are easily found over-the-counter. They can have adverse effects, however, including burning and stinging upon instillation, mydriasis, and rebound hyperemia with chronic use. They act primarily as vasoconstrictors to relieve erythema.[17]

Other candidates for treatment include nonsteroidal anti-inflammatory drugs (NSAIDs). An example is ketorolac tromethamine, which works on the arachidonic acid cascade and is effective in relieving ocular itching.[17] Like decongestants, NSAIDs can cause discomfort on instillation and, hence, may affect patient compliance.[17] Although the long-term effects of intraocular pressure, wound healing, and corneal tissue remain unknown, NSAIDS have a good safety profile compared to topical steroids.[3]

Antihistamines with mast-cell stabilizing properties, such as olopatadine and ketotifen, may also be used to relieve mild to moderate forms of VKC.[5] These drugs have a dual mode of action because they inhibit mast-cell degranulation while competitively blocking histamine binding to histamine 1 (H1) receptors. This allows them to have a rapid mode of action and thus can allow for greater compliance over the pure mast-cell stabilizers.[17]

Moderate to severe VKC should be treated with topical steroids because of their greater efficacy. However, because they can raise intraocular pressure and cause cataracts with prolonged use, steroid usage should be strictly monitored with frequent follow-up visits. For instance, there is a 2% incidence of glaucoma in VKC patients.[7] Various steroids used and recommended include: loteprednol, prednisolone acetate, prednisolone sodium phosphate, fluorometholone, and rimexolone. Of these, only loteprednol is specifically approved for ocular seasonal allergic conjunctivitis. Dosing for topical steroids varies depending upon the severity of the disease and can range from four times daily to once daily.[9]

An alternative to topical steroids for severe forms of VKC is cyclosporine A (CsA) from 0.5% to 2% ophthalmic emulsions.[5,8] Insoluble in water, cyclosporine is administered by oily bases such as olive oil or castor oil.[5,8,18,19] This can cause intolerable symptoms that range from burning to blurry vision.[5,18] Dosing starts at four times daily and can be reduced to once daily as the disease process subsides.[5,7,8,18] Cyclosporine works by blocking Th2 lymphocyte proliferation and interleukin production, as well as by inhibiting histamine release and eosinophil recruitment within the conjunctiva.[8] In essence, it acts as an immunomodulator.[18] A study showed a significant reduction in signs, symptoms, and tear levels of eosinophil cation protein in VKC patients after 2 weeks of using CsA four times daily.[5] An example of topical cyclosporine A is Restasis.[7,19] The advantage of this treatment over topical steroids is that it does not cause an increase in intraocular pressure.[5,18,19] The disadvantage is the high cost of topical CsA treatment. A study found that topical CsA 0.05% had a beneficial effect in patients with VKC who were not responding to treatment from steroids, antihistamines, and mast-cell stabilizers.[19]

Oral medication can be used to reduce symptoms of ocular allergy associated with VKC. Oral antihistamines, such as loratadine (Claritin), can be used to reduce symptoms of nasal and ocular allergy symptoms, but it has little effect on VKC.[8] For instance, loratadine has been shown to have a protective effect in conjunctival provocation studies.[17] Also, oral NSAIDs, such as aspirin, have been shown effective in reducing signs and symptoms of VKC.[8] Studies have shown that low levels of aspirin therapy at dosages of 0.5-1 g/day administered systemically are beneficial for VKC patients.[5] Because many patients are children, however, one needs to be cautious, as frequent use of aspirin poses its own risks.[5]

Surgical intervention can sometimes be warranted in the later stages. Physical removal of corneal plaques is recommended to allow for corneal re-epithelization and to allow for reduction

of symptoms such as photophobia, pain, and irritation.[5] Recently, amniotic membranes have been used in the treatment of corneal ulcers in VKC patients. Giant papillae excision is used for mechanical pseudoptosis and for gross papillary formations.[5] Cryotherapy of the tarsal mucosa may be performed, but this is not recommended because of potential scarring, no immunosuppressant effects, and the inability to always resolve signs and symptoms.[5] For severe forms of VKC, oral mucosal grafting and saphenous vein transplantation may be used, but these procedures are invasive and can permanently change the anatomy and physiology of the lid.[5]

What are the pharmacological actions of some of the commonly used drugs in the treatment of VKC? Because mast cell degranulation is a central event in VKC and causes many of the symptoms and signs, medications such as mast-cell stabilizers help to prevent the degranulation of the mast cells and the release of histamine. For instance, the prototypical mast-cell stabilizer, cromolyn sodium, can be used long-term without side effects, but it can take many days to reach therapeutic levels.[4] Antihistamines, such as emadastine and levocabastine, are topical selective H1 blockers that work by blocking the histamine receptors and causing a downregulation of chemicals and, hence, limiting chemotaxis of inflammatory cells.[4] The newer generation antihistamines, olopatadine and ketotifen, are H1 receptor antagonists that have mast-cell stabilizing properties that make them suitable for twice-a-day dosing.[4] Nonsteroidal anti-inflammatory drugs, such as ketorolac and diclofenac, help to relieve ocular pruritis and conjunctival hyperemia by inhibiting the synthesis of prostaglandins.[4] Topical steroids, which target both legs of the anti-inflammatory cascade, are effective in controlling the signs and symptoms of VKC, but they should not be used long-term because of their potential to cause side effects, such as cataracts, glaucoma, and increased susceptibility to viral and fungal infections.[4]

VKC generally has a positive visual outcome. In most patients, it spontaneously resolves after puberty and leaves no serious visual complications.[7] However, it can be chronic and visually devastating. Among the most severe visual consequences of the disease are corneal shield ulcers, which develop in 3% to 11% of VKC patients.[7] A reduction of best-corrected visual acuity from corneal scarring occurs in approximately 6% of cases.[7] There is also a 2% incidence of glaucoma from long-term steroid use in VKC patients.[7] In the most severe cases, VKC can be resistant to medical treatment and surgery (such as resection of giant papillae of the upper eyelid.)

Although the exact etiology of VKC is unclear, it appears to have a multifactorial origin.[5,7] In the past, VKC was considered a type 1, IgE-mediated disorder.[7,10] Recent clinical observations suggest it is a Th2-driven mechanism similar to that of asthma. A cascade effect of mast cells and basophils causes histamine release and ensuing inflammatory lymphocytes and eosinophils that lead to ocular surface inflammation and tissue damage.[10] For example, numerous degranulated eosinophils are evident in conjunctival scrapings, tear fluid, and ocular discharge of VKC patients.[10] The resulting vernal papillae are caused by infiltration of lymphocytes and plasma cells on the upper tarsal plate.[7] Other studies suggest neural and endocrine factors. For instance, neuropeptides have been found in the tears and serum of patients with VKC.[8] Yet other research has shown that certain sex hormones, such as estrogen and progesterone, are overexpressed in the conjunctiva of patients with VKC.[7,8] This might be demonstrated by the greater frequency of men versus women with VKC.[5,7]

This case illustrates several key concepts and goals in clinical care. The astute clinician must take a careful case history and be reminded of important patient demographics, such as age, sex, and race. Since VKC can mimic several other clinical entities, a list of differential diagnoses should be kept at hand so that it can be altered as treatment progresses. Recognizing hallmark signs is crucial to making a correct and swift diagnosis. In addition, taking a careful case history also involves probing for potential allergens that could be triggers for the condition. The history in this case included the boy's positive medical history of allergies and asthma in addition to the acquisition of a cat to his home, which may have been a contributing factor.

In addition to thoroughly understanding a patient's background, patient and parental education regarding the condition and treatment options is crucial. The mother and the patient were frustrated in the earlier stages of treatment because the erythromycin, olopatadine, and ketotifen did not initially relieve symptoms. Close and frequent follow-up visits were essential in this case to monitor compliance, as well as watch for any changes in signs and symptoms. As demonstrated, patient education is a significant component of care because poor understanding or inadequate patient education can lead to misuse of medication, frustration, and, eventually, noncompliance.

In this case, the signs were mild in the early stages but progressed and eventually revealed hallmark signs, such as limbal Horner-Trantas dots. It is important for the clinician to exercise flexibility in clinical diagnosis and treatment throughout the care of the patient. Initial diagnosis in this case was different from the final diagnosis. Early treatment with erythromycin, olopatadine, and ketotifen did not significantly relieve symptoms and, therefore, had to be modified. Although one does not know if this was a result of the mother's discontinuing the child's medication before it had sufficient time to reach therapeutic levels or if it was the result of inadequate treatment at the time. Even though the mother was educated regarding the length of time for the medication to achieve therapeutic level and for the condition to resolve, she did not adhere to the recommendation. One can see that noncompliance regarding medication instillation and recommended follow-up is common in clinical care. Fortunately, this case of VKC was moderate and did not lead to a corneal shield ulcer or other complications. As a result, alternative treatments, such as stronger steroids, oral medications, and surgical intervention were not necessary. It was interesting to note that the patient fit the stereotypical VKC patient who has a personal history of allergies, such as eczema, asthma, and seasonal allergies.

Conclusion

This case demonstrates the role of patient history and close clinical observation in the diagnosis of VKC. Early treatment is important to reduce the risk of further damage to the cornea. Because signs and symptoms may change presentation, it is important to reevaluate diagnosis and treatment. In most cases, a combination of epidemiology symptoms and hallmark signs confirm the disease. Clinicians must educate parents on the potential chronic nature of the condition, as well as appropriate follow-up care. For recurrent cases, parents can bring their children for preventative eye drops such as cromolyn sodium prior to the allergy season. Resolved cases of VKC should be followed annually to monitor for recurrence. With the proper diagnosis, treatment, and patient education, VKC usually has a good visual outcome. Hopefully, future research will be geared toward finding safer and more effective drug alternatives. Gene therapy, which seeks to understand the genetic characteristics and risk factors for VKC patients, may help shed light on new treatment strategies for VKC.

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