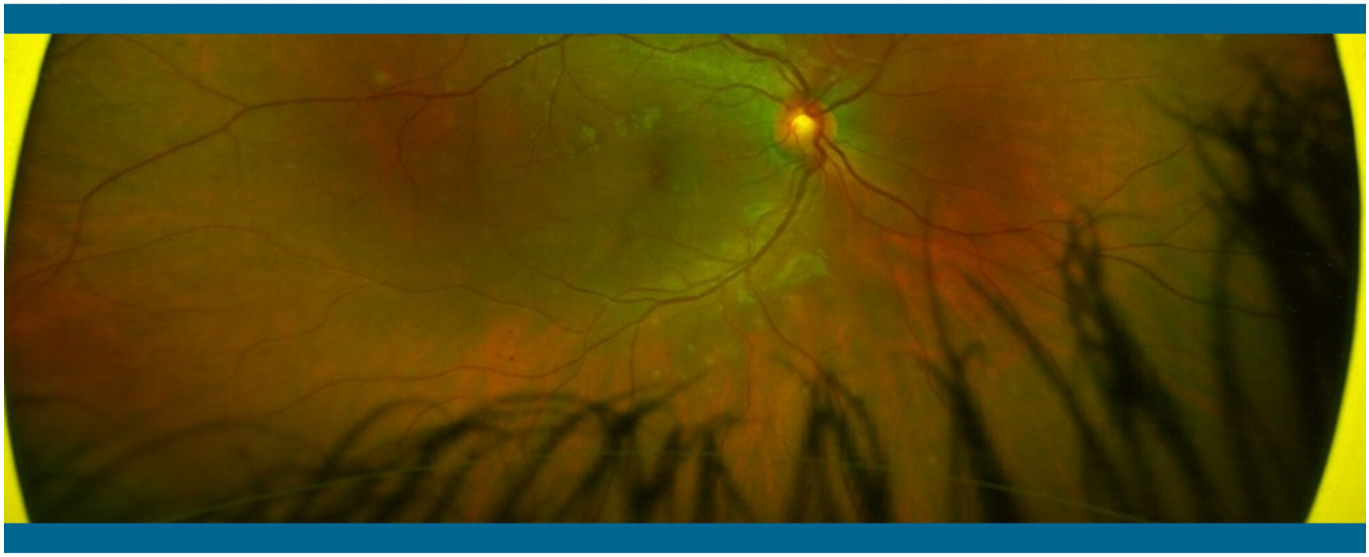
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Summer 2026



Articles

Interprofessional Education and Collaborative Practice at Schools and Colleges of Optometry: An Update

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Research Letter

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The Summer that Wasn’t

Keshia Elder, OD, MS, MS, FAAO | *Optometric Education: Volume 51 Number 3 (Summer 2026)*



Keshia Elder, OD, MS, MS, FAAO

Over the summer I found myself having the same conversation with colleagues over and over again. Where did the summer go? How can it already be July?

Sometimes I would ask, “How is your easy breezy summer going?” and be met with chuckles. This refrain began at the American Optometric Association Meeting in June, continued at the National Optometric Association Convention in July, and repeated itself during ASCO meetings and countless faculty interactions in between. In June, the message was It is almost July already. In July, it became I can’t believe it is July already. Now that July is coming to a close, the message has shifted again: Once August begins, the summer is over.

These conversations often led to reminiscing about a different time in academic life when summer seemed to be a time to slow down a little. It provided time to catch up on work that was unfinished from the previous academic year, pursue scholarship, start new projects and prepare for the next academic year. Today, summer seems more like a continuation of the traditional academic year with the same level of responsibilities and expectations. If faculty feel like there is never enough time to rest, recover or catch up, how do our students feel? More importantly, what message are we sending them about professional life? What hidden curriculum are they learning from the example we set?

As optometric educators, we have the responsibility to train students to become competent entry-level optometric practitioners. However, our responsibility extends beyond clinical competence. We must model professionalism, ethics, citizenship and habits that sustain a successful career. When students witness faculty members overworking, are we modeling appropriate examples of professional wellbeing? What unspoken and unofficial rules and behavior are we teaching? Are we demonstrating that having space for both professional and personal pursuits is important for long term professional and personal fulfillment?

Technology is a further complication. It has become an integral component of patient care, academic work and social interactions. At times, I find myself nostalgically recalling the days before email, when asking a question or making a request required picking up the phone or walking down the hall to speak with someone. Those interactions demanded a level of intentionality. You had to decide whether the

request justified the effort.

Although the ease of digital communication has many advantages, it also results in a relentless stream of requests and obligations because the cost of making the ask is so low. There are many improvements and efficiencies associated with technology, but the expectation of constant accessibility and connectivity can be exhausting. We must be intentional about creating opportunities to purposefully and responsibly disconnect and recharge. It is somewhat paradoxical how the technologies designed to help us be more efficient often result in feeling like we have less free time.

As academics with demanding schedules, we may undervalue time devoted to thinking, planning and reflecting. Quiet time matters. In today's environment with constant external noise and an unending to do list, it is increasingly difficult to carve out space to consider where we have been and where we need to go. Reflection is an essential component of growth. Summer once represented a season for renewal and reflection.

Many students do not have a comparable season. They move from semester to semester, balancing coursework, board preparation, clinical care, employment, leadership activities and extracurricular commitments with little time for genuine recovery. As I browse optometry-focused social media groups, I increasingly encounter discussions about burnout. It raises an important question: are some students experiencing burnout before they even begin their professional careers?

Should educational institutions teach students about boundary setting, recovery and sustainable professional habits alongside clinical competence? We want our students to pass boards, graduate and provide exemplary patient care. However, we also want them to enjoy meaningful, long and rewarding careers.

As educators, perhaps we should ask ourselves a final question: How can we promote sustainable performance rather than relentless productivity, both in our students and in ourselves?

Articles

PEER REVIEWED

An Evaluation of Student Use of the Southern College of Optometry Clinical Grading Program as Means of Reflection and Learning

Marc B. Taub, OD, MS, EdD, FAAO, FOVDR, FNAP, Dipl AAO | *Optometric Education: Volume 51 Number 3 (Summer 2026)*

Feedback to students during their clinical experiences can be provided in written form through the clinical grading process. This study examined how the students use the clinical grading program at Southern College of Optometry (SCO) and whether they view it as a means of learning through feedback and reflection.

A 15-question survey, which included Likert-scale, ranking, multiple-select, and open-ended questions, was distributed via Microsoft Forms to third-year and internal rotation fourth-year students at SCO. Student responses were anonymous.

The total, fourth-year, and third-year student response rates were 75% (135/180), 44/45 (97.8%), and 91/135 (67.4%), respectively. Students were satisfied with the SCO clinical grading process (73.1%). Fifty percent of students checked their grades at least daily. Close to 83% “agreed” that the clinical grading process could be used as a means of learning. Taking action based on the grade was overall positive; “Always” or “Often” was selected 77.6% of the time. A total of 467 actions were taken, averaging 2.59 per respondent. Close to 90% of students indicated the timeliness of grading impacted their learning. In comparison, 98.5% felt the quality of the faculty comments affected their learning through the clinical grading process.

The clinical grading program at SCO is part of the student’s educational paradigm. Students view the system as a means of learning and take actionable steps representing reflection based on the feedback they receive. The quality and timeliness of feedback impact learning. Faculty feedback has a greater positive than negative impact on student learning.

Keywords

clinical grading, experiential learning, optometric education, reflection, student learning

Introduction

One aspect of teaching in the clinical programs of a professional program, such as optometry, is the need to inform students about their performance. Grading rubrics can include Likert-scale items and open-text boxes to provide the students’ feedback. It is hoped that students will then absorb that feedback, reflect on it and take some action that helps them grow as clinicians and critical thinkers. The question of learning and the actions taken based on feedback during clinical grading has, to the best of our knowledge, not been explored in the optometric literature. Faculty often spend hours per week,

sometimes with dedicated scheduled time, completing grades, but the question of student impact remains unexplored. This study explored students' use of the clinical grading system at Southern College of Optometry (SCO), their attitudes toward the feedback provided, the impact on reflection and learning and the actions they took in response to that feedback. A better understanding of these aspects of clinical grading will provide SCO and other optometric institutions with information to analyze and enhance their clinical grading systems, thereby strengthening their role as a teaching tool.

Experiential Learning

History/Key Characteristics

The experiential learning theory originated in the work of educator John Dewey. Dewey[1] espoused the idea that learning occurs through experience. Dewey's work became the foundation for what is now known as progressive education. According to Dewey,[1] not all experiences produce learning; some may miseducate, leading to experiences that are less than meaningful, in which learning or growth does not occur. For learning to occur, the learner must connect with the experience and the experience must be meaningful.[2]

Figure 1

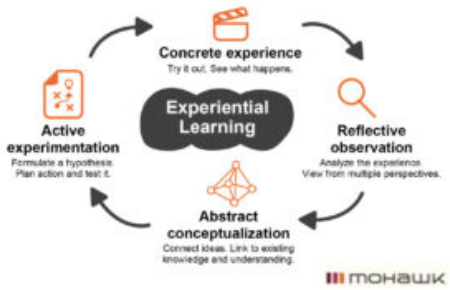


Figure 1. Kolb's Experiential Learning Theory5.Click to enlarge

Kolb[3] defined experiential learning as the process whereby knowledge is created through the transformation of experience. The Kolb learning model (**Figure 1**) consists of four stages through which learners progress during the learning process: concrete experience, reflective observation, abstract conceptualization and active experimentation.[4]

Learning is effective when the learner progresses through these four stages. The model is more complicated than a circular cycle, however. It comprises two modes of grasping experiences (concrete experience and abstract conceptualization) that are oppositional and two modes of transforming experiences (reflective observation and active experimentation) that are also oppositional. The four learning modes are defined as follows:

- *Concrete experience*: The ability to be open and willing to involve oneself in new experiences
- *Abstract conceptualization*: The ability to create concepts that integrate their observations with previous knowledge, experiences and logically sound theories
- *Reflective observation*: The ability to reflect on what was observed during the new experience.
- *Active experimentation*: The ability to try out or use the theories they learned to make decisions and solve problems.

The learning cycle begins with the individual having concrete experience, which is the basis for observation and reflection. The reflections are integrated into abstract concepts from which implications can be drawn and actively tested and experimented on by future experience.

Relevance of Experiential Learning to Clinical Grading

The four Kolb[6,7] experiential learning cycle stages concerning the clinical optometric learning experience highlight the following connections (**Figure 2**). Students are assigned a patient in the clinic and perform an examination, including a history. The students present their data and work with faculty members to develop a differential diagnosis and a plan. Treatment is initiated, be it glasses, medication, therapy, a minor surgical procedure, or referral. This is the concrete experience aspect of Kolb's learning cycle, which students encounter through patient care.

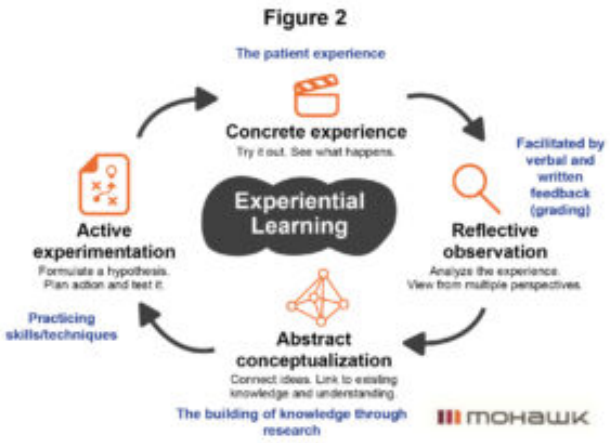


Figure 2. Kolb's Experiential Learning Theory with Connections to Clinical Experiences/Grading.Click to enlarge

Both during and after the examination, the students reflect on the encounter. This reflection begins with rethinking the case as they complete the examination record. By considering the choices made in test selection, how they approached and handled the encounter and the treatment provided, the student begins self-reflection on the concrete experience they just completed.

Verbal discussion between the faculty and the student, and clinical grading, facilitate the self-reflection process. During and after the clinical experience, there is often a verbal discussion between the faculty member and the student. This is an opportunity for case discussion and a time for the faculty member to guide the student and critique their performance. Clinical grading, which includes written and numerical feedback, should be considered part of the reflective component. Each clinical encounter is graded, offering faculty a structured opportunity to guide the student in the learning process for that patient and provide feedback and suggestions for future learning. The faculty member, of course, uses it in this manner, offering productive feedback to enhance reflection, and the student must be open to hearing the feedback and using it as part of their reflection.

The student builds on the reflection to improve in some way. This abstract conceptualization can occur by building knowledge by researching a topic, speaking with a friend or faculty member, or practicing/enhancing a skill. The student self-directs their learning, chooses to practice a given technique, or learns more about a given topic or condition regarding the previous patient encounter.

The faculty member's feedback and the self-directed learning it generates hopefully help the student integrate and actively experiment with their new knowledge or approach and test it in future patient experiences. This experience will then, in turn, lead to the process of starting anew.

In discussing the concept of assessment in experiential learning theory, Kolb[3] stated, "It views much assessment in education as problematic because it is overly focused on declarative content knowledge rather than learning skills: and it is not holistic, emphasizes cognitive knowledge at the expense of interpersonal and applied competencies." Despite this seemingly negative view of assessment related to

experiential learning, it is necessary to document learning outcomes and fuel the reflective fire. As Coyle, et al.[8] noted, “Students will learn more if instruction and assessment are integrally related. Providing students with information about particular qualities of their work and what they can do to improve it is crucial for maximizing learning.” Feedback, when coupled with practical application, helps students not only to learn content but also to enhance critical thinking.[9]

This study explored the student use of clinical grading system at SCO, their attitudes toward the feedback provided, the impact on reflection and learning and the actions they took based on that feedback.

Methods

A 15-question survey was created by the author based on experiences in clinical grading (**Appendix**). This survey has not been validated or used in previous studies. The survey was sent electronically via Microsoft Forms to third-year (135) and fourth-year (45) students at SCO. This represents the current third-year class and the fourth-year students who are completing their internal rotation. Both groups are currently using the described clinical grading system. The survey comprised multiple-choice and Likert-scale-type questions. The Likert scales had either four or five choices, depending on the question. Of the Likert-scale questions, nine of 12 used a four-point scale, while the remaining three used a five-point scale. The specific questions and scales used are available in the Appendix. The student responses were anonymous. No incentive was provided for the completion of this survey. The survey was open for 10 days and collected responses in MS Forms. Descriptive statistical analysis was performed using MS Forms. The study was approved by the Institutional Review Board of SCO.

Results

The response rate was 75% (135/180), with fourth-years showing a higher rate (97.8) than third-years (67.4%). The satisfaction with the SCO clinical grading process was as follows: “very satisfied” (5.2%), “satisfied” (67.9%), “neither satisfied or dissatisfied” (24.6%), and “dissatisfied” (2.2%).

Fifty percent of students reported checking their grades at least daily (17% more than once a day; 33% once per day). An additional 36% checked several times a week, while 14% did so only once a week. Regarding the time spent reviewing grades, 71% reported spending less than 3 minutes per session (17% spent less than 1 minute, 54% spent 1-2 minutes), while 27% spent 3-5 minutes.

In comparing the students’ examination of the various aspects of the grade (categories and comment box), there are different distributions, but overall, the patterns are similar. (**Figure 3**) Students indicated that they viewed the comment box “always” or “often” 98.5% of the time, compared to 76.3% for the categories. Of note, a tiny percentage did not view the categories (2.2%) or the comment box (0.7%).

Figure 3

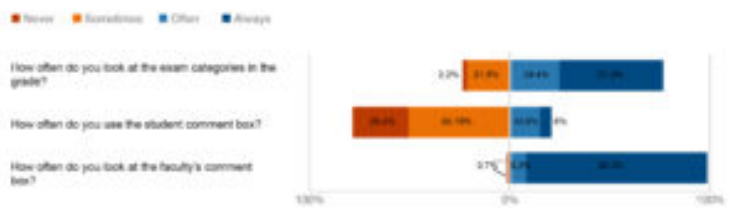


Figure 3. How often students use certain aspects of the grading process.Click to enlarge

The students’ comment box showed a different pattern of use. Only 20.9% selected the “always” or

"often" option, and 50.7% selected "sometimes." While this shows that close to three quarters of the students took the opportunity to use their comment box, the remainder (28.4%) did not.

Only 7.4% of students selected "disagree" or "strongly disagree" when asked if the clinical grading process could be used as a means of learning. Close to 83% selected "agree" or "strongly agree."

Taking action based on the grade was overall positive. "Always" or "often was selected 77.6% of the time, and "sometimes" was 21.6%. Only one respondent indicated that they "never" took action. The actions taken showed a wide distribution (**Figure 4**). The most common answers selected were "Google a topic", "look up your class notes", "ask a friend", and "ask a faculty member." A total of 467 actions were taken, averaging 2.59 per respondent. The number of actions ranged from zero to eight.

Figure 4



Figure 4. Different actions taken by the students in response to faculty feedback.Click to enlarge

Several factors were assessed for their perceived impact on learning (**Figure 5**). Faculty comments were reported to positively impact learning "always" or "often" by 79.7% of students compared to a negative impact of 10.5%. Responses indicating "never" further illustrated this contrast between positive vs. negative impact (0.8% vs. 38.1%). Close to 90% of students indicated that the timeliness of the grading impacted their learning. This underscores the perceived importance of prompt feedback in clinical education, as it adds interpretation and significance. In comparison, 98.5% felt that the quality of the faculty comments affected their learning through the clinical grading process.

Figure 5

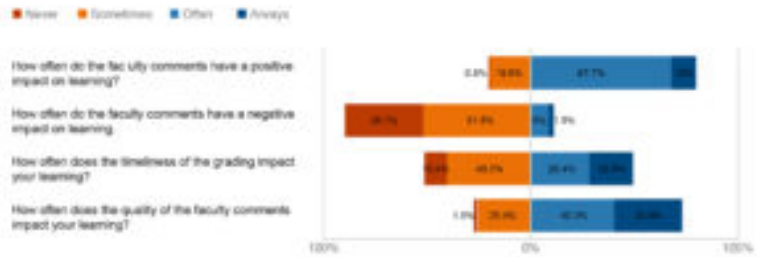


Figure 5. The impact of different aspects of feedback on learning via the grading process.Click to enlarge

Discussion

This study examined the clinical grading process at SCO and how students used various aspects, including faculty feedback and the grading system, as a means of learning. In early 2023, the grading system was updated to make it more efficient and provide greater transparency for students and faculty. The high student approval indicates that those changes effectively create a satisfactory experience.

One factor that affects students' ability to reflect on their grades is the timeliness of faculty in completing those grades.[10-12] While the burden to complete the grade falls on the faculty, the burden to view the completed grade, including the feedback provided, falls on the student. How often and for how long students are entering the grading platform to view their grades, and the timeliness of faculty completing the grade, must be considered in this equation. For example, a faculty member might efficiently complete their grades, but the student might not view them promptly, reducing the opportunity for reflection. Conversely, the student may often check their grades daily, but the faculty may be lax in their duties and complete the grade a week later.

On the student side of the equation, 50% reported checking their grades at least once a day. Fourth-year students, who have more clinical experience in patient care and are more knowledgeable, might check their grades less, but that would be a false assumption. Among students who checked their grades weekly, eight of 19 were fourth-year students and 11 were third-year students. Conversely, of the 23 students who viewed their grades more than once daily, eight were fourth-years. When examining the time spent reviewing grades, 38 of 44 fourth-year students spent 1-2 minutes or less per session, compared to 58 of 91 third-year students. Third-year students spend more time reviewing their grades. While the frequency of checking grades is student-specific, a pattern emerges: third-years spend more time viewing their grades when they access them.

Timely feedback is identified by Romani and Krackov[13] as one of their 12 imperatives for feedback. The current study supports this fact. The poor timeliness of the feedback can disrupt the experiential learning cycle,[14] thereby hindering reflection and, in turn, impacting the learning opportunity. Timely feedback is especially crucial for students requiring remediation, those with limited clinical efficiency, or those with identified academic deficiencies.[12]

Although the survey results do not identify which specific aspects of the grade most influence students' reflective processes, it is likely that the faculty comment boxes play a greater role, as they provide narrative feedback on what students did well and what they can improve. Faculty often provide links to additional resources as well. Faculty often include links to additional resources in their narrative feedback. In contrast, Likert-scale category ratings (e.g., documentation, technical skills and data interpretation) reflect performance along a continuum from 'below expected' to 'above expected.' While the numbers are still relatively high for both aspects of the grade, more students looked at the faculty comment boxes regularly than the categories. The impact on learning from the quality and nature of feedback provided in the faculty comment box will be discussed below.

Reflection is a critical aspect of clinical teaching and has been shown to help develop self-regulated learning skills that can enhance competence, humanism and professionalism.[15] According to Winkel et al., there is support for reflection as a means to "advance knowledge, guide future learning, deepen understanding of complex concepts and explore emotionally challenging situations.[15] According to Ledvinka,[14] "we are helping them [students] to develop tools for lifelong learning," through reflective practice. Looking more closely at the process's reflection component raises the question of whether clinical grading sufficiently supports reflective learning. A lack of reflection may indicate surface learning, whereas critical reflection demonstrates deeper engagement.

This question was evaluated in two ways in the survey. In 2023, one of the new aspects of the grading system was the creation of a student-only comment box developed in response to student feedback. In this box, which students complete before sending the grade request to the faculty member who worked with them, they can ask questions, request resources, or inform the faculty member who worked with them about something that occurred during the examination. In examining the definition of reflection put forth by Branch and Paranjape,[16] which defines reflection in medicine as "to include consideration of the larger context, the meaning and implications of an experience or action," the student comment box could be considered such an opportunity. It is positive to see that almost ¾ of the students use the comment

box in some fashion. In this aspect of the grading system, a proportion of students need to see the comment as a learning opportunity and take advantage of it often enough.

The opportunity for reflective practice concerns students' actions after receiving feedback through their grades. The most selected actions included Googling a topic, looking at class notes and asking a friend or a faculty member. Practicing a skill was selected less often but was chosen by slightly over 40% of students. Interestingly, 11 of the students who indicated that they "never" used the student comment box but instead selected the option to "ask a faculty member." It can be inferred that they are asking the faculty member in person, outside the grading process. Despite the actions taken, it is unclear whether they were prompted by faculty feedback or initiated independently. Given that reflection can be facilitated rather than purely self-directed, this distinction is important to explore in the future.

Another major issue with reflection in the clinical grading process is the quality of feedback. Comments may be superficial, focusing on technique or diagnosis, but they do not provide the student with enough direction to reflect and grow. All but two students (98.5%) indicated that the quality of the faculty comments impacted their learning. This can be interpreted as having either a positive or a negative influence. While the lack of feedback or low-quality, overly general feedback can have a negative impact, specific, actionable feedback can have a positive impact.[17] If one of the goals of the clinical grading system is to provide feedback that students can use to build confidence and engage in meaningful reflection on what they did well or poorly, providing high-level, specific feedback with actionable points is crucial.

Several studies have examined the characteristics of the feedback given in medical clinical grading. Canavan et al.[18] found that "Most feedback comments were positive, self-oriented and lacked actionable information that would make them useful to learners." Pulito et al.[19] reviewed 331 evaluation forms from medical students' clerkship rotations. Not one comment was made regarding history-taking and physical examination skills, ordering or performing lab tests, or surgical technical skills; these are actionable growth areas where specific feedback would be most beneficial to student growth. Comments related to these three topics are likely to have the greatest impact and offer the greatest opportunity to enhance reflection. Lye et al.[20] conducted a study of pediatric medicine clerkships and collected 261 evaluations from 157 students. Only 311 (31%) comments were related to clinical performance, and only 134 of those offered specific details.

In the current study, students reported that faculty comments can negatively impact learning. Learners vary in their responses to criticism, which may hinder their ability to process feedback and reflect on their strengths and weaknesses.[17] "Students with inaccurate self-assessment may struggle to interpret and apply feedback effectively.[21] Self-esteem also impacts how students receive feedback, as students with high self-esteem are more likely to engage in positive reflection. Those with poor self-esteem interpret the criticism as negative and personal in nature.[22]

Clynes,[23] however, also reported that negative feedback did not harm the mentor-student relationship. As fewer than 10% of students selected "often" or "always" for the impact of negative feedback on learning, one can extrapolate that, on the whole, students appear to internalize negative feedback constructively and that it is not negatively impacting their learning. Interestingly, a relatively equal percentage of third- and fourth-year students chose both options, indicating that receiving feedback for a longer period did not alter their reactions to the negative feedback.

Clinical grading can give students confidence and boost their emotional well-being.[24] In the current study, nearly 100% of the students indicated that the faculty comments had a positive learning impact. Skinner et al.[25] found that students' confidence and interpersonal skills improved following experiential learning opportunities. Giving constructive criticism is intended to boost self-esteem and motivation. Veloski et al.,[26] in a systematic review of assessment, feedback and clinical performance of physicians, identified

220 potential studies. Of 41 studies that met the inclusion criteria, 29 (70%) reported a positive effect of feedback on clinician performance.

While overall, the students surveyed felt that the type of feedback, negative or positive, did not impact their ability to learn via the SCO clinical grading process, specific changes in performance before and after the feedback were beyond the scope of this survey. Zahid et al.[27] found a significant difference in performance pre- and post-surgical procedures in a training lab following negative and positive feedback. The positive feedback group improved by 39 seconds, compared to only 4 seconds in the negative feedback group. When asked about their performance, those in the positive feedback group rated their performance as average to above average. In contrast, those in the negative feedback group said they were average to below average. When questioned about future performance, those in the positive feedback group expected to do better, while those in the negative feedback group ranged from expecting to perform extremely well to expecting no change. This study highlights how feedback type may influence both immediate performance and students' expectations of future performance.

Limitations

This study is limited to a single grading system at a single college of optometry. As such, the findings may not be generalizable to other programs or grading structures. It is possible that students at another college of optometry with a different clinical grading system and a different frequency of feedback may not respond similarly. The qualities and optimal timing for facilitating reflection and student action were not studied but understanding them would be beneficial.

Conclusion

The clinical grading program at SCO is part of the student's educational paradigm. They use and view the system as a means of learning and reflection and take actionable steps based on the feedback they receive. The quality and timeliness of feedback impact learning. Faculty feedback has a greater positive impact than a negative one. Further study will focus on the nature and quality of faculty feedback, with the goal of providing insight into how student reflection can be enhanced.

Appendix

Survey Questions

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PEER REVIEWED

Interprofessional Education and Collaborative Practice at Schools and Colleges of Optometry: An Update

Jasmine Wong Yumori, OD, FAAO, Dipl AAO, FNAP, Melissa Zarn Urankar, OD, FAAO, FNAP, Linda Casser, OD, FAAO, FNAP, Julie A. Tyler, OD, FAAO, FNAP, Amy Logan, OD, FAAO, Tracy Wang, OD |
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Interprofessional education and collaborative practice (IPECP) improve healthcare quality and safety and are important components of optometric education. In August 2020, the 25 member institutions and associate members of the Association of Schools and Colleges of Optometry were surveyed to increase understanding of their IPECP efforts. The 2020 survey results indicated that implementation trends had stabilized, and IPECP was becoming increasingly important, consistent with earlier survey findings. Barriers to development and integration – including lack of time, interest, funding and scheduling difficulties – continue to persist. Additional resources are needed to support further growth and development.

Keywords

collaborative practice, interprofessional education, interprofessional education and collaborative practice, optometric education, optometry, survey

Background

According to the World Health Organization, interprofessional education (IPE) “occurs when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes.”[1] Interprofessional collaboration (IPC) is “the process in which different professional groups work together to positively impact health care.”[2] Interprofessional education and interprofessional collaboration, together termed interprofessional education and collaborative practice (IPECP), are important components of health education. According to the original 2011 Interprofessional Education Collaborative (IPEC) panel, which created the first Core Competencies for Interprofessional Collaborative Practice, “in order to deliver high-quality, safe and efficient care, and meet the public’s increasingly complex health care needs, the educational experience must shift from one in which health profession students are educated in silos to one that fosters collaboration, communication, and a team approach to providing care.”[3] The revised report “Attributes of Students Graduating from Schools and Colleges of Optometry”[4] was released in the same year by the Association of Schools and Colleges of Optometry (ASCO) and outlined the following attributes as critical to recipients of the Doctor of Optometry Degree:

- Have the ability to appropriately use all resources, including the use of ancillary personnel, intra- and interprofessional collaboration, co-management, and referral, in ensuring the best quality patient care
- Manage their practices in a manner that is appropriate within the healthcare delivery system and that promotes patient access to eye and vision care
- Have the ability to recognize personal limitations regarding optimal patient care and to work with the broader health care community in providing the best care possible
- Have a commitment to work as an integral member of the larger interprofessional health care team to improve patient care outcomes

- Have the ability to recognize and initiate the coordination of patient care requiring advanced medical, systemic, interprofessional, or specialty care
- Have the ability to work in cooperation with those who receive care, those who provide care, and others who contribute to or support the delivery of prevention and health services

In 2011, ASCO also developed a survey to identify IPECP activities; this survey was subsequently disseminated in 2013 and 2015, with a special report published in 2015 revealing that 19 out of the 21 schools and colleges of optometry that took part in the ASCO survey participated in IPE activities, with nine indicating that IPE was a program requirement, eight describing "IPE coursework involving students from different programs teaching one another," and 20 various professions represented in IPE activities across all schools and colleges of optometry.[5] Given the shared values between ASCO and IPEC, ASCO became the first IPEC Supporting Organization[6] and was represented in the 2016 update of the IPEC Core Competencies for Interprofessional Collaborative Practice.[7] It is important to note that the term "Interprofessional Practice" (IPP) is often used interchangeably with "Interprofessional Collaboration" (IPC) and is included in the IPECP acronym.

In 2016, ASCO's Interprofessional Education and Collaborative Practice (IPECP) Committee brought together members from schools and colleges of optometry as well as representatives from non-optometry health professions institutions and organizations to "identify and share current best practices and ideas on future development of IPE and IPP"[8] at an in-person IPECP Summit. Future trends and implementation plans were also established[9] and resources were subsequently collaboratively created, including a video featuring educators and students sharing the importance of IPECP in optometric education and how it improved patient outcomes,[1,2] a Special Interest Group (SIG) to facilitate the exchange of ideas between faculty and administrators at the schools and colleges of optometry,[3,11] an IPECP Toolkit to "serve as a guide for building, implementing and sustaining IPECP initiatives at optometric institutions."[12] The ASCO Board more recently adopted the IPECP Core Competencies for Optometric Education (**Table 1**).[13]

TABLE 1
IPECP Core Competencies for Optometric Education

Overarching Goal: The school or college of optometry shall ensure that before graduation each student will have demonstrated critical professional and personal attributes, including a commitment to work as an integral member of the larger interprofessional health care team to improve patient care outcomes.	
Competency	**Example of Competency-Based Learning Activities**
Identity: Understanding optometry's unique professional identity, as well as the identities of other professions	• Fulfill the responsibilities of the profession of optometry • Highlight the roles of other professions through appropriate review of health information and referral • Utilize optometry as a part of the interprofessional team to advance public health
Active Participation: Implementation of a sequential series of didactic, clinical, and extracurricular IPE learning activities	• Engage in didactic and extracurricular opportunities for IPE • Joint education with students from other professions in various classroom settings/ institutions • Apply IPE knowledge, skills, and values into clinical training and practice
Integration: Promotion of the integration of optometry into team-based care	• Share knowledge, values, and respect with other professions to maximize expertise • Serve as a member of an interprofessional team to address patients' health care needs and population health
Teamwork: Development and demonstration of effective interprofessional teamwork skills	• Communicate confidently the diagnosis, treatment, and prevention of disease with the patient's health care team • Facilitate interactions with other health care professionals, patients, and their families • Practice terminology and presentation of materials easily accessed and understood between professions
Collaboration: Collaboration and coordination across academic institutions, professions, health systems and community partners	• Deliver patient care that is safe, timely, efficient, effective, accessible, and equitable • Produce meaningful relationships between professionals and with the patient and family • Appropriately encourage and provide feedback between professions to expand patient and population health care

Table 1. IPECP Core Competencies for Optometric Education. Click to enlarge

Given the increased focus on IPECP both within and beyond optometry, ASCO's IPECP Committee and SIG share in this article updates from ASCO's 2020 survey regarding current IPECP activities at ASCO member and associate member schools and colleges of optometry.

Methods

The 16-question survey, originally developed in 2011 by an ASCO Government Affairs staff member[5] and subsequently updated by ASCO's Interprofessional Education and Collaborative Practice (IPECP) Committee and SIG and disseminated in 2013 and 2015, was updated and provided via SurveyMonkey to each president and chief academic officer at the 25 ASCO member schools (23 regular, two associate) in August 2020 with a deadline to respond by October 2020. The survey consisted of four sections: Participation, Infrastructure and Barriers, Programming, and Resources. Survey items can be found in the **Appendix**. While reminders were provided, no incentives were offered for survey completion. Data analysis utilized mainly descriptive statistics; open-ended survey item responses were also reviewed by the Committee. The Institutional Review Board at Western University of Health Sciences approved this study as exempt research.

Results

Representatives from 23 member schools (22 regular and one associate) completed and returned the surveys, resulting in a response rate of 92%. Of the 23 schools that responded to the survey, 17 (73.91%) reported that their program requires participation in IPECP for all optometry students, with 22 (95.65%) schools reporting optometry faculty participation in IPECP activities and eight (36.36%) indicating that participation by optometry faculty was required.

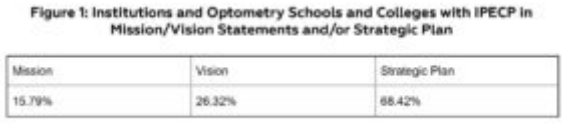


Figure 1. Institutions and Optometry Schools and Colleges with IPECP in Mission/Vision Statements and/or Strategic Plan.
Click to enlarge

When asked whether the ASCO school/college and/or associated institution has IPECP in their mission and/or vision statements and/or strategic plan, 19 responses were received. While the response rate for the overall survey was 23, the response rate for this specific question was 19. The number of respondents will be used as the denominator for percentage calculation where applicable for this question. Thirteen (68.42% of 19 responses) schools reported inclusion in their optometry strategic plans, five (26.32% of 19 responses) schools in their optometry vision statements, and three (15.79% of 19 responses) schools in their optometry mission statements. Results from this item are summarized as percentages in **Figure 1**. While the difference between institution and school may be thought of as institution referring to larger, if appropriate, organization and school referring to school or college of optometry, no definitions were provided in the survey.

The top five professions with which optometry schools reported collaborating were Medicine (MD/DO) (91%), Nursing (87%), Pharmacy (83%), Occupational Therapy (61%), and Social Work (57%). **Table 2** lists all the collaborating professions reported by survey respondents reported from the 2011, 2013, 2015 and 2020 surveys, with more than 33 collaborating professions across all programs in 2020. Examples of reported IPECP experiences include clinical shadowing, outreach, collaborative care planning, workshops, lectures, screenings, case discussions and simulations.

TABLE 2
Collaborating Professions with Optometry Programs, Reported 2011, 2013, 2015, and 2020

Profession	2011 n=18	2013 n=19	2015 n=19	2020 n=23
Medicine (MD/DO)	2	12	14	21
Nursing	9	9	13	20
Pharmacy	8	9	13	19
Occupational Therapy	3	8	9	14
Social Work	0	3	3	13
Physical Therapy	5	7	7	12
Dentistry	3	6	6	11
Low-Vision Specialist	0	1	0	9
Opticianry	0	1	1	9
Psychology	3	0	0	8
Audiology	2	4	0	7
Public Health	0	1	2	7
School of Health Professions	0	0	0	6
Physician Assistant	4	0	0	6
Behavioral Health	0	0	1	4
Podiatry	2	2	3	3
Speech-Language Pathology	0	1	5	3
Veterinary Medicine	0	0	0	3
Biomedical Sciences	0	0	0	2
Chiropractic	0	0	0	2
Gerontology	0	0	0	2
Other*	3	6	2	16

Table 2. Collaborating Professions with Optometry Programs, Reported 2011, 2013, 2015, and 2020. *Other collaborating professions included Acupuncture, Athletic Training, Cardiovascular Perfusion, Dental Hygiene, Law, Medical Laboratory Technology, Nutrition Science, Recreation Therapy, Respiratory Therapy, Sonography Click to enlarge

Relating to interprofessional programming, variations existed in terms of formal versus informal activities or interactions, with eight programs (34.78%) reporting mainly formal (includes required courses and assignments), 12 programs (52.18%) reporting mainly informal (includes interactions not specific to assigned courses), and three programs (13.04%) reporting equal amounts of formal and informal. Similar variations were seen with scheduling, with 10 programs (43.48%) reporting mainly synchronous (scheduled/pre-set meeting times), eight programs (34.78%) reporting mainly asynchronous (programs/assignments completed within a specified timeframe), and two (8.70%) reporting equal amounts of synchronous and asynchronous IPECP activities or interactions. Examples of IPECP opportunities included case discussion, community outreach and within clinical settings.

Knowledge associated with the IPEC Core Competencies were included in most curricula. The most common means of inclusion reported was optometry-only courses (15 programs, 65.22%). IPEC Core Competencies were also reported to be included in interprofessional/collaborative courses (11 programs, 47.83%), interprofessional special projects (11 programs, 47.83%), and multi-disciplinary courses (three, 13.04%). Regarding National Board of Examiners in Optometry (NBEO) topics being taught at least partially within interprofessional coursework, the most common topic covered was Communication Skills (nine programs, 39.13%). Other topics covered included: Legal Issues/Ethics/Public Health (eight programs, 34.78%), Diagnosis (seven programs, 30.43%), Treatment/Management (seven programs, 30.43%), Clinical Presentation (six programs, 26.09%), Clinical Correlation of Basic Science Principles (six programs, 26.09%), Affective Skills (six programs, 26.09%), and Clinical Observation and Reporting Skills (six programs, 26.09%).

Regarding assessing outcomes of interprofessional activities and courses, 16 (69.57%) reported course-related tests, student reflections, or similar, 11 (47.83%) reported use of validated survey instruments, 11 (47.83%) reported informal surveys, four (17.39%) reported student focus groups, and six (26.09%) reported no formal assessment.

When asked about institutional infrastructure, six (26.09%) reported having a formally appointed standing committee with interprofessional representation, five (21.74%) reported no formal structure with significant numbers of IPECP activities offered by individual IPECP champions, four (17.39%) reported having a centralized administrative structure with dedicated personnel and office space to lead IPECP at an institutional level, three (13.04%) reported either having an ad hoc task force, and another five (21.74%) reported no formal structure with few IPE activities, courses, and/or designated experiential

rotations.

When asked whether IPECP is referenced in promotion and tenure guidelines for faculty, 17 (73.91%) reported no reference, four (17.39%) reported reference within optometry guidelines, two (8.70%) reported reference within institutional guidelines, and two (8.70%) reported other.

When asked about the full time equivalent (FTE) assignment of the leader designated exclusively to IPECP responsibilities, seven (30.43%) reported no designated IPECP leader, 12 (52.17%) reported 0-25%, one (4.35%) reported 26-50%, none reported 51-75%, and three (13.04%) reported 76-100%.

Regarding how IPECP is financed, nine (39.13%) reported centralized funding managed by central administration, seven (30.43%) reported no dedicated budget, and six (26.09%) reported that each college/program funds their own projects.

The largest unaddressed barriers to IPECP implementation and growth were reported as lack of time (11), lack of interest by other programs (10), scheduling difficulties (10), lack of interest by optometry faculty (eight), and lack of funding (seven). The survey question asked respondents to select “does not exist,” “addressed,” or “not addressed” for each barrier. The results reported focus on the count of schools responding “not addressed” indicating where the barriers continue to impede IPECP. For example, for lack of time, 11 schools reported it was “not addressed,” while the remaining 12 schools either reported that the barrier was “addressed” or “does not exist.”

When asked about resources for faculty and program development (for example, whether representatives from their institution attended any IPEC-sponsored workshops), 17 (73.91%) responded yes while six programs (26.09%) responded no. Interest in the development of a “universal” IPECP initiative that could be implemented by all schools and colleges of optometry was affirmed by 15 respondents (65.22%) and the remaining eight (34.78%) said no; however, 21 (91.30%) respondents recommended that ASCO host a second IPECP Summit.

Discussion

As IPECP has become more established, implementation trends are stabilizing within optometric education and are consistent with nationwide trends across health professions programs.[14] Specifically, the 2020 survey data, when viewed against the earlier 2011, 2013 and 2015 surveys, supports the finding that IPECP implementation is becoming more established. The importance of IPECP within optometric education is reflected not only in the number of optometric programs that require participation in IPE for students and include faculty involvement but also by its inclusion in the majority of ASCO schools and colleges’ strategic plans and vision statements, with many also including IPECP in their mission statements both at a school/college level and at an institutional level. The recent development of resources, including the ASCO IPECP Toolkit and Core Competencies for Optometric Education, further supports these trends.

There are large variations in interprofessional programming when it comes to types of activities and interactions, formality, timing, and assessment. There is also diversity in collaborating professions across ASCO schools and colleges, with medicine, nursing, pharmacy, occupational therapy and social work being the most common. While there is growth in the frequency of collaborations for almost all professions, some variations exist likely due to the prospect of collaborations within the clinical setting and scheduling difficulties between programs. Aligning academic calendars for collaborating professional programs and building in scheduling flexibility have been shown to be helpful.[15-19] In addition to difficulties with scheduling, challenges with interest and funding persist. These barriers are seen within other health professions programs and can adversely affect the realization of IPECP.[16,20,21] Challenges related to lack of physical resources and geographical barriers previously reported[5] may not be as common because of

the increased access to and use of technology. Opportunities for further development within optometric education include strengthening IPECP infrastructure and including IPECP within the faculty promotion process. While references to IPECP within the faculty promotion process is also not common across other health professions programs,[21] it is promising that infrastructural support, such as a centralized administrative structure, designated IPECP leadership, dedicated budget, systematic planning, and internal faculty development, is seen across most health professions programs.[14]

One such resource that was designed to enhance the foundation for sustainable IPECP development within optometric education was the 2022-2023 IPECP virtual summit. Developed by the ASCO IEPCP Special Interest Group, the goal of the 2022-2023 IPECP virtual summit was to create a collaborative scholarly environment and to demonstrate improved patient outcomes resulting from the implementation of IPE programming.

Conclusion

While optometry and other health professions are moving beyond simply recognizing the importance of IPECP, and efforts are becoming more organized and operationalized while at the same time varied in terms of types of activities and interactions and collaborating professions, barriers to development and integration continue to persist. Refining methods to assess the quality of IPECP efforts more formally and maximizing resources to support further growth and develop are increasingly important.

Appendix

2020 IPECP SURVEY

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PEER REVIEWED

Optometric Management of Age-Related Macular Degeneration: Recommendations for Ongoing Optometric Care

Stephen H. Sinclair, MD | *Optometric Education: Volume 51 Number 3 (Summer 2026)*

Once age-related macular degeneration (AMD) is diagnosed in one or both eyes of a patient, the optometrists predominantly involved in delivering primary vision care are focused on monitoring the progression of the disease prior to referring the patient to an appropriate ophthalmologist to administer treatment. However, following this referral they lose the opportunity to follow the patient to manage the common occurrence of continued vision loss due to disease progression. The ophthalmologist, however, is focused upon the intravitreal care delivery of treatment for late stages of AMD and fails to refer the patient back to the diagnosing optometrist or to an appropriate low vision rehabilitation service until it is too late, resulting in poor rehabilitative recovery.

This article recommends that the original diagnosing optometrist should continue to follow the patient, and after referral, continue to manage the vision experienced by providing the low vision rehabilitation or orchestrate the referral to an appropriate provider. While this review discusses several reasons for the current clinical involvement of optometrists in low vision care, those who have recognized this significant need have responded via such a biphasic approach. However, challenges are recognized when comprehensive low vision rehabilitation programs are scarce, or transportation is unavailable. In addition, optometrists may not know of or be able to utilize regional referral resources, such as state agencies for the visually impaired that would be able to address the complex rehabilitative needs involved with a patient's daily living activities. Often, the result is that, despite the optometrist's best clinical efforts, the patient's functional vision goals are not achieved, and patients are not knowledgeable about appropriate resources that could address their specific rehabilitation goals.

This article reviews several programs in progress to improve the rehabilitative care required to meet the vision needs and lifestyles of an elder population with AMD.

Keywords

AMD, gerontology, macular degeneration, optometric education, optometry, vision impairment, vision rehabilitation

Age-related macular degeneration (AMD) is a leading cause of vision loss in those older than 55 years across all income levels and constitutes 6% to 9% of global legal blindness.[1] The progressive visual loss is certainly recognized to affect functional capacity and quality of life, especially in the elderly, and constitutes an important public health problem because of the resulting impaired coordinated motor skills and neural dysfunction that are recognized to cause falls, car accidents, impaired reading and cognitive comprehension deficits, etc.[2]

Once AMD is diagnosed in one or both eyes of a patient, optometrists, predominantly those involved in the delivery of primary vision care, are focused on monitoring the progression within the early disease stages. When more advanced pathology develops, either geographic atrophy or choroidal neovascularization, this requires referral to an ophthalmologist for the appropriate treatment. Following the referral, optometrists often lose the opportunity to follow the patient to manage the occurring,

sequential, progressive vision loss due to the common occurrence of disease progression. The ophthalmologist, on the other hand, focused upon the intravitreal care delivery of treatment,[2] fails to refer the patient back or to a low vision rehabilitation service.[3,4] When the pathology often continues with progressive visual loss that results in loss of visual functionthe treating ophthalmologist may refer the patient to the original referring primary care optometrist so as not to threaten the referral relationship or often optimally refers to a practicing low vision rehabilitation optometrist.[5] However, this is frequently delayed, leaving individuals with visual impairment the responsibility often to search for low vision rehabilitation services on their own.[6]

It is recommended that the original diagnosing optometrist continue to follow the patient, and after referral, continue to interact cooperatively with the treating ophthalmologist to manage the vision experienced by the patient. This may be done by providing the low vision rehabilitation or orchestrating the referral to an appropriate provider. However, in a 2006 American Optometric Association (AOA) Scope of Practice Survey,[7] while 89.9% reported that they managed or co-managed patients with macular degeneration, only 36% indicated that they provided some level of low vision services with 84.6% reporting they referred low vision patients elsewhere for services. Only 25.4% indicated that they accepted low vision referrals from other practitioners.

If the degree of vision impairment is mild, the primary care optometrist certainly should provide some degree of rehabilitative support, and if beyond their capabilities, should refer appropriately. There are a range of possible explanations for the current, limited clinical involvement of optometrists in low vision care, including start-up costs, reimbursement rates, breadth of low vision rehabilitation knowledge and referrals and a range of perceptions about low vision practice. One such perception is that all aspects of clinical low vision rehabilitation fall within a highly specialized area of optometric practice that requires advanced training and credentialing, and, therefore, are not within the clinical scope of primary care optometry. Optometrists, who have recognized the significant need for low vision care, have responded via such a biphasic approach, either delivering what low vision care of which they are capable or by referring to a low vision rehabilitation program. These comprehensive low vision rehabilitation programs, however, are scarce and often do not meet the geographic need for low vision rehabilitation services throughout the US, Canada and Puerto Rico.[6] To address the low vision needs of their patients, primary care optometrists without low vision rehabilitation experience, to some degree utilize their basic optometric training, clinical experience and informal post-graduate studies in the management of their patients' low vision issues. However, due to variations in clinical low vision experience throughout the optometry programs, these doctors may not have the clinical experience or resources to offer more extensive low vision rehabilitation care. They may also not utilize regional referral resources, such as state agencies for the visually impaired, which would be able to address their patients' complex rehabilitative needs such as difficulties with activities of daily living or orientation and mobility. The result is that a patient's functional vision goals are not achieved, despite the optometrists' best clinical efforts. Certainly, patients are not knowledgeable about appropriate resources that could address their specific rehabilitation goals.

Over 25 years ago, there was a recommended plan for an educational program from the Associations of Schools and Colleges of Optometry (ASCO) that included a comprehensive curriculum for low vision rehabilitation, including the development and standardization of specific competencies and learning objectives for both entry-level and advanced-level low vision care curricula that reflect the need for two tiers of optometric low vision rehabilitation.[7] The first tier, entry-level competency, is incorporated in the four-year optometric programs of existing basic science and clinical practice curricula and should foster in the students the perception that their patients' low vision issues must be incorporated into primary care practice and clinical management strategies. Primary low vision care must include an awareness of comprehensive rehabilitation resources and strategies, necessitating the inclusion in the curricula of concepts that highlight appropriate patient guidance, education and referral, if necessary, for comprehensive care. In a small pilot study, Kammer and Jones reported that approximately 36% of the

“low vision” patients seen in optometric practices, although categorized by visual acuity, may in fact need only entry-level low vision care, and that this need could be met by training optometrists to address a large segment of this visually impaired population.[8] The courses to develop such entry level practitioner competencies were developed and finalized during cooperative meetings of ASCO and committees sponsored by the American Academy of Ophthalmology.[9]

The second-tier competency would serve individuals with moderate to severe visual impairment who have special rehabilitative needs that cannot be addressed within the primary care practice. Additionally, individuals who have both visual impairments and other physical or cognitive impairments, necessitating specialized examination and management strategies, would be managed by these second-tier practitioners. Certainly, education about the role of comprehensive low vision rehabilitation services and clearly defined referral criteria are critical for appropriate care of patients who may fall outside the scope of entry-level practice.[5]

It is recognized that a major impediment to the low vision rehabilitation practice is the scarcity of monetary support for low vision devices and rehabilitative services outside of optometry. Each state has an agency for the visually impaired, with varying levels of support for devices and rehabilitation. These varying levels depend upon vocational and financial status, age and other variables. An additional impediment to the provision of functional vision improvement is the failure to demonstrate that providing such devices and training results in acceptable improvement in the patient’s functioning. A major cause of this is the focus for such rehabilitation on magnification devices to solve the provider perceived “vision impairment” as measured by chart best corrected visual acuity, contrast sensitivity or by contrasted spot automated perimetry. These are all conducted under photopic conditions, but as explained above, fail to define the ocular or brain functionality (e.g. such as coordinated, inter-ocular saccades and fixation tracking stability[10]) which enable the person to perform the tasks he or she wishes to accomplish in common environmental conditions.[11]

The functional difficulties, due to the parafoveal and mid macular abnormalities that occur early in the disease process, as well as progression,[6] restrict the functional field of view to perceive targets and their surround within environments of even mildly reduced luminance and contrast because of the pathologic effect primarily involving the rods, outside of the small 1^{o}-3^{o} dense cluster of cones. The optometrist needs to evaluate these effects to understand the difficulties the patient commonly experiences during such tasks and the necessary rehabilitation required. Research studies in this regard have focused primarily on patient reported endpoints, such as those of visual function questionnaires (such as the National Eye Institute’s Visual Function Questionnaire 15). However, most often the endpoints reported are for distance facial recognition or near reading speed but without recognizing that the multiple vision tasks require different interactions within the usual field of view and under environments of different luminance (e.g. walking on uneven pavement or reading a menu or eating in a restaurant). All such tasks are differently affected by paraxial versus more peripheral visual field defects that frequently occur binocularly in symmetric or asymmetric patterns.[10-16]

The promotion of such recommendations for optometrists to manage patients with vision loss will necessarily require further development of continuing education courses with accompanying hands-on learning of device management and will ultimately require the clinical adoption of testing methods that demonstrate improved correlation with patient reported vision task difficulties. Such testing methods are currently in development including resolution visual fields conducted with target contrasts presented against background luminance that are commonly encountered when performing such tasks.[17,18] In addition, there are early studies of questionnaires that examine task management under dimmed lighting conditions that have demonstrated improved adoption and correlation with quantified imaging and rod photoreceptor loss.[19] Hopefully, these will not only identify abnormalities of a patient’s dysfunction in commonly encountered tasks earlier in the disease course, but also improve understanding of the rehabilitation methods required. Finally, these recommendations should also result in improved

communication between the optometrist providing ongoing care for the patient and the ophthalmologist performing the necessary interventions.

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Literature Review

Treating Patients with Intense Pulsed Light for Severe Evaporative Dry Eye, Reducing Ocular Inflammation and Demodex Management

Rachel Grant, OD, FAAO, Dipl ABO | *Optometric Education: Volume 51 Number 3 (Summer 2026)*

Keywords

dry eye disease, intense pulsed light therapy, IPL therapy, literature review, optometric education, optometry

Dry eye disease (DED) remains one of the most common conditions encountered in clinical practice and is increasingly recognized as a chronic, multifactorial disorder involving tear film instability, ocular surface inflammation, neurosensory abnormalities and meibomian gland dysfunction. As our understanding of the underlying mechanisms of DED has evolved, so too have treatment options. As of 2021, Intense Pulsed Light (IPL) has been approved by the Food and Drug Administration for the treatment of DED due to Meibomian Gland Dysfunction (MGD) and has emerged as a valuable adjunctive treatment for patients with MGD and evaporative dry eye disease. Originally developed for dermatologic applications, IPL has demonstrated benefits that extend beyond cosmetic indications, including improvement in meibomian gland function, stabilization of the tear film, reduction of ocular surface inflammation, and management of Demodex infestation. Over the past 5 years, the use of IPL has continued to expand within eye care, and clinicians are increasingly seeking evidence-based guidance regarding treatment protocols, expected outcome and long-term management.

The following literature review examines recent studies evaluating the role of IPL in severe evaporative dry eye disease, ocular surface inflammation and Demodex management, highlighting both the therapeutic potential of this technology and the questions that remain regarding optimal treatment strategies and long-term care.

Managing Severe Evaporative Dry Eye with Intense Pulsed Light Therapy[1]

Authors: Guanghao Qin, Jiayan Chen, Liangzhe Li et al.

***Ophthalmology and Therapy* (2023)**

Dry eye disease (DED) has been well established as a chronic, multifactorial condition that results in disruption to the tear film and ocular surface. Patients with dry eye disease experience a wide range of signs and symptoms, including but not limited to ocular pain, blurred vision, foreign body sensation and contact lens intolerance. Historically, treatment options have been limited to tear supplementation, warm compresses and prescription eye drops. Better understanding of the disease etiology has led to new treatment and management options for these patients, including the use of intense pulsed light (IPL). This study compared IPL treatment in patients with severe dry eye disease vs. a control group.

Forty-nine participants were recruited for this study. Inclusion criteria comprised of the following: (i) age over 18 years, (ii) Fitzpatrick skin types I–IV, (iii) capable and willing to comply with the treatment and

follow-up obligations, and (iv) a determination of severe DED. Fitzpatrick skin typing is a classification system to categorize skin based on its melanin content. The grading systems ranges from I to VI, with the higher number correlating to more melanin. The dry eye severity was based on either a score of greater than 33 on the ocular surface disease index (OSDI), a non-invasive tear film breakup time (NITBUT) of less than 5 seconds or a conjunctivocorneal staining score (CS) of greater than three points according to the Asian Dry Eye Consensus. Participants were excluded if they had skin defects or scars to the treatment area, autoimmune conditions, history of cancer or a Fitzpatrick skin type of V or VI. All participants were required to refrain from using dry eye treatments (lubricants, etc.) during the study. The participants were randomly assigned to either the IPL group or the control group. The mean age of the IPL group (n=56 eyes) was 28.05 ± 3.41 years, while the mean age of the control group (n=42 eyes) was 28.14 ± 3.53 years.

Baseline measurements from non-invasive to invasive included best corrected visual acuity (BCVA), OSDI, NITBUT, tear film lipid layer (TFLL), endothelial cell count (ECC), intraocular pressure (IOP), meibomian gland (MG), and conjunctivocorneal staining score (CS). Baseline measurements were repeated at all visits prior to either IPL or sham-IPL (control) treatment. Both treatment groups consisted of the same IPL procedure, based on the Toyos protocol. Ultrasound gel and ocular shields were placed on the participant, and 12 pulses were delivered from temple to temple. For the control group, the device was applied to the participant, but no pulses were delivered. Another IPL device in the room was used to simulate the sounds and lights of the procedure. Each participant received three treatments separated by 3 weeks, with the study lasting 12 weeks.

Statistically significant changes were seen between the IPL group and the control group in mean OSDI score, NITBUT, TFLL, MG score and quality, and MG expression at the 12 week follow up. There was no significant difference in conjunctivocorneal staining.

These findings suggest that IPL can be clinically beneficial in managing severe evaporative dry eye in young patients. The exclusion criteria did not specifically mention refractive status or contact lens wear, which could impact the relevance and application of these results. It is important to recognize that, according to the definition of DED, it is a chronic, multifactorial condition. This study performed three treatments over 12 weeks, whereas the Toyos protocol typically involves four sessions separated by 2 to 4 weeks. It is possible that additional treatment sessions could lead to an improvement in CS. Lastly, treatment benefits extended three weeks after the last session. Is there an ideal re-treatment window for these patients? With the growing popularity of this technology, it is important to establish realistic expectations and specific follow-up protocols.

Intense pulsed light treatment improved tear film quality and reduced ocular surface inflammation in dry eye patients[2]

Authors: Jiayan Chen, Ying Zhang, Sile Yu, et al

***Scientific Report* (2025)**

Inflammation has been well established as a hallmark of DED, and anti-inflammatory medications ranging from short term corticosteroids to long-term cyclosporine are routinely prescribed over the course of treatment. Depending on clinical signs, not every patient will be an ideal candidate for these medications, and novel and effective alternatives have not been fully established. The mechanism of action of IPL treatment for DED remains incomplete but it has been proposed that treatment may result in the obliteration of superficial blood vessels, subsequently reducing local inflammation and has antibacterial and anti-inflammatory effects. This study aims to identify and investigate the therapeutic efficacy and underlying mechanisms of IPL, establishing a foundation for its application in the treatment of DED.

Twenty-eight participants were enrolled in this study and randomly assigned to one of two groups. Group A consisted of 30 eyes with a mean age of 34.47±6.58 years and received three IPL sessions separated by 3 weeks. Group B consisted of 26 eyes with a mean age of 33.15±2.22 years, and received two IPL sessions separated over 3 weeks. All participants were examined at Baseline, 3, 6, 9 and 12 weeks for NITBUT, Lymphotoxin-alpha (LT-?), meibomian gland quality (MGQ), tear meniscus height (TMH), conjunctivocorneal staining score (CFS), meibomian gland expression (MGEx), tear-film lipid layer (TFLL), and OSDI. The IPL procedure included the appropriate Fitzpatrick score settings and 12 pulses of the IPL device spanning from tragus to tragus, with appropriate safety precautions. There is no mention of following a specific protocol (i.e. Toyos). Eligibility criteria include at least 18 years of age and having voluntarily participated in this trial, Fitzpatrick skin types I to IV and diagnosis of DED. DED diagnosis is established according to the TFOS DEWS II report by fulfilling a minimum of two of the following criteria: (i) the score range for OSDI questionnaire is from 13 to 100. (ii) CFS signifies the existence of over five spots on the cornea and more than nine spots on the conjunctiva. (iii) NITBUT is less than 10 seconds. Exclusion criteria include existing infectious diseases, pigmentation, skin defects, ocular trauma, moles, skin cancer, scars, recent surgical history, autoimmune diseases, skin allergies. and pregnancy or lactation. LT-? is a member of the tumor necrosis factor family, secreted by T cells, B cells and other immune cells and has recently emerged as an exploratory biomarker for diagnosing DED, although its mechanistic interpretation is still uncertain.

Seven parameters (NITBUT, TMH, TFLL, MGEx, MGQ, CFS, OSDI) showed improvement after two IPL sessions for both groups. Continued improvement in these parameters was seen at 3 weeks and 6 weeks post treatment. At 12 weeks, a comparison between the three IPL therapy group (Group A) and two IPL therapy group (Group B) found significant improvements in the NITBUT (p=0.002), TMH (p=0.011), TFLL (p=0.009), MGEx (p=0.011), MGQ (p=0.021), LT-? (p=0.034), while the CFS (p=0.104), OSDI (p=0.189) had no significant improvements. In Group A, LT-? was the only parameter that showed improvement after the third IPL session and continued to improve at the 12-week visit.

Based on the results of this study, the authors support a three-treatment protocol. However, as IPL appears to be a cumulative treatment, the question of whether additional treatments would enhance these outcomes is not answered in this study. As with the previous study, there was no mention of excluding contact lens wear and similarly, the mean age of participants makes this data more difficult to apply to the general dry eye population. Lastly, it is unclear if there was gland expression post-IPL sessions or only prior to treatment. The Toyos protocol implies gland expression after treatment, but this is not specified in the study. The results of this study support increased long-term benefits of multiple IPL treatment sessions. The next step would be to establish more data on the maximum ideal number of treatment sessions within a therapeutic window and the duration of effect on inflammatory markers.

Therapeutic effect of intense pulsed light in ocular demodicosis: A systematic review and meta-analysis[3]

Authors: Hsin-Ming Liu, Shannon Su, Cher-Ming Liou, Ann Yi-Chiun Chuang

***Contact Lens and Anterior Eye* (2025)**

Demodex is often an overlooked and underdiagnosed contributor to blepharitis in adults. As with other forms of dry eye disease, signs and symptoms can vary widely from the pathognomonic collarettes, to generalized lash debris, lid erythema and scalloped lid margins. The presence of demodex can alter sebaceous gland secretions, disrupt lash direction as well as disrupt meibomian gland openings and secretions. In addition to mechanical disruption, there is increased association with bacterial antigens on the lid surface, and the condition is associated with refractory keratoconjunctivitis and chalazion. Although pharmacological treatments have proven effective, it is possible that IPL could offer effective treatment and favorable safety profiles for ocular demodicosis. The exact mechanism of action is

unknown, but it is thought that IPL may alter the mite environment by disrupting abnormal vessels, modification of gland expression and photobiomodulation as well as provide a sustained temperature for mite elimination. This study assessed the impact of IPL on reducing the burden of ocular demodicosis.

A systematic literature search was conducted up to March 8, 2025, using the PubMed, Embase, Google Scholar and Cochrane Central Register of Controlled Trials databases. Eligible studies had to meet the following criteria: reported outcome measurements of Demodex mite infestation before and after IPL therapy and possessed study designs of controlled clinical trials with or without randomization. No restrictions were imposed regarding age, language or publication date. However, subjects with Demodex infestation unrelated to the eyelids or those undergoing light therapy other than IPL were excluded.

Six trials consisting of 329 patients in total were included in the analysis from dating from 2019 to 2024. They consisted of one retrospective controlled study and five randomized controlled trials. Three studies combined IPL with meibomian gland expression as an intervention, one treated with IPL and a tea tree oil product, and two were IPL alone. The predominant population studied was Asian and the gender distribution was noted as unequal in most studies, although never specified. In total, five studies involving 229 patients compared IPL therapy with control therapy in terms of demodex mite count per 100 eyelashes. The pooled mean difference (MD) was –7.80 (95% CI –16.36 to 0.76) when considering only randomized control studies. No significant difference was found in the IPL only group of participants, with a pooled MD of –2.08 (95% CI –9.69 to 5.54). Analysis revealed a greater therapeutic trend of IPL combined with meibomian gland expression or topical tea tree oil, with MDs of –69.25 (95% CI –158.55 to 20.06) and –15.20 (95% CI –21.43 to –8.97), respectively. The pooled risk ratio (RR) of Demodex mite eradication was 1.41 (95% CI –158.55 to 20.06) and –15.20 (95% CI –21.43 to 8.97), respectively. IPL with gland expression showed a greater therapeutic effect on mite eradication than IPL alone, with RRs of 1.49 (95% CI 1.17 to 1.91) and 1.32 (95% CI 1.02 to 1.72), respectively. No major adverse events were reported in any of the studies and no participants dropped out due to the side effects.

The authors conclude that IPL alone was effective for ocular Demodex eradication, while its combination with gland expression enhanced therapeutic outcomes. Further studies are needed to establish guidelines for the optimal IPL treatment regime. The authors note that a major limitation of IPL is its cost and the limited availability of insurance coverage, so financial barriers may impact accessibility and treatment adherence. Some limitations of this meta-analysis included the number of studies assessed, the varied disease severity and the lack of consistent and/or universal IPL parameters and follow up. It is interesting that there were studies that did not include meibomian gland expression as part of the IPL treatment given that the original FDA approval for IPL was based on studies of gland expression compared to IPL with gland expression. In addition, with the FDA approval of lotilaner ophthalmic solution (Xdemvy, Tarsus Pharmaceuticals, Inc.) for the treatment of Demodex blepharitis, IPL may not be the most ideal option for management, especially for those patients who fall to the higher numbers on the Fitzpatrick skin scale.

The growing body of literature evaluating IPL therapy suggests that it has become an important addition to the management of evaporative dry eye disease and other related ocular surface disorders. Recent studies continue to demonstrate improvements in a wide array of both subjective symptoms and objective clinical findings. While these findings are encouraging, several important questions remain unanswered. Variability in treatment protocols, patient populations, outcome measures and follow-up periods makes direct comparison between studies challenging. Most investigations have focused on relatively young patients and have not fully addressed factors commonly encountered in clinical practice, such as contact lens wear, concurrent therapies or long-term maintenance schedules. Additionally, the optimal number of treatment sessions, retreatment intervals and patient selection criteria have yet to be clearly established. As the use of IPL continues to expand into comprehensive dry eye management,

additional research will be essential to refine treatment protocols and targets. Until then, current evidence supports IPL as a safe and effective tool that can address several underlying contributors to ocular surface disease, offering clinicians another option to improve patient comfort, ocular surface health and quality of life.

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Teaching Case Reports

Secondary Canaliculitis Due to Punctal Plugs

Alaina R. Bandstra, OD, FAAO | Optometric Education: Volume 51 Number 3 (Summer 2026)

Secondary canaliculitis is a rare subcategory of canaliculitis, the inflammation of the proximal lacrimal pathway, commonly associated with punctal or intracanalicular plug use for dry eye management. These lacrimal plugs can elicit an infection within the canaliculus by damaging the mucosal tissue. In the presence of tear flow stasis, this enables bacterial proliferation. This teaching case report reviews the clinical presentation of canaliculitis, including signs that differentiate it from other anterior segment conditions. It also discusses how early diagnosis and appropriate medical management may prevent the need for surgical intervention.

Keywords

canaliculitis, lacrimal plugs, optometric education, optometry, pouting punctum, punctal plugs, secondary canaliculitis, teaching case report

Background

Canaliculitis is a very rare inflammation of the lacrimal pathway in which an infection develops within the punctum and canaliculus, the two most proximal components of the nasolacrimal tear drainage system.[1-5]

Cases of canaliculitis are classified as either primary, with no known underlying etiology, or secondary, caused by lacrimal pathway obstruction.[4,5] In most cases of secondary canaliculitis, lacrimal plugs are the inciting obstruction.[3,5-8] Signs and symptoms associated with both primary and secondary canaliculitis are often mild and similar in presentation to those of other, more common, anterior segment diseases. These similarities frequently cause a delay in diagnosis or the misdiagnosis of canaliculitis, which can exacerbate the condition and result in poor outcomes.[1-3,6] With prompt diagnosis, canaliculitis can be effectively treated with conservative management strategies; however, recurrence is common, and more invasive procedures, such as canaliculotomy, are often required for complete resolution.[1,3,8-10] Accurate identification of the clinical features of canaliculitis, including the classic “pouting punctum”, aids in proper diagnosis, which may limit the need for surgical intervention.[11]

This teaching case report demonstrates the importance of early diagnosis and prompt treatment of secondary canaliculitis to avoid surgical intervention. It reviews the role that primary care optometrists play in managing this rare condition and is suitable for teaching or reviewing the condition with third- and fourth-year optometry students, optometry residents and novice practitioners with knowledge of the anatomical pathway of the nasolacrimal drainage system and an understanding of microbiological and pharmacological interactions.

Case Description

Initial Presentation

A 43-year-old Caucasian female presented with complaints of a red, tender and irritated lower right eyelid for the past month along the nasal lid margin near the medial canthus. She admitted to frequent lid rubbing, which exacerbated symptoms and often resulted in mild pain, tearing and burning of the

affected eyelid. She denied discharge or vision changes. She denied any relief following consistent use of warm compresses, artificial tears and topical ocular allergy drops. Her ocular history included bilateral laser in situ keratomileusis (LASIK), intermittent alternating exotropia and dry eye syndrome. The dry eye was managed with artificial tears and the recent insertion of punctal plugs. Nine months prior to presentation, 0.6 mm petite silicone punctal plugs (brand name and manufacturer unspecified) were inserted into both lower puncta. At the time of presentation, the redness, tenderness and irritation symptoms were localized to the area around the right punctal plug. The patient's medical history included depression, anxiety and migraines. She reported use of the following medications: divalproex sodium, rizatriptan, vortioxetine, trazodone, ketorolac and onabotulinumtoxinA injections. She noted an allergy to sulfa drugs. Her family history included diabetes (mother, grandfather) and glaucoma (grandmother).

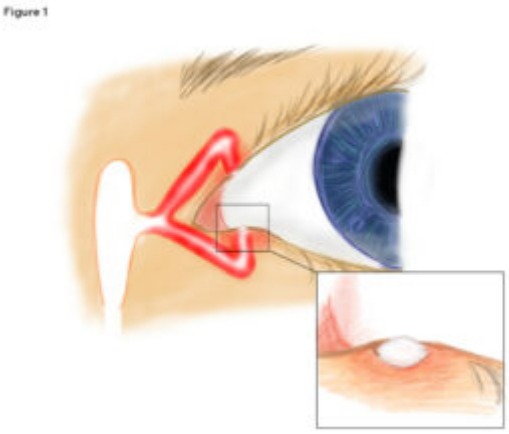


Figure 1 Diagram of anatomy of the puncta and lacrimal drainage, showing location of "pouting punctum" (inset) characteristic of canaliculitis. Click to enlarge

Entering uncorrected Snellen visual acuities were 20/25 in the right and left eyes, with pinhole acuities of 20/20 in each eye. Pupil, confrontation field and extraocular motility evaluations were unremarkable, and the intraocular pressure was 9 mmHg in each eye. Slit lamp evaluation revealed LASIK flap scarring and a low tear meniscus in each eye. The left lower punctal plug was absent. There was 1+ lid erythema and edema surrounding a punctal plug protruding from the right lower punctum, extending temporally towards the central lid. The inflammation was concentrated at the nasal lid margin and created the appearance of a swollen "pouting punctum" around the exposed plug (**Figure 1**).

Lid scaling, tenderness upon palpation and trace nasal conjunctival injection were present in the right eye. The posterior segment evaluation was unremarkable.

Given the localized inflammation surrounding the punctal plug in the right eye, removal of the plug was recommended to further investigate the etiology of the patient's symptoms. Informed consent was obtained, and sterile jeweler's forceps were used to extract the plug from the lower punctum without complication. Immediately following extraction, spontaneous excretion of purulent discharge from the punctum was observed. Gentle pressure to the lower eyelid aided in the complete expression of the discharge. No solid concretions, blood or foreign material was noted. Based on the observation of infectious inflammation (erythema, edema and purulent discharge) within the lacrimal pathway above the medial canthal tendon associated with a punctal plug, the patient was diagnosed with secondary canaliculitis of the right lower eyelid.

Treatment and Management

Treatment was initiated with a 1-week course of both oral cephalexin 500 mg taken twice daily and

topical combination trimethoprim sulfate and polymyxin B sulfate ophthalmic solution for use in the right eye 4 times daily. The patient was also instructed to keep the eye clean by limiting makeup use and using lid scrubs 1-2 times daily. Future use of punctal plugs for dry eye management was discouraged. The patient continued dosing artificial tears up to 4 times daily in each eye. She was scheduled for a 5-day follow-up visit.

Follow-Up Care

Five days later, the patient reported compliance with all treatments as prescribed and denied any residual redness, tenderness, pain, discharge or swelling of the right lower eyelid. Her visual acuities were stable, and entrance testing was normal. Anterior segment evaluation revealed clear and open puncta in both eyes without evidence of inflammation of the right lower eyelid or canaliculus.

The patient was instructed to continue the oral and topical antibiotics for an additional 2 days to complete the full 1-week course. Given the near resolution of the canaliculitis, she was scheduled for follow-up in 2 months, with advice to return if symptoms worsened.

At the 2-month follow-up, the patient had completed and then discontinued all antibiotics (topical and oral) as instructed and reported no recurrence of symptoms. She did note persistent bilateral dry eye symptoms in the morning upon awakening, which resolved with the instillation of artificial tears. She declined further dry eye evaluation and was not interested in more aggressive management strategies at that time.

Anterior segment evaluation was unremarkable except for LASIK flap scarring, trace-1+ punctate keratitis and a reduced tear meniscus height in each eye. Both lower puncta were clear and open, and there was no expression with gentle pressure. Thus, the canaliculitis had fully resolved. The risk of recurrent canaliculitis was discussed, and the patient was instructed to return should she experience symptoms of tearing, discharge, redness or swelling of the eyelid. For management of her dry eye disease, she was encouraged to continue with regular dosing of artificial tears.

The patient returned for her annual exam 9 months later (1 year after initial onset) with a quiet anterior segment and no recurrence.

Education Guidelines

Key Concepts

1. A complication of punctal plugs is secondary canaliculitis
2. Consider canaliculitis as a differential diagnosis in chronic or recurrent medial eyelid lesions, conjunctivitis or blepharitis
3. Identification of the classic, swollen “pouting punctum” helps differentiate canaliculitis from these conditions
4. First-line medical management involves topical and oral antibiotics
5. Appropriate diagnosis and early intervention may prevent the need for more invasive surgical intervention

Learning Objectives

At the conclusion of this case report, readers should be able to:

1. Identify the clinical signs of canaliculitis, including the classic, swollen “pouting punctum”
2. Understand how the pathophysiology of canaliculitis differs from Meibomian gland diseases, nasolacrimal duct obstruction and dacryocystitis

3. Prescribe an appropriate first-line medical management protocol for canaliculitis

Discussion Questions

1. Anatomy and pathophysiology of the nasolacrimal tear drainage system
    1. Describe the anatomy of the nasolacrimal tear drainage system, including the anatomical location of the puncta, canaliculi and lacrimal sac.
    2. What is the difference (in name) between an infection of the proximal aspect of this pathway vs. the distal aspect?
    3. How do infections of the various components of this system differ in their presentation?
2. Clinical presentation of canaliculitis
    1. What is the difference between primary and secondary canaliculitis?
    2. What clinical symptoms and signs are typically present with this condition, and how is the diagnosis made?
    3. What pathogens commonly cause canaliculitis infections?
    4. Which anterior segment conditions should be considered in the differential diagnosis of canaliculitis, and how does a clinician differentiate between these diseases?
3. Optometry's role in the management of canaliculitis
    1. What is the first-line treatment for canaliculitis? Give specific examples of what may be prescribed.
    2. How does initial management differ in cases of secondary disease (compared to primary disease)?
    3. What is the primary risk associated with delayed diagnosis (and delayed treatment)?

Assessment of Learning Objectives

This teaching case report is intended for third- and fourth-year optometry students, optometry residents and novice practitioners with knowledge of the anatomical pathway of the nasolacrimal drainage system, microbiology and pharmacology. In an academic setting, it is recommended that a faculty member or residency supervisor facilitate the discussion in a small group, such as at a grand rounds presentation or clinical case discussion in the primary care, ocular disease or urgent care clinical setting. The case could also be presented in the classroom via a slide show presentation and facilitation of independent review or large-group discussion. The details of the case should be presented to learners with an opportunity to answer discussion questions prior to the formal case discussion. An open-ended discussion generates an environment where students and residents can gauge their knowledge gaps and learn from peers and instructors.

Discussion

Canaliculitis is a rare inflammatory disease of the proximal lacrimal pathway that accounts for only 2.0-4.0% of all lacrimal diseases and 0.8% of all lacrimal infections.[1-5,12] The upper and lower canaliculi function as part of the tear drainage system within the lacrimal pathway.[3,13] Each canaliculus originates at the punctal opening and transverses the medial lid margin vertically, then horizontally, for approximately 10.0 mm before converging into the common canaliculus. Tears flow from the common canaliculus through the lacrimal sac into the nasolacrimal duct before draining into the nasal cavity (**Figure 2**). An infection of the proximal portion of this pathway (the canaliculus and adjacent punctum) results in canaliculitis.

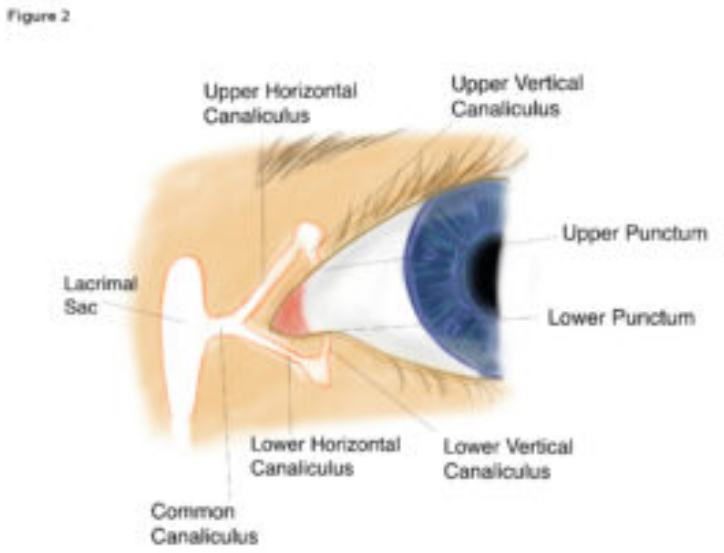


Figure 2. Diagram of the anatomy of the nasolacrimal tear drainage system. Click to enlarge

Due to the rare nature of canaliculitis, and its similar presentation to conjunctivitis, dacryocystitis and hordeolum, it is often misdiagnosed.[1-3,6,12] A 2024 study reported that canaliculitis may initially be misdiagnosed in up to 60% of cases.[12] A similar study conducted in 2011 found that up to 33% of cases were misdiagnosed multiple times.[3] Delayed diagnosis has been reported up to 20 years after the onset of symptoms[3] and commonly spans more than 5 months.[5,6,9,10] This often results in recommendation of inappropriate treatments, which may further exacerbate the disease process.[2,3]

Presenting symptoms of canaliculitis most commonly include epiphora and discharge, while ocular irritation or mild pain, conjunctival injection and swelling, and erythema of the medial lid margin are also possible.[1-5,9,10,12] Symptoms are typically unilateral and associated with a purulent or mucopurulent discharge. Purulence refers to the presence of white blood cells (pus) within a secretion, which indicates an infectious etiology. When secreted from mucous membranes (such as the lacrimal pathway), the term mucopurulent may be used to describe the addition of mucus to this discharge. A classic “pouting punctum” is considered pathognomonic.[5,12] In addition to generalized inflammation of the nasal lid margin and adjacent conjunctiva, punctal discharge may include yellow, gritty sulfur granules, known as concretions, which are diagnostic of canaliculitis (though present in only one-third of cases).[1-3,7,9-12] Given the high rate of misdiagnosis, Singh et al proposed the use of a “clinical tetrad” to aid in the diagnosis of lacrimal canaliculitis, which emphasizes identification of the clinical signs of canaliculitis, including medial eyelid inflammation with a “pouting punctum” and punctal discharge.[14]

Infection occurs most commonly in the lower canaliculus (55-87%)[4-6,10,12] and shows no right or left eye predilection.[6,10,12] Canaliculitis typically presents in females 50-65 years of age;[9,10,12] however, larger age ranges and pediatric cases have been reported.[6,12] The strong female predilection (two to five times more common) is attributed to menopause-related hormonal changes, resulting in poor tear production with reduced antimicrobial properties.[2,6,12] Further, frequent use of makeup and lacrimal plugs in this population enhances bacterial proliferation within the lacrimal pathway.

There are two forms of canaliculitis: primary and secondary. In primary canaliculitis, the infection occurs without foreign obstruction.[4,5,12] It has been proposed that a diverticulum within the proximal lacrimal pathway obstructs tear drainage, allowing bacteria to accumulate; however, known predisposing factors are often difficult to identify. In secondary canaliculitis, a foreign body within the lacrimal drainage system initiates the infectious process.[3-8,12] Injury to the canaliculus mucosa, in addition to tear flow stasis,

creates a reservoir for bacterial growth. Lacrimal plugs (either punctal or intracanalicular) are the most common cause of secondary canaliculitis. In a literature review of canaliculitis, Pal et al. classified 91.59% of the reviewed cases as primary, noting SmartPLUG™ (Medennium Inc., Irvine, California; a thermosensitive material that allows the plug to expand and fit the canaliculus) use in 86.72% of secondary cases.[12] In a similar review, Huang et al. found that cases of secondary canaliculitis had an even stronger female predilection than that of primary disease (100% vs. 65%).[7]

Secondary canaliculitis is more common with intracanalicular plugs; however, punctal plug-related cases have also been reported. In 2015, the American Academy of Ophthalmology reviewed the safety of lacrimal plugs for dry eye. In this report, the incidence of secondary canaliculitis was low in both groups (7.8% with intracanalicular plugs; 0.0-5.6% with punctal plugs).[8] Huang et al. also found a higher incidence of canaliculitis in the intracanalicular plug group.[7] This retrospective review of secondary canaliculitis reported that only 18% of cases were related to punctal plugs, while 82% were intracanalicular. The increased risk of inflammation associated with intracanalicular plugs is attributed to a more distal location within the lacrimal pathway, which more easily damages the mucosal tissue, allowing for bacterial proliferation. Regardless of plug type, continued monitoring is important, as most cases of secondary canaliculitis develop between 3 to 5.5 years after plug insertion.[7]

Diagnosis of canaliculitis is typically made based on clinical presentation alone.[2,3] Given the frequency of misdiagnosis, canaliculitis should be considered in any patient presenting with chronic or recurrent medial eyelid inflammation, conjunctivitis or blepharitis, especially if the patient has a history of lacrimal plugs. In this case, the patient presented with symptoms consistent with canaliculitis; however, these symptoms are also common to other anterior segment diseases. A careful assessment of the clinical findings was necessary for proper diagnosis. The primary identifying feature was a classic “pouting punctum” of the right lower eyelid with surrounding lid inflammation. Removal of the punctal plug allowed expression of a purulent discharge from the punctal opening. Though concretions were not evident in the expressed material, the localized inflammation, presence of punctal discharge, and history of lacrimal plug use, along with the mild nature of the patient’s symptoms, supported the diagnosis of secondary canaliculitis.

Other conditions considered in this case include chalazion or hordeolum, acquired nasolacrimal duct obstruction (NLDO) and dacryocystitis.[2,3,6,12,15] Meibomian gland obstruction (not lacrimal pathway obstruction) can cause chalazia or hordeola. Localized inflammation surrounding a palpable eyelid nodule is often evident; however, punctal discharge is never present. Acquired NLDO and dacryocystitis are important differentials in this case as they represent diseases of the lacrimal pathway; however, both differ in presentation from that of canaliculitis. An acquired NLDO refers to an obstruction of the tear drainage system that develops during adulthood. It presents with classic symptoms of persistent unilateral epiphora, without significant infection or inflammation. Dacryocystitis is an infection of the lacrimal sac. Symptoms of dacryocystitis include severe pain, erythema and edema of the distal portion of the lacrimal pathway and may be accompanied by a fever. In this case, the location of inflammation within the proximal lacrimal pathway and the mild nature of the patient’s symptoms excluded dacryocystitis (**Figure 3**).

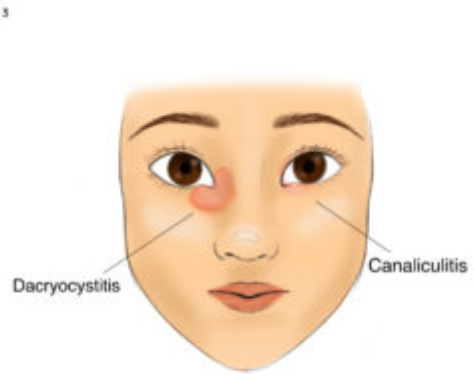


Figure 3. Diagram of the difference in clinical presentation between dacryocystitis (left) and canaliculitis (right). Click to enlarge

Initial medical management of canaliculitis is conservative with use of topical and oral antibiotics supported by warm compresses and local massage.[1-3,12] In a retrospective review, Anand et al. reported a high susceptibility of all microorganisms isolated from canaliculitis cultures to gentamicin, chloramphenicol and cefotaxime.[16] In a review by Huang et al., *Streptococcus* sp, *P. acnes*, and *Staphylococcus* sp (Gram-positive) were the most common isolates from primary canaliculitis, while *Pseudomonas aeruginosa* (Gram-negative) was most common in secondary disease, though mixed infections were frequent in all cases.[7] Based on this study, prescribed antibiotics should provide coverage against both Gram-positive and Gram-negative organisms (particularly *Pseudomonas aeruginosa)*. Well-tolerated oral antibiotics commonly used in the treatment of anterior segment diseases include doxycycline 100 mg taken twice daily for 7-14 days or cephalexin 500 mg taken twice daily for 7-14 days.[17] Topical ophthalmic antibiotics to consider are gentamicin 0.3% (for its protection against *Pseudomonas aeruginosa*) taken 4 times daily for 7-14 days or combination trimethoprim sulfate and polymyxin B sulfate (a broad-spectrum agent) taken 4 times daily for 7-14days. Some reports also propose the addition of topical corticosteroids.[18]

In cases of primary canaliculitis, lacrimal duct irrigation with antibiotics or intracanalicular ophthalmic corticosteroid/antibiotic ointment infiltration (IOI) may also be considered.[12] Caution should be exhibited when using lacrimal irrigation in suspected cases of secondary canaliculitis to avoid distal plug migration.[2,3] For secondary canaliculitis, removal of the lacrimal plug is necessary prior to treatment.[1-3,12] Punctal plugs are easily removed with forceps.[19] Intracanalicular plugs, however, prove more challenging as they are most often removed via irrigation,[19-21] which may force the plug to lodge more distally within the lacrimal pathway, increasing complications.[2,3] Imaging is commonly performed prior to surgical intervention in cases of secondary canaliculitis in order to confirm the location of a retained intracanalicular plug.

Disease recurrence following conservative management of canaliculitis occurs in 33% of cases.[1-3] Initiating treatment early improves success rates, but frequent delays in diagnosis often prevent prompt intervention.[3] Higher rates of recurrence have also been linked to the presence of concretions,[1-3,7,9,10,12] which obstruct topical antibiotic penetration and act as a reservoir for bacterial growth. Successful resolution of canaliculitis depends on complete concretion extraction; therefore, manual expression of punctal discharge should be attempted prior to initiating medical therapy.[3]

In this case, the patient was diagnosed with canaliculitis secondary to punctal plug insertion. Following plug removal and gentle expression of punctal discharge, oral cephalexin and topical combination trimethoprim sulfate and polymyxin B sulfate ophthalmic solution were prescribed. Cephalexin is a well-tolerated cephalosporin medication with broad-spectrum coverage and is frequently used for skin and

soft tissue infections.[17] Cephalosporins have been shown to be highly effective against most microorganisms isolated in canaliculitis cultures.[16] Topical polymyxin has also been shown to successfully treat cases of primary and secondary canaliculitis,[1] and is effective against *Pseudomonas aeruginosa*. Furthermore, when combined with trimethoprim sulfate, broad-spectrum topical coverage is achieved.[17] In this case, the patient's infection cleared rapidly within 5 days of initiating treatment, and there was no evidence of disease recurrence over the following year. The patient did not require more invasive surgical intervention.

Surgical intervention is indicated when conservative treatment fails or in cases of recurrent disease.[12] Alternative treatments for primary canaliculitis include one-snip punctoplasty with curettage, lacrimal endoscopy, lacrimal duct irrigation with antibiotics, or intracanalicular ophthalmic corticosteroid/antibiotic combination infiltration (IOI).[2,12,18,22] Canaliculotomy is the definitive treatment for canaliculitis.[1-3,8,10] In secondary canaliculitis, a canaliculotomy also includes intracanalicular plug removal.[7] Dacryocystorhinostomy (DCR) with silicone intubation may be required in more complicated cases, or if a plug has been forced distally due to lacrimal irrigation.[7,20]

The success of conservative therapy in this case is attributed to an early diagnosis with prompt intervention. In contrast to most cases of canaliculitis, treatment was initiated early in this case (within 1 month of symptom onset). Furthermore, there was no evidence of concretions in the expressed punctal discharge, which are known to harbor bacteria and prolong the infection. This lack of concretions, in addition to the successful removal of the punctal plug early in the disease course, allowed the prescribed antibiotics to successfully penetrate the infected mucosa without the need for more invasive and high-risk surgical procedures.

Conclusion

Canaliculitis is a relatively uncommon condition, but it can be successfully triaged and managed by primary eyecare providers from onset. Understanding the presenting clinical features of canaliculitis and differentiating it from other anterior segment disorders is crucial to the successful management of this lacrimal pathway disease. Avoid any delay in diagnosis by recognizing characteristic signs of canaliculitis, which include the classic, swollen "pouting punctum." Early intervention and medical management improve successful resolution and can help avoid the need for more invasive procedures. Secondary canaliculitis is often caused by lacrimal plugs. Extraction of the plug, followed by complete expression of any purulent material in the punctum, will improve antibiotic access to the infected tissues, thus quickly and successfully eliminating the canaliculitis without the need for more invasive surgical intervention.

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Multiple Evanescent White Dot Syndrome in an Atypical Patient

Melissa Tawa, OD, FAAO | Optometric Education: Volume 51 Number 3 (Summer 2026)

Multiple evanescent white dot syndrome (MEWDS) is a rare, self-limiting inflammation of the retinal pigment epithelium and outer photoreceptors. It is characterized by multiple white dots in the posterior pole and mid-periphery and foveal granularity. Most patients have spontaneous resolution within weeks. This teaching case report reviews the epidemiology, pathophysiology, differential diagnoses and management of MEWDS. Instructors are guided on how to use the case in educational settings, such as small group discussions in the classroom or clinic. Although MEWDS is a relatively rare condition, this teaching case report challenges learners clinical reasoning skills and multimodal imaging interpretation.

Keywords

fluorescein angiography, fundus autofluorescence, multiple evanescent white dot syndrome, optical coherence tomography, optometric education, optometry, teaching case report, vaccination

Introduction

Multiple evanescent white dot syndrome (MEWDS) is a rare white dot syndrome characterized by white dots in the posterior pole and mid-periphery, and foveal granularity.[1] It was previously thought to be a disease of the choriocapillaris, however more recent multimodal imaging studies suggest that the retinal pigment epithelium-photoreceptor complex may be the primary site of inflammation.[2] It typically affects young adult myopic females between 20 to 40 years of age[3] and may be preceded by a flu-like viral episode.[4] Patients classically present with complaints of decreased visual acuity and photopsias.[3] MEWDS is typically a self-limiting condition.[2]

This teaching case report aims to facilitate discussion around the clinical presentation of MEWDS. While MEWDS is a relatively rare condition and the atypical patient demographics makes this case more challenging; it is an exercise in clinical reasoning skills and an opportunity to discuss various multimodal imaging techniques frequently used in more common posterior segment diseases.

Case Description

Visit 1

A 16-year-old Latino male presented for a routine comprehensive eye examination. He denied any known medical conditions, a denial confirmed by the patient's father. His ocular history was significant for longstanding chorioretinal scars in the left eye. He reported no ocular complaints with his current glasses. Best corrected visual acuity was 20/20 in each eye with mixed astigmatism in the right eye and compound hyperopic astigmatism in the left. Pupils, extraocular muscle movements and confrontation visual fields were within normal limits in both eyes. Anterior segment findings were normal in each eye. Intraocular pressures were 18 mmHg in both the right and left eye. He declined dilation that day and scheduled a dilated fundus examination in 2 weeks. Posterior segment examination was normal to the extent seen undilated. Widefield color photography (**Figures 1a and 1b**) was also normal to the extent imaged in each eye.

Figure 1a

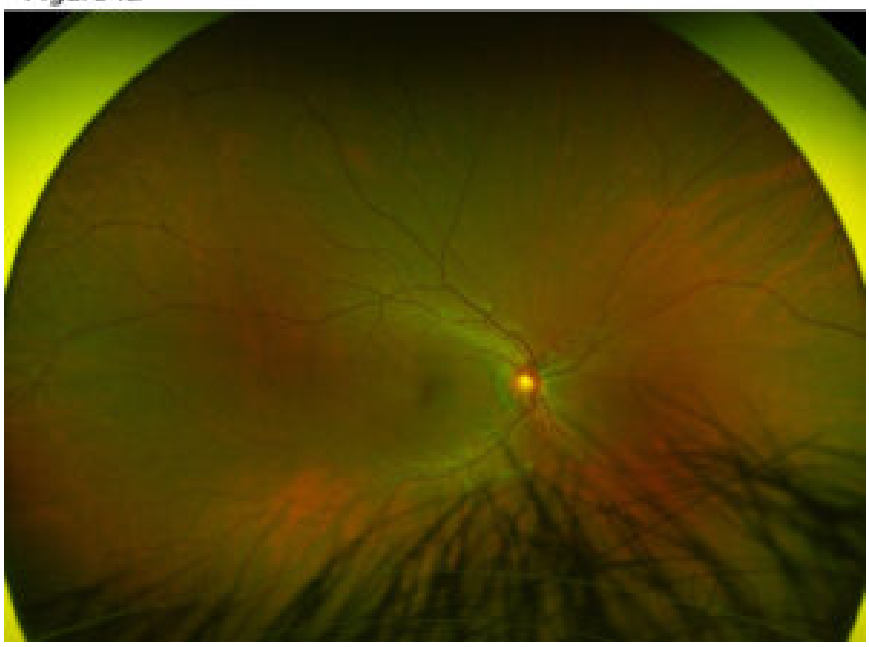


Figure 1a. Widefield color fundus photo right eye, visit one. No retinopathy or optic neuropathy. Click to enlarge

Figure 1b

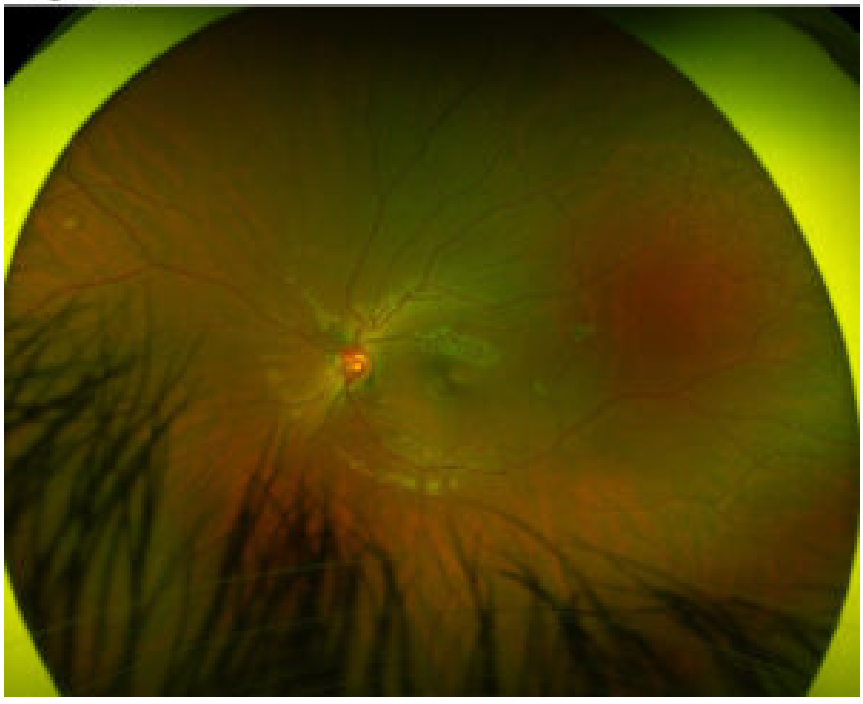


Figure 1b. Widefield color fundus photo left eye, visit one. Aside from the longstanding chorioretinal scar at the end of the superotemporal arcades, there is no other retinopathy or optic neuropathy. Click to enlarge

Visit 2

The patient returned 2 weeks later for his scheduled dilation. He reported that the day after his comprehensive examination, he visited a theme park and rode multiple rollercoasters. He denied any direct trauma to his head or eyes but noted that he experienced significant head movement on the rollercoasters. That afternoon, while at the theme park, he reported noticing flashes and floaters in his right eye. He also reported that the quality of vision in the right eye was not as good as the left, particularly in dim lighting.

Best corrected visual acuity remained 20/20 in each eye. Pupils, extraocular muscle movements and confrontation visual fields were within normal limits in each eye. Anterior segment findings were normal in each eye. Intraocular pressures were 20 and 19 mmHg right eye and left eye, respectively. The patient was dilated with tropicamide 1% and phenylephrine 2.5% in both eyes. Given the history of rollercoasters and symptoms of flashes and floaters, careful attention was paid to signs of retinal tears/detachments. Evaluating the anterior vitreous revealed no Shafer sign present in either eye. Posterior segment evaluation revealed many small hypopigmented lesions around the vascular arcades in the posterior pole, more prominent superiorly and extending towards the equator of the right eye. Careful examination of the fovea with slit lamp fundus biomicroscopy evaluation revealed subtle granularity in the right eye only. The optic nerves had distinct margins and healthy rim tissue in both eyes. There were no holes, breaks, tears or detachments in either eye. The posterior segment findings of the left eye were unremarkable. Widefield color photos from this visit can be seen in **Figures 2a and 2b**.

Figure 2a

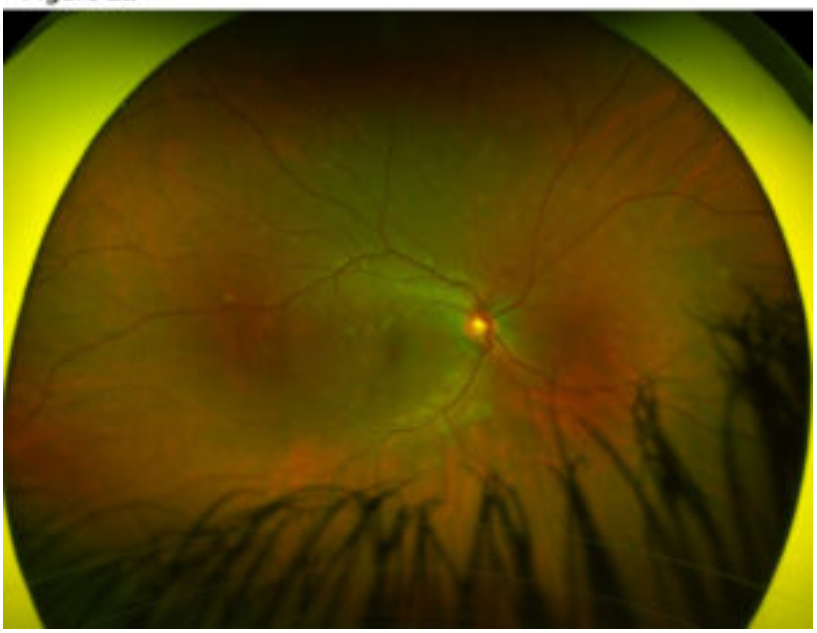


Figure 2a. Widefield color fundus photo right eye, visit two. White round lesions can be seen in the posterior pole and equator, greatest in the superior hemifield. Click to enlarge

Figure 2b

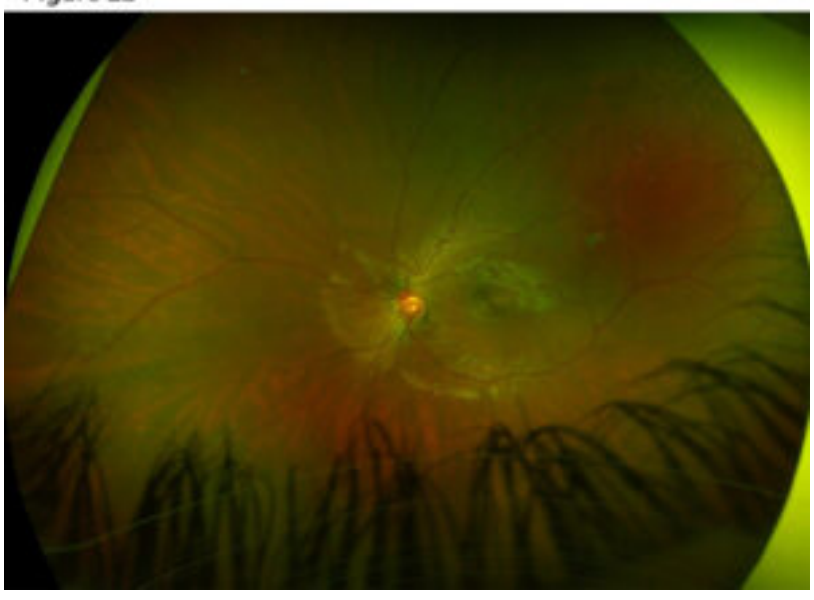


Figure 2b. Widefield color fundus photo left eye, visit two. Left eye is stable when compared to the visit 2 weeks prior without the presence of white round lesions or other retinopathy. Click to enlarge

Visit 3

Due to insurance, the patient's father requested a referral to an in-network provider for the follow-up visit. The patient was seen by an outside provider 6 weeks later with full resolution of both symptoms and posterior segment findings in the right eye. There was no new retinopathy or other significant ocular findings in either eye.

Preliminary Differential Diagnoses

Trainees should be asked to pause and come up with preliminary differential diagnoses based on the information gathered so far, as these will guide further testing in the next section. Corrective feedback should not be given at this time since trainees will have the opportunity to re-evaluate differential diagnoses after the results of multimodal imaging are presented. Examples of reasonable differential diagnoses include the following:

1. Retinal tear/detachment: Based on the patient's chief complaint of flashes and floaters and the history of riding rollercoasters at the onset of symptoms, a differential diagnosis of a retinal tear or detachment was considered early in the examination. However, careful dilated evaluation revealed no tears or detachments in the retina and no Shafer sign in the anterior vitreous. This differential diagnosis was ruled out prior to imaging.
2. Commotio retinae
3. Multiple evanescent white dot syndrome
4. Other white dot syndromes – ex: acute posterior multifocal placoid pigment epitheliopathy (APMPPE), idiopathic multifocal choroiditis, acute zonal occult outer retinopathy (AZOOR), birdshot chorioretinopathy, serpiginous chorioretinopathy
5. Masqueraders of white dot syndromes – ex: syphilitic outer retinitis, primary vitreoretinal lymphoma

Additional Testing

Based on the patient's presentation, trainees can now be asked about additional tests they would perform to aid in the diagnosis of the patient. Emphasis should be placed on testing that will be most discriminatory in the diagnosis of this patient's condition. Trainees should also be specific in the types of tests ordered (ex: macula optical coherence tomography instead of optical coherence tomography, or threshold visual field instead of visual field). Residents or more advanced students can take it one step further and be asked about the expected imaging results for their differential diagnoses. Then, once the trainee has requested testing, they can then be shown the results provided in this teaching case report and be asked to interpret the data.

Fundus autofluorescence (**Figures 3a and 3b**) was performed to further evaluate the white lesions seen on color fundus photography and clinical exam. Fundus autofluorescence revealed patchy hyperautofluorescence in the peripapillary region, greatest superiorly, as well as paramacular region and into the arcades corresponding with the hypopigmented lesions seen clinically in the right eye. The areas of hyperautofluorescence exceeded the number of white dots seen clinically, particularly in the peripapillary region. Fundus autofluorescence findings were normal for the left eye.

Figure 3a

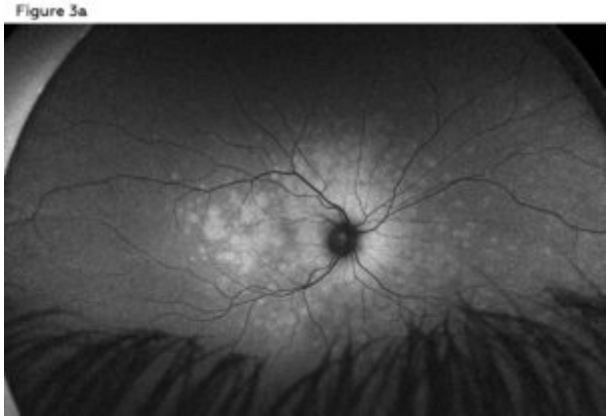


Figure 3a. Widefield color fundus photo right eye, visit two. Patchy hyperautofluorescence in the peripapillary region, greatest superiorly. Hyperautofluorescence is also seen in the paramacular region. Click to enlarge

Figure 3b

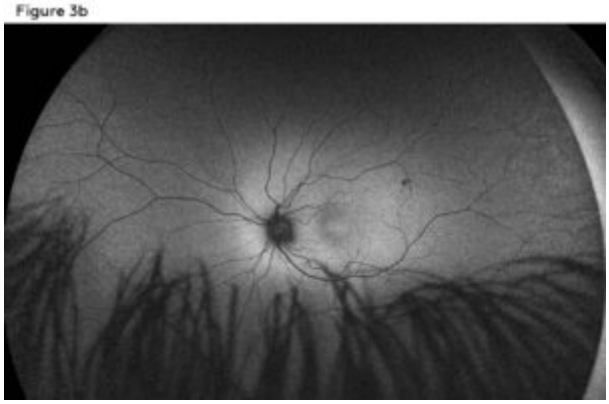


Figure 3b. Widefield color fundus photo left eye, visit two. Normal fundus autofluorescence pattern aside from the hypoautofluorescence of the longstanding chorioretinal scar. Click to enlarge

Figure 4a

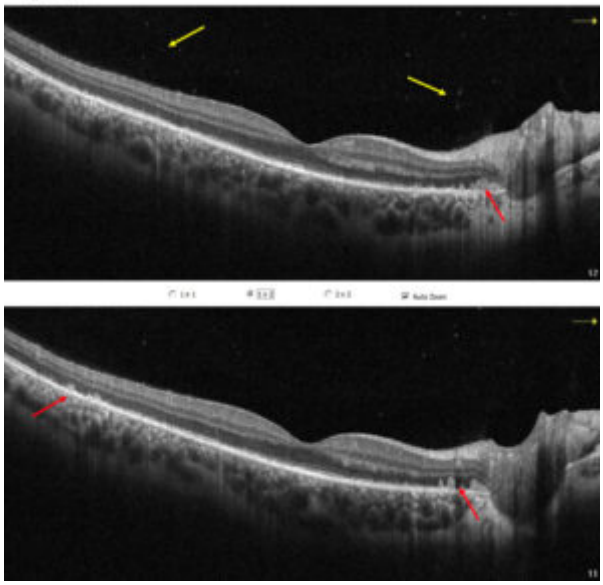


Figure 4a. Macula OCT right eye, visit two. Raster of the right eye shows loss of the ellipsoid zone just temporal to the fovea and retinal pigment epithelium inflammation (red arrows). Mild vitreous cells are present (yellow arrows). Click to enlarge

Macula optical coherence tomography (OCT) (**Figures 4a and 4b**) was performed for both eyes to look for correlations with the white dots and fundus autofluorescence findings as well as the foveal granularity and complaint of reduced quality of vision in the right eye. Right eye OCT revealed mild vitritis (yellow arrows). There were also several areas of retinal pigment epithelium inflammation (red arrows), as represented by the hyperreflective lesions of the retinal pigment epithelium extending anteriorly into the outer nuclear layer. These lesions are particularly evident in the temporal peripapillary region and correspond to the hypopigmented lesions seen on clinical examination and hyperautofluorescence on fundus autofluorescence. Disruption of the foveal ellipsoid zone can also be seen in the right temporal subfoveally and into the temporal parafoveal region. Macula OCT findings were normal for the left eye.

Macula OCT of the right eye without arrows can be found in the **Appendix** and should be used to show trainees when they request additional testing. This version with arrows can be used to point out the vitritis and RPE inflammation if missed during the initial discussion.

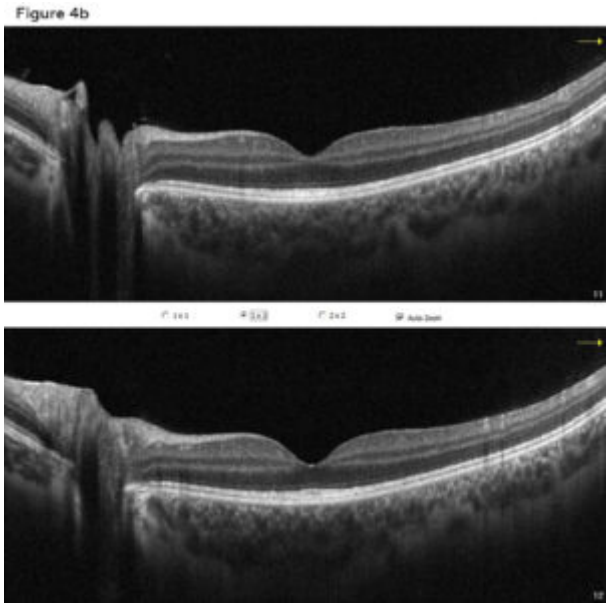


Figure 4b. Macula OCT left eye, visit two. Normal macula OCT findings of the left eye. The ellipsoid zone is well defined and fully intact. Click to enlarge

A Humphrey Visual Field 24-2 SITA Faster (**Figures 5a and 5b**) was performed on both eyes. Results showed a slightly reduced foveal threshold in the right eye (34 dB) with an enlarged blind spot and moderate paracentral defects greater superiorly than inferiorly. These defects correspond with the hyperautofluorescent areas seen in fundus autofluorescence. They also account for his complaint of decreased quality of vision in the right eye. The visual field 24-2 for the left eye had a few mild non-contiguous defects, unremarkable for neurologic or ocular disease. It is appropriate for trainees to request a Humphrey Visual Field 30-2, full-field or other similar threshold testing strategy. A Humphrey Visual Field 10-2 or microperimetry may be done to look at central fixation function; however, they should be performed in conjunction with wider field threshold testing strategies, as the fundus autofluorescence and white dots on clinical exam indicate involvement outside of the central ten degrees.

Figure 5a

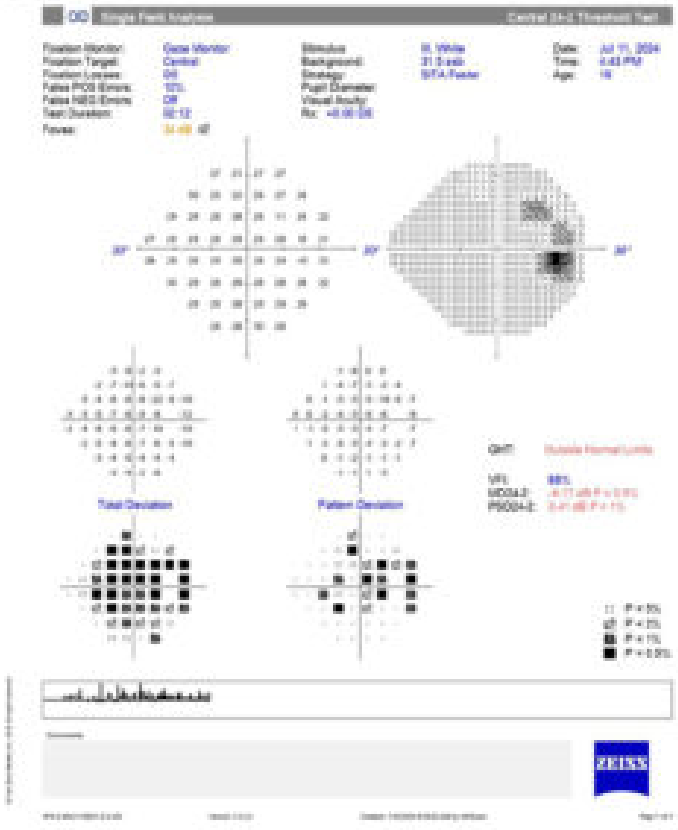


Figure 5a. Humphrey Visual Field 24-2 right eye, visit two. Visual field findings indicate a slightly reduced foveal threshold, enlarged blind spot and moderate paracentral defects, greater superiorly than inferiorly. Click to enlarge

Figure 5b

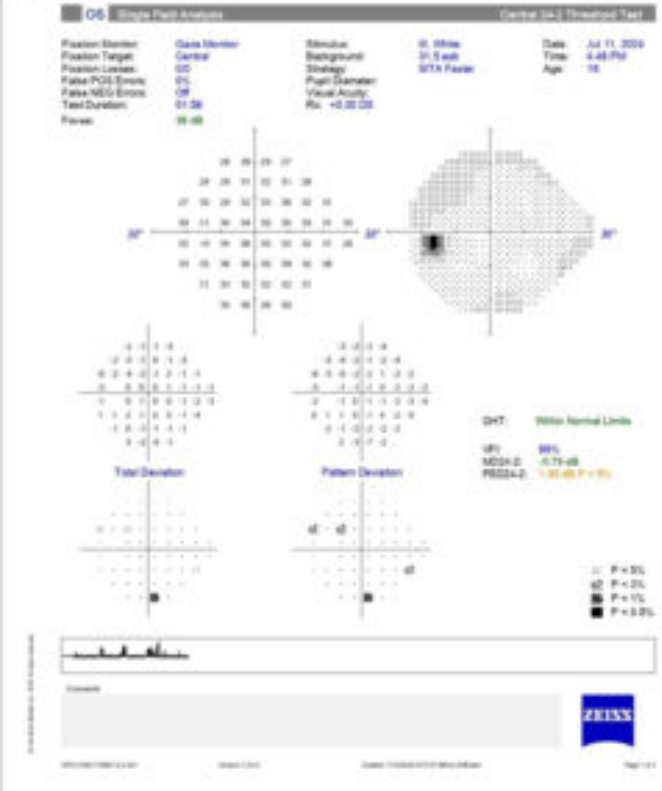


Figure 5b. Humphrey Visual Field 24-2 left eye, visit two. The visual field defects are mild and mostly edge points. There is no suggestion of

neurologic, glaucomatous or retinal pathology. Click to enlarge

Updated Differential Diagnoses

Now that imaging has been obtained, trainees should be asked to come up with their updated differential diagnoses. Trainees should also be asked to explain case findings that are consistent and/or inconsistent with each of the proposed differentials to demonstrate clinical reasoning skills. This exercise should be a formative assessment, where knowledge gaps are identified, and feedback provided throughout the discussion. **Table 1** compares the three white dot syndromes listed in the differential diagnoses and can be used to facilitate discussion about this group of conditions.

1. Multiple evanescent white dot syndrome: MEWDs belongs to the white dot syndromes and typically affects young adult myopic females between 20 to 40 years of age.[1,3] The disease is characterized by white dots in the posterior pole and mid-periphery, mild vitritis and foveal granularity.[1] Patients classically present with complaints of decreased visual acuity and photopsias.[3] The retinal pigment epithelium-photoreceptor complex may be the primary site of inflammation. Ocular signs and symptoms may be preceded by a flu-like viral episode.[4] MEWDS is typically a self-limiting condition.[2]
2. Commotio retinae: Commotio retinae is described as retinal whitening after blunt trauma to the globe. This deep retinal whitening occurs opposite the site of impact. Macular edema, also known as Berlin's edema, may mimic a cherry red spot, which is classically associated with a central retinal artery occlusion.[5] Expected OCT findings include increased reflectivity of the ellipsoid zone, disruption of the interdigitation zone and loss of reflectivity of the external limiting membrane.[6] Vision and edema typically resolve over several weeks and can leave behind granular hyperpigmentation.[5]
3. Acute posterior multifocal placoid pigment epitheliopathy (APMPPE): APMPPE is another white dot syndrome. It occurs in adults, often between 20 to 50 years of age, is typically bilateral, and patients often complain of reduced vision. Flat, round and confluent cream-colored plaque-like lesions with indistinct margins can be seen in the posterior pole, representing subretinal infiltrates. Indocyanine green angiography and OCT angiography have demonstrated that inner choroidal ischemia is the underlying cause of disease. These lesions resolve on their own and may leave behind hypopigmentation and later pigment mottling or clumping. If the placoid lesions and choroidal ischemia persist for more than 3 months, the condition is referred to as persistent placoid maculopathy.[5]
4. Idiopathic multifocal choroiditis: Idiopathic multifocal choroiditis also belongs to the white dot syndromes and is an inflammatory choroiditis. It tends to affect myopic women between 20 to 60 years with reported symptoms of photopsias and blurry vision (more than half have visual acuity worse than 20/100 in the worse seeing eye).[5, 7] In the acute phase, round or oval yellow lesions are seen in the posterior pole, peripapillary region and midperiphery. They may form a linear pattern and be associated with subretinal fluid. It is commonly bilateral and associated with anterior chamber and vitreous cells ranging from quiescent to severe. The yellow lesions can later develop into atrophic chorioretinal scars with pigmentation, and choroidal neovascular membranes commonly develop. The clinical course tends to wax and wane but can be chronic in some cases.[5]
5. Syphilitic outer retinitis: Syphilis is known as the "great masquerader" of ocular diseases, including MEWDS. Syphilitic outer retinitis can present subtly, but characteristic features include flat yellow lesions of the outer retina, disruption of the ellipsoid zone and increased fundus autofluorescence (FAF) signal. Phlebitis may also be a key feature of syphilitic outer retinitis (SOR) and is well observed with fluorescein angiography.[8]

TABLE 1

	Multiple Evanescent White Dot Syndrome (MEWDS)	Acute posterior multifocal placoid pigment epitheliopathy (APMPPE)	Idiopathic multifocal choroiditis
Demographics	Myopic females 20-40 years old	Females 20 to 50 year old	Myopic females 20-60 years old
Symptoms	Decreased vision and photopsias; may be preceded by a flu-like	Decreased vision	Decreased vision and photopsias
Clinical Signs	White dots in the posterior pole to mid-periphery; mild vitritis; foveal granularity	Flat, round, and confluent cream-colored plaque-like lesions with indistinct margins	Round or oval yellow lesions in linear pattern that become atrophic chorioretinal scars with pigmentation; anterior chamber and vitreous cells
Laterality	Unilateral	Bilateral	Bilateral
Ocular etiology	Retinal pigment epithelium-photoreceptor complex inflammation	Inner choroidal ischemia	Choroiditis
Key Imaging Differences	FAF: Hyperautofluorescence of active lesions FA: early hyperfluorescence in wreath-like pattern OCT: photoreceptor disruption and RPE inflammation	FAF: Hypoautofluorescence of active lesions FA: early hyperfluorescence and late staining of lesions OCT: outer retinal and RPE disruption	FAF: hypoautofluorescent center with hyperautofluorescence surrounding active lesions FA: FA: early hyperfluorescence and late staining of lesions OCT: sub-RPE lesions, thickened choroidal on EDI-OCT beneath active lesions
Clinical Course	Self-limiting	May self-resolve, if chronic, described as persistent placoid maculopathy	Waxes and wanes or chronic May develop choroidal neovascular membranes

Table 1. Summary table of common findings of the three white dot syndromes in the differential diagnoses. Click to enlarge

Additional History

After interpretation of multimodal imaging on visit two, the patient was asked further case history questions to narrow down the differential diagnoses. Because MEWDS may be preceded by a flu-like viral episode,[4] the patient was asked about flu-like symptoms. He reported that he was training for wrestling and is often fatigued. He reported that it was possible he would not recognize mild flu-like symptoms, thinking they are part of his training fatigue. He also denied a recent diagnosis of COVID-19 infection as well as any other vaccinations. The patient reported a normal routine physical examination within the school year. He also denied any new systemic signs or symptoms aside from his usual wrestling fatigue, including headaches, skin rashes or skin lesions. The patient reported that he has never been sexually active.

Final Diagnosis

During or after the differential diagnoses are discussed, the trainee should be asked to come up with a final diagnosis based on the findings of the case.

Given the history of roller coaster rides coinciding with the onset of symptoms, ocular trauma, such as retinal tear/detachment and commotio retinae were differential diagnoses. Earlier trainees may focus on this aspect of the case and limit their differential diagnoses to trauma-related conditions. However, upon further questioning the patient denied any direct contact to his head or eyes while riding the rollercoasters and dilated ocular evaluation revealed no retinal tears, breaks or detachments. The lack of direct trauma also helps rule out commotio retinae. Because the white dots were in the posterior pole, and in commotio retinae, the retinal whitening is opposite the site of impact, he would have had to experience trauma to the anterior portion of his eye/globe. Additionally, he lacked the classic confluent retinal whitening and edema associated with commotio retinae. Instead of the expected increased reflectivity of the ellipsoid zone with commotio retinae, the patient in this case displayed disruption of the ellipsoid zone, and there was no decrease in external limiting membrane reflectivity compared to the normal left eye on macula OCT.

While the typical patient diagnosed with multiple evanescent white dot syndrome is a young adult myopic female, this patient was slightly younger as a teenage male with minimal myopia in the right eye only. His racial background is not pertinent to this case as MEWDS lacks known racial associations. However,

his ocular examination and multimodal imaging findings aligned best with a diagnosis of MEWDS in the right eye. Key distinguishing features include unilateral presentation, white dots, foveal granularity, mild vitritis and good vision. Additionally, his signs and symptoms resolved without treatment within 6 weeks. Of the other differential diagnoses previously discussed, foveal granularity is a feature unique to MEWDS. While he is only a teenager, the expected age range of MEWDS is the youngest of the white dot syndrome differentials listed, as well as younger than the mean age of patients with syphilitic outer retinitis.

Although the patient in this case displayed features like acute posterior multifocal placoid pigment epitheliopathy, there were also several inconsistencies. APMPPE tends to present bilaterally rather than unilaterally with white plaque-like rather than dot-like lesions. The white dots did not leave behind hypopigmentation or pigment clumping on follow-up examination.

Idiopathic multifocal choroiditis also shares several features of MEWDS, but it tends to be a bilateral condition with worse visual acuity. There was no subretinal fluid found on macula OCT of the patient in this case. Additionally, the white dots did not leave behind atrophic chorioretinal scars on follow-up examination.

Syphilis infection is an important differential diagnosis to consider, particularly for cases of uveitis. However, the patient's very young age, lack of sexual activity, lack of syphilis signs or symptoms and spontaneous resolution of ocular findings did not align best with syphilitic outer retinopathy. However, if the patient did not have spontaneous resolution of signs and symptoms on follow-up examination or endorsed sexual activity, syphilis testing would have been warranted.

The results of the fundus photos, OCTs and visual field results were discussed with the patient and his father. The patient was reassured that there was no evidence of retinal tears, breaks, detachments or other signs of ocular trauma in either eye. While the history of rollercoasters seemed like a reasonable etiology of the patient's symptoms, it was explained to the patient that this was likely a coincidence. The patient was educated on the self-limiting nature of MEWDS and recommended follow-up evaluation in 1 month, sooner if new or worsening symptoms.

Education Guide

Key Concepts

1. Retinal inflammation
2. Multimodal imaging interpretation
3. White dot syndromes

Learning Objectives

After working through this teaching case report, trainees should be able to:

1. Describe the classic clinical presentation of MEWDS
2. List potential differential diagnoses for MEWDS
3. Describe expected multimodal imaging results of patients with MEWDS

Discussion Questions

1. Knowledge, understanding and facts about the clinical case and condition presentation
    1. Describe the typical demographics of a patient presenting with MEWDS
    2. Describe the typical clinical presentation of MEWDS
2. Differential diagnosis

    1. What are differential diagnoses based on this patient's presentation?
    2. What tests and clinical findings in this case helped make the diagnosis of MEWDS?
3. Patient management and role of the optometrist
    1. What is the visual prognosis of MEWDS?
    2. What is the appropriate management for a patient with MEWDS?
    3. What is appropriate patient education?
4. Critical-thinking concepts
    1. What additional testing or follow-up could be considered in this patient to confirm the diagnosis/rule out other etiologies?

This teaching case report is most appropriate for small group discussions for third and fourth-year students and residents either in the classroom or clinic. The case should be presented stepwise, just as a patient would present in clinic. Assessments should be formative in the form of informal discussion, with feedback provided throughout the discussion of the case. Trainees can be asked to highlight pertinent findings from the case history and initial examination. Any knowledge gaps should be addressed by the instructor before moving on with the case. Then, trainees should request additional imaging, and the instructor can provide the corresponding findings. Trainees should be asked to interpret the imaging and come up with differential diagnoses based on the findings of the case. Discussion around imaging results should be tailored to the knowledge level and expectations of the trainee or group of trainees. After appropriate differentials are discussed, trainees should present a final diagnosis, along with treatment and management plans. Instructors should facilitate discussion by asking questions related to the learning objectives and providing immediate corrective feedback. Facilitating discussion rather than lecturing will allow trainees to practice multimodal imaging interpretation and clinical reasoning skills.

Discussion

MEWDS is a member of the white dot syndrome disorders and was first described by Jampol et al. in 1984.[1] It is characterized as sudden-onset unilateral retinitis with a hallmark feature of white dots in the retina. The white dots vary in size from about 100 µm to half a disc diameter. High magnification reveals that the dots are clusters of smaller lesions. Another key feature of this condition is fine granularity of the fovea, which can be observed on clinical evaluation and color fundus photography. Patients may also present with vitreous cells and optic disc swelling.[9] An annual incidence of 0.22/100,000 persons has been reported[9] and accounts for 1.24% of uveitis cases.[3]

The typical demographics of patients presenting with MEWDS are young adult myopic females between 20 to 40 years of age. They often present with an acute decrease in visual acuity, complain of photopsias and demonstrate temporal visual field defects in one eye, often following an episode of flu-like symptoms.[3] Up to 50% of reported cases are preceded by a flu-like viral episode.[4] MEWDS has also been reported after vaccination, including vaccinations for human papilloma virus, hepatitis B, influenza (mostly live attenuated), and hepatitis A.[10] Recently, there has been a surge in reports of MEWDS following COVID-19 vaccination. In 2024, Zeng et al.[11] performed a systematic review of this association. The time from vaccination to onset of symptoms varied, ranging from 1 day to 3 months, with an average onset of 14.7 days. The patient demographics resembled those of non-vaccine-associated cases of MEWDS with a predilection for young females. The authors proposed that the most likely mechanism for the association is molecular mimicry. Structural similarities between pathogens and self-proteins cause activation of autoreactive T-cells or B-cells among those that are genetically predisposed upon vaccination. Hypersensitivity reactions to COVID-19 vaccination have also been proposed as a mechanism for this type of association with MEWDS.[11]

MEWDS may also be associated with human leukocyte antigen B51 (HLA-B51) as increased frequencies of the HLA-B51 haplotype have been reported in patients with MEWDS; however, there are

limited studies with small sample sizes, so further investigation is needed to better understand genetic involvement in MEWDS pathogenesis.[12] The patient in this case was not tested for HLA-B51 due to the lack of strong evidence for genetic inheritance of MEWDS in the current literature and the benign and self-resolving nature of his condition.

Traditionally, MEWDS was thought to primarily be an inflammatory condition of the choriocapillaris, with hypoperfusion of the choriocapillaris leading to ischemic lesions of the outer retina and retinal pigment epithelium. However, Pichi et al.[2] found normal choriocapillaris flow using OCT angiography. The authors concluded that the lesions seen in MEWDS likely result from inflammation of the RPE and outer photoreceptor layer (photoreceptoritis) and lead to loss of the inner and outer segments. This inflammation of the outer photoreceptors can be seen as hyperreflective foci in the outer nuclear layer (dots) or loss of the ellipsoid zone. If the photoreceptors are severely damaged, the outer segments may accumulate when phagocytosis by the RPE cannot keep up.[7]

In a study on choroidal vascular changes in MEWDS, eyes with MEWDS exhibited significantly higher subfoveal choroidal thickness, total choroidal area and choroidal vascularity index compared to fellow uninvolved eyes. During the recovery stage, subfoveal choroidal thickness, total choroidal area and choroidal vascularity index significantly decreased in eyes with MEWDS. The fellow eyes showed no changes during either the acute or recovery stages. These changes may be due to a vascular component of MEWDS causing choroidal thickening. However, the relationship between choroidal changes and outer retinal changes remains unknown.[13]

Multimodal imaging is key to making the diagnosis of MEWDS. The following will discuss the utility and expected findings for current imaging modalities:

Fluorescein Angiography Findings

On fluorescein angiography (FA), early hyperfluorescence of the white dots is often observed in a wreath-like pattern.[2, 9] During the intermediate phase, the margins of these lesions become less distinct with multifocal staining of the larger lesions in the later phases. FA may show more numerous hyperfluorescent lesions than identified with either clinical exam or color fundus photography. If the disc is involved, FA will show late staining and late leakage of the disc.[2]

Indocyanine Green Angiography Findings

On Indocyanine green angiography (ICGA), patchy hypocyanescent areas in the posterior pole (including peripapillary region) and mid-periphery can be seen, especially in the late phase. These lesions correspond to the areas of hyperautofluorescent lesions seen on FAF and photoreceptor outer segment loss/damage seen on OCT.[2,3] In most cases, the hypocyanescent lesions exceed those seen on other imaging modalities.[2]

There are several proposed theories on presence of the hypocyanescent dots in MEWDS:[14]

1. Choroidal inflammatory deposits may divert choroidal blood flow and interfere with the outer retinal pigment epithelium blood-retinal barrier.
2. Occlusion, low perfusion pressure or inflammatory-mediated shunting may impair choriocapillaris flow.
3. Inflammatory debris that does not have affinity for the ICG molecules.
4. Reduction in dye uptake due to the altered retinal pigment epithelium.

Hypercyanescent lesions are occasionally seen and may represent inflammatory lesions impregnated by the dye.[14]

Fundus Autofluorescence Findings

The classic white dots seen on clinical examination or color fundus photography correlate with hyperautofluorescent lesions on fundus autofluorescence. Some of these hyperautofluorescent lesions are only seen on FAF without corresponding lesions on color fundus photography. The hyperautofluorescent lesions typically correspond to areas of early/late hyperfluorescence on fluorescein angiography, as described above.

Dell'Omo et al.[9] described four evolution patterns of these hyperautofluorescent lesions:

1. The lesions decreased in number but those that remained became more well-defined starting a few weeks after initial presentation and remained for months.
2. The lesions retracted centripetally and became small hyperautofluorescent dots surrounded by a hypoautofluorescent halo.
3. The lesions became hypoautofluorescent.
4. The lesions resolved without residual abnormal autofluorescence.

Small hypoautofluorescent areas in the peripapillary area and posterior pole may correlate with small brownish lesions seen ophthalmoscopically or on fundus photography. These hypoautofluorescent areas may also lack a clear connection to ophthalmoscopic exam or fundus photography.

On follow-up, some of the pinpoint hypoautofluorescent lesions may disappear completely without residual abnormalities on FAF. These lesions may also become smaller and more faint or continue to persist.[9]

Optical Coherence Tomography Findings

Optical coherence tomography (OCT) typically shows disruption or loss of the ellipsoid zone and interdigitation zone of the fovea.[2,3]

A study focusing on the foveal granularity seen in patients reported that only the outer retina was involved on OCT. Changes included disruption of the ellipsoid and interdigitation zones, focal thickening of the retinal pigment epithelium with hyperreflective material and a vertical line through the outer nuclear layer.[15] Over the course of the disease, the ellipsoid zone disruption gradually improves from diffuse to focal involvement, and in previous areas of loss, the ellipsoid zone becomes irregular.[2]

In the late recovery phase, the ellipsoid band was continuous in all affected eyes.[2] Punctate or round hyperreflective lesions may be seen in the outer nuclear layer and correspond to small dots seen on fluorescein angiogram.

OCT-Angiography Findings

OCT-angiography (OCT-A) has shown significantly diffuse reduction of flow densities in the retinal deep capillary plexus and choriocapillaris in the acute phase, with recovery in the convalescent phase.[7]

Tang et al.[7] did not find a correlation between the hypocyanescent spots on ICGA and choriocapillary dropout on OCT-A, which supports the theory that these hypocyanescent lesions are not a direct consequence of acute inflammation and ischemia of the choroid, but rather due to impaired retinal pigment epithelium function.

Multifocal Electroretinogram (ERG)

There is limited data on multifocal electroretinograms (mf-ERG) in patients with MEWDS. However, mf-

ERG may come up in discussion with trainees, particularly in academic settings where mf-ERGs are more easily accessible. Very early on in the disease, patients with MEWDS will exhibit greater than normal N1 and P1-wave amplitudes. After symptoms are present for 2 weeks, these amplitudes are either within the normal range or decreased. Changes in photoreceptors, such as inflammation, toxicity, ischemia or genetics, may be resulting in the above normal amplitudes.[16]

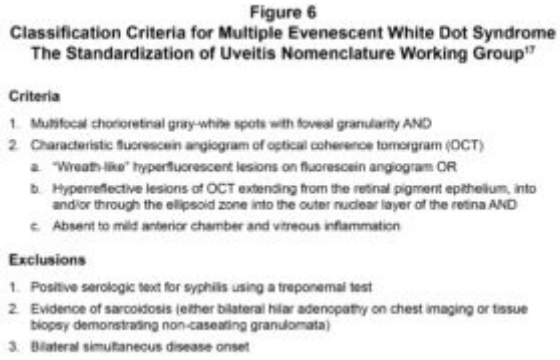


Figure 6
Classification Criteria for Multiple Evenescent White Dot Syndrome
The Standardization of Uveitis Nomenclature Working Group[17]

Criteria

1. Multifocal chorioretinal gray-white spots with foveal granularity AND
2. Characteristic fluorescein angiogram of optical coherence tomorgram (OCT)
   a. "Wreath-like" hyperfluorescent lesions on fluorescein angiogram OR
   b. Hyperreflective lesions of OCT extending from the retinal pigment epithelium, into and/or through the ellipsoid zone into the outer nuclear layer of the retina AND
   c. Absent to mild anterior chamber and vitreous inflammation

Exclusions

1. Positive serologic text for syphilis using a treponemal test
2. Evidence of sarcoidosis (either bilateral hilar adenopathy on chest imaging or tissue biopsy demonstrating non-caseating granulomata)
3. Bilateral simultaneous disease onset

Figure 6. Classification Criteria for Multiple Evanescent White Dot Syndrome created by the Standardization of Uveitis Nomenclature Working Group. Click to enlarge

In 2021, The Standardization of Uveitis Nomenclature (SUN) Working Group identified classification criteria for multiple evanescent white dot syndrome based on machine learning of cases with MEWDS and 8 additional posterior uveitides.[17] The goal of the SUN criteria is classification at presentation, so these criteria are most appropriate for the early stage of the condition. It is important to note that these classification criteria are different from clinical diagnostic criteria in that specificity is emphasized rather than sensitivity, which is more typically emphasized in diagnostic criteria. **Figure 6** shows the classification criteria as published by the SUN Working Group.

The patient in this case meets both classification criteria. For criteria one, he had multifocal white spots in the right eye with foveal granularity seen on clinical exam and widefield color photography. For criteria two, he had hyperreflective lesions on OCT in the RPE that extended through to the outer nuclear layer as well as mild vitritis (b and c). While further testing was not done for syphilis or sarcoidosis, the patient met the exclusion criteria for lacking bilateral simultaneous disease onset.

In a 2020 retrospective, multicenter, case series on MEWDS masqueraders by Russel et al.,[18] syphilitic outer retinitis was the most common masquerader. In a 2021 systematic review of the literature on syphilitic outer retinitis, the median age of presentation was 48 years.[8] This is older than the typical patient demographics of MEWDS and much older than the teenage patient in this case. Over a third of patients in the review had visual acuity of 20/200 or worse, and all patients who presented with vitritis had acuity of 20/200 or worse.[8] Both conditions can present with hyperautofluorescent lesions seen as white spots in the retina and ellipsoid zone disruption. However, patients with syphilitic outer retinitis tended to present bilaterally, rather than unilaterally, and resolve with penicillin treatment rather than spontaneously, as was seen in this case.[18] Recommended testing for patients suspicious of syphilis infection includes a treponemal test, such as a fluorescent treponemal antibody absorption test (FTA-ABS) or the *Treponema pallidum* passive particle agglutination assay (TP-PA). Patients should also be tested for human immunodeficiency virus (HIV) due to the high rate of coinfection with syphilis. Syphilitic outer retinitis is considered a form of neurosyphilis and therefore should be treated with intravenous penicillin G for 2 weeks.[8]

Primary vitreoretinal lymphoma was the second most common masquerader in the same case series.[18] However, these patients were also older and lacked spontaneous resolution seen in MEWDS.

Fluorescein angiogram and fundus autofluorescence showed mottled hypo and hyperfluorescent spots in a “leopard spot” pattern, which is classic for lymphoma. Another masquerader of MEWDS was idiopathic multifocal choroiditis. Idiopathic multifocal choroiditis also affects young myopic women with reported symptoms of photopsias and blurry vision. This inflammatory choroiditis can leave behind RPE atrophy, pigmentary scars and lead to choroidal neovascular membranes. Compared to MEWDS, multifocal choroiditis is more commonly bilateral and associated with greater anterior chamber and vitreous cells.[18]

Management

MEWDS is a self-limiting condition that does not require medical therapy. Typically, visual symptoms and posterior segment changes on multimodal imaging resolve within 3 months.[1,9, 14] It has therefore been described as the “common cold of the retina”.[19]

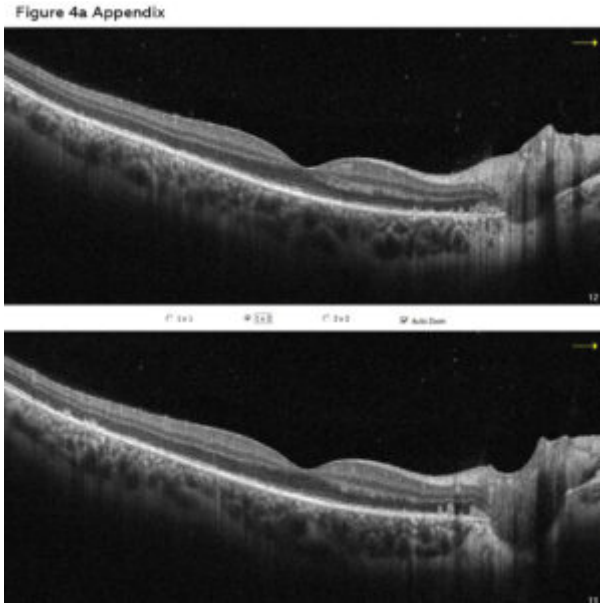
In a retrospective study of the clinical course of MEWDS and factors influencing visual recovery, reduced presenting visual acuity (VA) and younger age were associated with poorer final VA. The authors also concluded that the disruption of the outer retinal layers on OCT was not statistically significant in predicting the final VA as some patients had persistent disruption on OCT but complete visual recovery.[20] Although the patient in this case was young, he presented with good visual acuity and continued to have good acuity as his lesions and symptoms resolved over the subsequent weeks.

Short pulse corticosteroids have been reported in a limited number of cases.[21, 22] Patients have exhibited an improvement in visual acuity within 1 week and full visual recovery within 3 weeks.[21] However, further prospective studies are needed to fully assess the clinical value of corticosteroids in MEWDS.

Conclusion

This teaching case report exemplifies how a seemingly routine appointment can result in an uncommon diagnosis. Clinicians should be aware of Multiple Evanescent White Dot Syndrome, its differential diagnoses and utilize available multimodal imaging to make the final diagnosis. Careful evaluation of multimodal imaging findings was key in distinguishing this diagnosis from others that can present similarly, especially when the patient is of an atypical demographic for all differential diagnoses. This teaching case report walks trainees and educators through the case with prompts for discussion of differential diagnoses, multimodal imaging interpretation, the final diagnosis and management of MEWDS based on the current literature.

Appendix



Appendix. Figure 4a Macula OCT right eye, visit two – without arrow annotations . Click to enlarge

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