



2016
Resident Edition



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YO Info

THE YOUNG OPHTHALMOLOGIST'S NEWSLETTER

Your source for clinical pearls, coding, practice management advice and more

Let the Training Begin: My Secret to Becoming a Better Physician

Reflective practice has been an integral part of my professional life, I've used it to develop and maintain competence as a clinician and surgeon. In my personal life, reflective practice also provides the structure I need to become a successful amateur dressage competitor.

What Reflective Practice Is

Because reflective practice is used in many different disciplines, it has been interpreted in a variety of ways. The general consensus is that reflective practice is a process in which critical analysis of an event can lead an individual to greater self-awareness.

Reflective Practice and Ophthalmology

Reflective practice can be used in almost every aspect of professional development, but it's particularly helpful in improving surgical outcomes at any stage of an ophthalmologist's career.

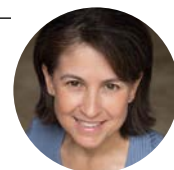
The following is an example of how I incorporate reflective practice in our cataract surgical curriculum. In the first part of the learning process, I coach the young physician to safely complete portions of the surgery or the entire procedure. Afterwards, the resident and I independently reflect on the case and assess it by answering the same set of questions:

- What was good about the procedure?
- What steps need improvement?
- Are there any barriers to improvement?
- Is there anything else you feel is important about the case?

What Is the Plan for Improvement?

In the third phase of the exercise, the resident and I meet to review our assessments and the video of the case. The fourth and final phase requires that the resident takes the information obtained and (Continued on page 2)

Laura L. Wayman, MD, is vice chair of education, director of resident education and associate professor of ophthalmology at the Vanderbilt Eye Institute, Vanderbilt University Medical Center. She is also the 2016 president of the Program Directors Council of the Association of University Professors of Ophthalmology.





Dr. Wayman (pictured bottom center) and residents from the Vanderbilt Eye Institute.

develops, with my guidance, a plan for improvement.

Key Components of the Exercise

- First, it is important that in the early years of training, the resident obtains input from an experienced educator (attending surgeon). The resident's inexperience can lead to unreasonable expectations or the wrong improvement plan.
- Second, it is critical that the resident recognizes the positive features of the case and avoids focusing solely on the areas of weakness, or those that need improvement.
- Third, it's important to find a process that works for both the learner and mentor.

- Fourth, all parties should keep the process simple.
- Fifth, residents should follow through and complete the action items on their improvement plan.

A Key to Lifelong Growth

Reflective practice is a valuable skill for any phase of one's career and very important in the development of self-awareness. It helps acquire and retain new knowledge by encouraging active learning. It promotes self-motivation and identifies strengths and areas that need improvement. It stimulates change that can lead to better outcomes. And finally, the process of working with a coach encourages the exchange of ideas between surgeon and mentor, which, in turn, can lead to growth.

From the Editor's Desk

We proudly present our fifth-annual *YO Info Resident Edition*! This edition was specially crafted for first-year residents in ophthalmology by members of the Academy's *YO Info* editorial board to give you a high-yield rock-star start to your year. The Academy and its Young Ophthalmologist (YO) Committee and three subcommittees (Advocacy, International and the *YO Info* editorial board) have a long-term strategy to engage members in training and those in their first five years of practice. *YO Info* is a free online e-newsletter that you and 6,000 other YOs in the United States and abroad receive monthly. The content focuses on practice management, clinical pearls, international opportu-

nities, spotlights on outstanding YOs and advocacy for our profession. You may also visit aao.org/yo to view the previous four editions of *YO Info Resident Edition* as well as current articles from the monthly newsletter.

We hope these valuable tools help you in your training and beyond!

Natasha L. Herz, MD, is a cataract, corneal and refractive surgeon who works as a solo practitioner at Kensington Eye Center in Washington, D.C. Dr. Herz has been chair of YO Info's editorial board since 2012. She is also a member of the Academy's Communications Committee.



OKAPs Reading Schedule

For most of us, starting residency can feel like stepping into the deep end of the swimming pool. But reading the Academy's *Basic and Clinical Science Course*™ (BCSC®) series can help keep you afloat by building a solid knowledge base. It's also a vital part of prepping for the Ophthalmic Knowledge Assessment Program (OKAP) exam.

There's a lot of material to get through, but never fear! To assist with your OKAP prep, here's a reading schedule that will give you some structure and help you finish

the series on time. It begins on the second week of the 2016–2017 academic year and ends in late February 2017. This will leave you with a few weeks to review other material before the March 18 exam date. (Note: This proposed schedule does not include the *Update on General Medicine* book, which is still tested.)

The highest-yield books are scheduled for earlier on in the year, which will also be helpful clinically for the more junior resident. Good luck!

2016

7/11 – 7/17

18 PAGES/DAY

Fundamentals and Principles of Ophthalmology, Section 2 (pages 5–128) | Begin with: Chapter 1: Orbit and Ocular Adnexa | End after: Chapter 4: Ocular Development; Genetic Cascades and Morphogenic Gradients — Future Directions

7/18 – 7/24

20 PAGES/DAY

Fundamentals and Principles of Ophthalmology, Section 2 (pages 131–269) | Begin with: Part III Introduction | End after: Chapter 12: Retina; Retinal Electrophysiology

7/25 – 7/31

17 PAGES/DAY

Fundamentals and Principles of Ophthalmology, Section 2 (pages 271–389) | Begin with: Chapter 13: Retinal Pigment Epithelium; Anatomical Description | End after: Study Questions and Answers (END OF BOOK)

8/1 – 8/7

18 PAGES/DAY

Lens and Cataract, Section 11 (pages 1–126) | Begin with: General Introduction; Objectives | End after: Chapter 7: Surgery for Cataract; Outcomes of Cataract Surgery

8/8 – 8/14

14 PAGES/DAY

Lens and Cataract, Section 11 (pages 127–221) | Begin with: Chapter 8: Complications of Cataract Surgery; Corneal Complications | End after: Study Questions and Answers (END OF BOOK)

8/15 – 8/21

21 PAGES/DAY

Glaucoma, Section 10 (pages 1–146) | Begin with: Objectives | End after: Chapter 5: Angle-Closure Glaucoma; Drug-Induced Secondary Angle-Closure Glaucoma

8/22 – 8/28

13 PAGES/DAY

Glaucoma, Section 10 (pages 147–240) | Begin with: Chapter 6: Glaucoma in Children and Adolescents | End after: Study Questions and Answers (END OF BOOK)

8/29 – 9/4

22 PAGES/DAY

Retina and Vitreous, Section 12 (pages 1–156) | Begin with: Objectives | End after: Chapter 7: Other Retinal Vascular Diseases; Terson Syndrome

9/5 – 9/11

19 PAGES/DAY

Retina and Vitreous, Section 12 (pages 157–288) | Begin with: Chapter 8: Retinopathy of Prematurity; Introduction | End after: Chapter 15: Retinal Detachment and Predisposing Lesions; Macular Holes in High Myopia

9/12 – 9/18

13 PAGES/DAY

Retina and Vitreous, Section 12 (pages 289–380) | Begin with: Chapter 16: Diseases of the Vitreous and Vitreoretinal Interface | End after: Study Questions and Answers (END OF BOOK)

9/19 – 9/25

24 PAGES/DAY

External Disease and Cornea, Section 8 (pages 1–169) | Begin with: Objectives | End after: Chapter 6: Ocular Immunology; Diagnostic Approach to Immune-Mediated Ocular Disorders

9/26 – 10/2

24 PAGES/DAY

External Disease and Cornea, Section 8 (pages 171–335) | Begin with: Chapter 7: Diagnosis and Management of Immune-Related Disorders of the External Eye | End after: Chapter 12: Clinical Approach to Depositions and Degenerations of the Conjunctiva, Cornea, and Sclera — Endothelial Manifestations

10/3 – 10/9

16 PAGES/DAY

External Disease and Cornea, Section 8 (pages 337–448) | Begin with: Chapter 13: Clinical Aspects of Toxic and Traumatic Injuries of the Anterior Segment; Injuries Caused by Temperature and Radiation | End after: Study Questions and Answers (END OF BOOK)

10/10 – 10/16

25 PAGES/DAY

Orbit, Eyelids, and Lacrimal System, Section 7 (pages 1–172) | Begin with: Objectives | End after: Chapter 10: Classification and Management of Eyelid Disorders; Benign Adnexal Lesions

10/17 — 10/23**19 PAGES/DAY**

Orbit, Eyelids, and Lacrimal System, Section 7 (pages 172–306) | Begin with: Chapter 10: Classification and Management of Eyelid Disorders; Benign Melanocytic Lesions | End after: Study Questions and Answers (END OF BOOK)

10/24 — 10/30**20 PAGES/DAY**

Ophthalmic Pathology and Intraocular Tumors, Section 4 (pages 1–138) | Begin with: Objectives | End after: Chapter 10: Vitreous; Intraocular Lymphoma

10/31 — 11/6**18 PAGES/DAY**

Ophthalmic Pathology and Intraocular Tumors, Section 4 (pages 139–261) | Begin with: Chapter 11: Retina and Retinal Pigment Epithelium | End after: Chapter 17: Melanocytic Tumors — Iris Melanoma

11/7 — 11/13**12 PAGES/DAY**

Ophthalmic Pathology and Intraocular Tumors, Section 4 (pages 262–342) | Begin with: Chapter 17: Melanocytic Tumors; Melanoma of the Ciliary Body and Choroid | End after: Study Questions and Answers (END OF BOOK)

11/14 — 11/20**22 PAGES/DAY**

Pediatric Ophthalmology and Strabismus, Section 6 (pages 1–101) | Begin with: Objectives | End after: Chapter 9: Exodeviations; Evaluation

Refractive Surgery, Section 13 (pages 1–55) | Begin with: Objectives | End after: Chapter 3: Incisional Corneal Surgery; Arcuate Keratotomy and Limbal Relaxing Incisions

11/21 — 11/27**22 PAGES/DAY**

Pediatric Ophthalmology and Strabismus, Section 6 (pages 101–201) | Begin with: Chapter 9: Exodeviations; Classification | End after: Chapter 17: Eyelid Disorders; Congenital Ptosis

Refractive Surgery, Section 13 (pages 55–106) | Begin with: Chapter 3: Incisional Corneal Surgery; Instrumentation | End after: Chapter 6: Photoablation — Complications and Adverse Effects; Sterile Infiltrates

11/28 — 12/4**18 PAGES/DAY**

Pediatric Ophthalmology and Strabismus, Section 6 (pages 201–282) | Begin with: Chapter 17: Eyelid Disorders; Marcus Gunn Jaw-Winking Syndrome | End after: Chapter 22: Pediatric Glaucomas; Primary Congenital Glaucoma

Refractive Surgery, Section 13 (pages 106–149) | Begin with: Chapter 6: Photoablation — Complications and Adverse Effects; Corneal Haze | End after: Chapter 8: Intraocular Surgery; Light-Adjustable Intraocular Lenses

12/5 — 12/11**21 PAGES/DAY**

Pediatric Ophthalmology and Strabismus, Section 6 (pages 282–382) | Begin with: Chapter 22: Pediatric Glaucomas; Juvenile Open-Angle Glaucoma | End after: Chapter 28: Ocular Manifestations of Systemic Disease; Inborn Errors of Metabolism

Refractive Surgery, Section 13 (pages 153–195) | Begin with: Chapter 9: Accommodative and Nonaccommodative Treatment of Presbyopia; Introduction | End after: Chapter 11: Considerations After Refractive Surgery; Glaucoma After Refractive Surgery

12/12 — 12/18**12 PAGES/DAY**

Pediatric Ophthalmology and Strabismus, Section 6 (pages 383–427) | Begin with: Chapter 28: Ocular Manifestations of Systemic Disease; Familial Oculorenal Syndromes | End after: Study Questions and Answers (END OF BOOK)

Refractive Surgery, Section 13 (pages 197–236) | Begin with: Chapter 12: International Perspectives in Refractive Surgery; Introduction | End after: Study Questions and Answers (END OF BOOK)

SMALL BREAK FOR THE HOLIDAYS
12-19-2016 TO 1-1-2017

2017**1/2 — 1/8****27 PAGES/DAY**

Intraocular Inflammation and Uveitis, Section 9 (pages 1–189) | Begin with: Objectives | End after: Chapter 6: Noninfectious Ocular Inflammatory Disease; Behçet Disease

1/9 — 1/15**19 PAGES/DAY**

Intraocular Inflammation and Uveitis, Section 9 (pages 191–325) | Begin with: Chapter 7: Infectious Ocular Inflammatory Diseases; Viral Uveitis | End after: Study Questions and Answers (END OF BOOK)

1/16 — 1/22**21 PAGES/DAY**

Neuro-Ophthalmology, Section 5 (pages 1–145) | Begin with: Objectives | End after: Chapter 4: The Patient With Decreased Vision — Classification and Management; Posterior Optic Neuropathies

1/23 — 1/29**19 PAGES/DAY**

Neuro-Ophthalmology, Section 5 (pages 145–275) | Begin with: Chapter 4: The Patient With Decreased Vision — Classification and Management; Optic Atrophy | End after: Chapter 11: The Patient With Eyelid or Facial Abnormalities; Disorders of Overactivity of the Seventh Nerve

1/30 — 2/5**13 PAGES/DAY**

Neuro-Ophthalmology, Section 5 (pages 277–368) | Begin with: Chapter 12: The Patient With Head, Ocular, or Facial Pain; Evaluation of Headache | End after: Study Questions and Answers (END OF BOOK)

2/6 — 2/12**18 PAGES/DAY**

Clinical Optics, Section 3 (pages 1–129) | Begin with: Objectives | End after: Chapter 3: Clinical Refraction; The Prentice Rule and Bifocal Lens Design

2/13 — 2/19 **18 PAGES/DAY**
Clinical Optics, Section 3 (pages 129-251) | **Begin with:** Chapter 3: Clinical Refraction; Occupation and Bifocal Segment | **End after:** Chapter 7: Optical Instruments and Low Vision Aids; Surgical Microscope

2/20 — 2/26 **12 PAGES/DAY**
Clinical Optics, Section 3 (pages 252-337) | **Begin with:** Chapter 7: Optical Instruments and Low Vision

Aids; Geneva Lens Clock | **End after:** Study Questions and Answers (END OF BOOK)

Note: The eBook version of the BCSC does not have page numbers.

Brian Chan-Kai, MD, is a vitreoretinal specialist at EyeHealth Northwest in Portland, Ore. He has been on the YO Info editorial board since 2013.



How a Story Turned Legislative Apathy to Empathy

While waiting outside the office of my assigned U.S. representative for our meeting to begin, I had a nagging feeling that I was out of my league. I had never been politicking before and felt like an imposter and a tourist. The legislator’s initial reaction did not encourage me.

Once in the meeting, our group brought up a truth-in-advertising law that would require optometrists to be transparent and display their credentials clearly for patients. The representative respectfully noted his apathy toward turf battles and voiced his priority for improving access to care.

All that changed when I remembered a patient I met on call. “I agree,” I began. “Access is important.” I then told the story of my patient with an anterior chamber foreign body. His optometrist managed this intraocular foreign body solo for seven days by scraping the cornea, all the while treating it as if it was a corneal foreign body, before finally sending the patient to our ER. The patient missed out on safe, high-quality care because he trusted the person in a white coat whose credentials he did not understand.

While I shared this story, I was amazed by how the congressman’s body language changed as he became

visibly more receptive. After I finished speaking, he shared his own story — of someone close to him who suffered an unfortunate globe trauma accident while handling a campaign sign. He was visibly moved. We exchanged contact information, and he asked us to be his future liaisons for eye care issues.

The meeting taught me a vital lesson: Legislators want and need our input. If we do not deliver our unique insight as to how their laws affect our patients’ welfare, who will? Many legislators are undecided on issues that directly affect the future of our profession and the well-being of our patients.

The political arena in eye care is much more open and susceptible to your involvement than you probably think, even more so at the state level.

You do not need a background in politics. Each of you already has the most powerful tool available for turning apathy into empathy: your patients’ stories.

Last year, the Texas State Senate almost passed Bill 577, which would have allowed optometrists to manage glaucoma independently. Our most powerful allies in stopping that bill were those patients who lost vision due to mismanagement of glaucoma by optometrists and who stood ready to testify.

Do not wait for a last-minute surprise hearing to share your patients’ voices with legislators. Connect with your elected officials now. Join your state’s political action committee and the Academy’s OPHTHPAC® Fund and Surgical Scope Fund. If each of us does the above, we will take back charge of our profession. More importantly, we’ll protect the welfare of our patients, which is why we went into medicine in the first place.

Soheil M. Daftarian, MD, is currently chief resident, PGY-4, at Texas Tech University Health Sciences Center, Department of Ophthalmology.



Surgical Scope Fund	OPHTHPAC Fund	State Eye PAC
Fights optometric surgical initiatives at the state level that pose a threat to patient safety and quality of surgical care	Supports candidates for U.S. Congress	Supports candidates for state legislature
Lobbyists, media, public education, grassroots efforts	Campaign contributions and political education	Campaign contributions and political education
Contributions: Individual or corporate	Contributions: Individual	Contributions: Individual/corporate — check state PAC laws
Contributions are 100% confidential	Contributions above \$200 are on the public record	Contributions are on the public record — check state PAC laws

10 Tips for Surviving Call

Taking call is one of the more stressful experiences during residency, but certain things can make your call duty simpler. Here are some tips to help.

1. Take your own history and perform your own exam.

Ophthalmology is a “black box” to most physicians and other practitioners. You can trust, but make sure to verify!

2. Make *The Wills Eye Manual* your best friend.

This book will keep you out of trouble and help you shine. Especially early on, consider reading before your exam to help direct your patient interview. Definitely review it before contacting someone senior. By the end of your residency, this book will have helped you develop sound plans and differentials for common presentations.

3. Maintain a running list.

Keep running lists for everyone you see that include primary diagnoses, contact info and planned follow-up. If you're old school, buy a notebook or use your favorite app (e.g., Evernote). Confirm the patient's phone number! Certain diagnoses require close observation (e.g., preseptal cellulitis, hyphema, etc.). These steps will save you tons of headaches and make it easy to follow up.



4. Develop a routine.

Vision, pressure, pupils, drops! An efficient exam will save tons of time in the middle of the night — and developing good habits will help you ensure a complete exam, even when you're tired. Be aware that dilating is not an option in every circumstance. For the OR, streamline the process for preparing ruptured globes. Lastly, include a to-do list in your call bag (e.g., make patient NPO, update tetanus, place shield, etc.).

5. Bag it!

Prepare everything in a call bag: vision card, fluorescein strips, eye patches, suture for lid lacs, Desmarres retractors (\$20 on eBay for four), eyedrops, etc. Be minimally reliant on the ER and staff who don't always know where to find all the “eye stuff.” Make sure to periodically restock necessary items.

6. Identify the tools available.

Every program and hospital makes different instruments available. Know the most efficient routes to the indirect, portable slit lamp and other critical instruments. Also, learn where to find an ultrasound with an appropriate probe for B scans that you can use in the middle of the night.

7. Know the coverage.

This may seem simple, but no one wants to waste time at night determining backup, especially if different attendings cover different hospitals. Save the schedule, and keep it easily accessible.

8. Visit the dollar store.

Pick up a pair of +3.00 and +1.50 glasses. This is especially useful for trauma patients who require lid retraction while simultaneously holding the near card. You'll never have to hear, “I forgot them,” again!



9. Give clear instructions — in writing and without acronyms.

This is very important when meeting people in distress at odd hours of the night! Write down all instructions and contact info so the patient can follow them and follow up accordingly. Use words, not acronyms. Ophthalmology has a library of unique abbreviations and terms the ER physician may not know, so write the assessment and plan in plain English!

10. Copy the note.

Make a copy of the note for dictation and recording procedures as necessary.

Bonus.

Get to bed! It may be a long night.

James G. Chelnis, MD, is a newly appointed assistant professor in oculoplastics at the New York Eye and Ear Infirmary of Mount Sinai and has been on YO Info's editorial board since 2012.



How to Use a Slit Lamp

You can't diagnose or treat a problem if you can't identify it. Here's a quick guide on how to navigate the slit-lamp biomicroscope ahead of time to avoid fumbling in front of an anxious patient.

Basic Approach

First, take a quick second to observe the patient as a whole. Once under the microscope, macropathology such as iris heterochromia, periorbital neoplasms and heterotropias can be surprisingly easy (and embarrassing) to miss. Begin with a lower magnification — and fight the urge to jump to obvious lesions. Then figure out your exam algorithm, beginning with external features and working towards deeper structures. Stick to that order so you don't neglect other important, but more subtle, findings.

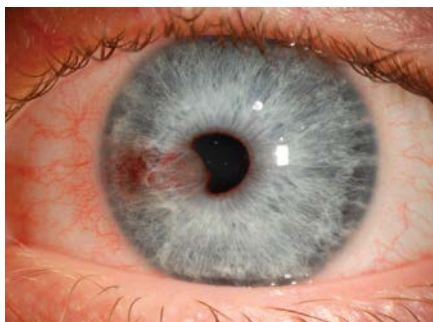
Lighting Techniques

Remember that there is a human on the other end of the scope. Cranking up the light intensity may improve your view, but it's uncomfortable for the patient. If you must do so, give a courtesy heads-up and keep it short. The rule of thumb is to decrease the beam width and/or height as you increase brightness.

Here are a few of the more common and useful lighting techniques that you'll need to employ:

Diffuse illumination 10x magnification

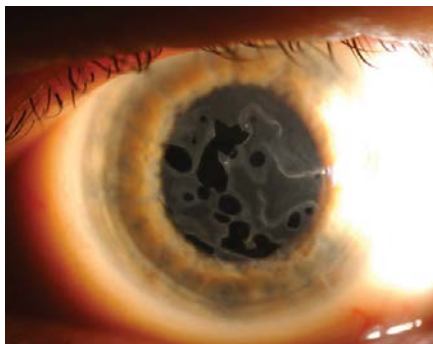
With this technique, an open beam is directed on the eye at 45°. This is useful for conducting an overall survey of the eye, lids, lashes, caruncle, sclera, surface vessels and media opacities.



Vascularized iris cysts viewed with diffuse illumination.¹

Sclerotic scatter 10x magnification

With this technique, a tall, wide beam is directed straight at the limbus. The light is scattered through the cornea to reveal a general pattern of opacities.



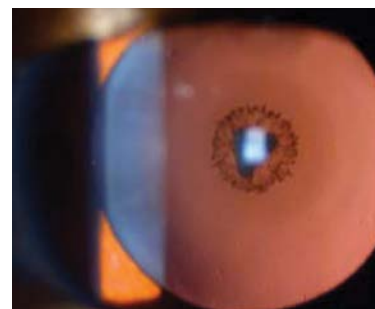
Map-dot-fingerprint dystrophy viewed with sclerotic scatter.²

Retroillumination

10x–16x magnification

Iris retroillumination:

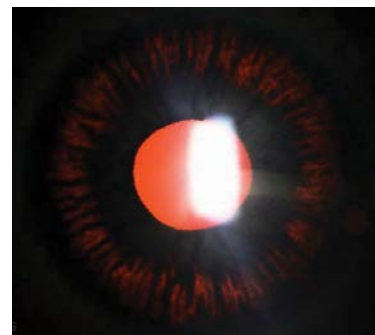
Light is reflected anteriorly off of the deeper iris to study corneal opacities and guttata.



Cataract viewed with retroillumination.³

Red reflex test:

A short light beam is directed through the pupil and reflects off the retina to reveal lens opacities (best with dilated pupil) and iris transillumination (best with undilated pupil).



Radial, midperipheral iris transillumination defects in pigmentary glaucoma.⁴

Optical Section

Van Herick's technique 6x–10x magnification

A narrow slit beam is angled at 60° onto the limbus to estimate the depth of the peripheral anterior chamber. The angle is considered open if the ratio of aqueous to cornea is greater than 1:2 and narrow when this ratio is no greater than 1:4. *Note: This method is not appropriate for plateau iris syndrome.*

Conical beam

16x–20x magnification

Using the pupil as a dark background, a bright conical beam of light is angled 45° to 60° onto the aqueous to assess cells and flare. This technique also works with a small rectangular beam.



Thinning of the cornea in keratoconus viewed by corneal cross-section.⁵

Corneal cross-section 16x–20x magnification

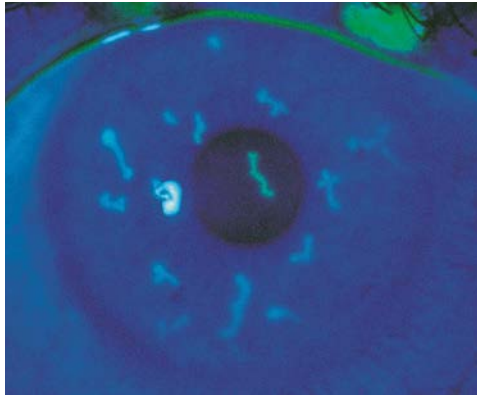
A thin, bright beam is angled at 45° to 60° for a detailed view of the corneal layers. This technique is used to gauge the depth of lesions and any areas of thinning (ulcers and ectasias).

Light Filters

Neutral density: This colorless, gray filter reduces illumination for photosensitive patients.

Cobalt blue:

This filter is utilized with fluorescein for applanation and to assess the tear lake, tear breakup time, contact lens fit and corneal lesions and defects. It's also employed in Seidel testing to evaluate aqueous leakage from penetrating/perforating injuries, surgical wounds or thin filtering blebs.



Fluorescein stain highlighting dendritiform lesions in herpetic keratitis.⁶

Red free: This filter obscures red light to enhance the observation of retinal nerve fiber layer wedge defects. It also helps differentiate pigmented lesions (which appear dark before the filter is applied) from blood vessels and hemorrhages (which appear dark after the filter is applied).

Yellow barrier: This filter enhances contrast when using fluorescein and the cobalt blue filter.

References

- 1 <http://eyeworld.org/article-first-ascrs-ops-symposium>
- 2 <http://webvision.med.utah.edu/2012/04/map-dot-fingerprint-dystrophy/>
- 3 <http://www.molvis.org/molvis/v14/a64/>
- 4 <http://webeye.ophtb.uiowa.edu/eyeforum/cases/184-pigmentary-glaucoma.htm>
- 5 <http://www.kcnz.co.nz/what-is-keratoconus.html>
- 6 <http://www.aao.org/browse-multimedia?filter=image>

Jiaxi Ding, MD, is undergoing glaucoma fellowship training at the University of Iowa. She joined the YO Info editorial board in 2016.



Beginner's Guide to Corneal Ulcers

Yet another corneal ulcer walks in while you're on call. What now? Follow these 10 simple tips to deal with this very common diagnosis.

1. Culture the corneal ulcer.

The only exception to this might be if you rupture a descemetocoele. Oftentimes it is unnecessary to culture small (<2 mm) peripheral infiltrates if there are no suspicious features. All other corneal infiltrates should be scraped for diagnostic purposes (Figure 1).

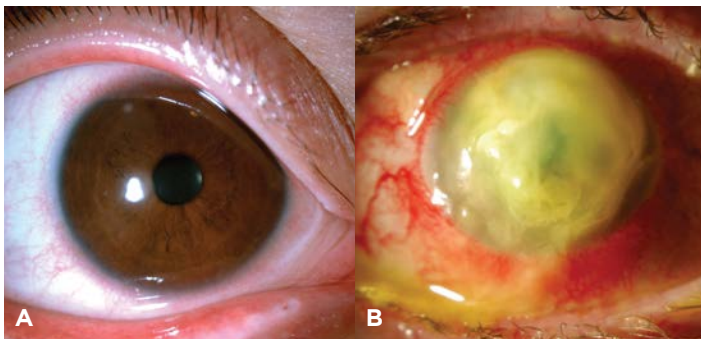


Figure 1. A small peripheral infiltrate (A) does not require culture, but any corneal ulcer that is large or central (B) or presents with suspicious features should be cultured.

2. Choose the right scraping tool.

There are many choices: for example, a 67 blade, Kimura spatula or calcium alginate swab (Figure 2). If nothing else is available, you can always use a sterile cotton swab.

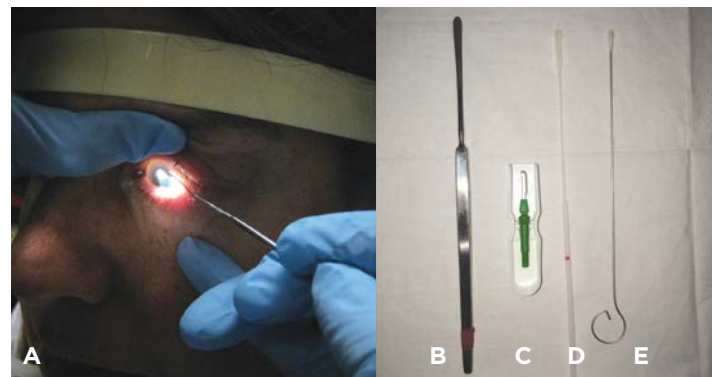


Figure 2. Corneal scraping (A) can be performed with a Kimura spatula (B), blade (C), culturette swab (D) or calcium alginate swab (E).

3. Don't exclude non-bacterial causes.

Look out for suspicious features such as feathery edges, satellite lesions or endothelial plaque that may suggest fungus or yeast. A ring ulcer easily brings to mind *Acanthamoeba* keratitis, but the early presentation may simply be epitheliopathy with pain that's out of proportion to the exam. Herpetic keratitis can present in many ways, but be especially wary if you see prior scars in multiple stromal planes, neovascularization, focal edema with keratic precipitates or branching dendritic staining.

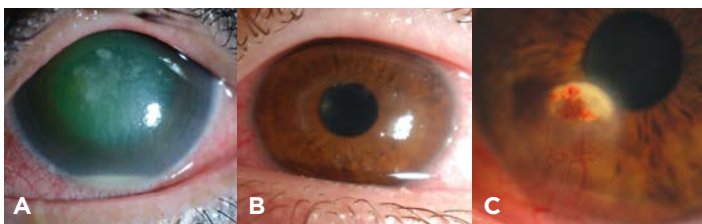


Figure 3. Beware of atypical or suspicious features suggestive of fungal keratitis (A), *Acanthamoeba keratitis* (B) or herpetic keratitis (C).

4. Become friends with the microbiology department at your institution.

Most commonly, you will have blood, chocolate and Sabaroud agar, thioglycolate broth and viral transport media available to you (Figure 4). Make sure these are not expired or already growing colonies. In some institutions, you can submit a specimen and the plating is done in the lab. If you suspect something exotic, like mycobacteria, be aware of what culture media (e.g., Lowenstein-Jensen) is needed. (Although the media probably won't be readily available in the clinic, you can go ahead and send the lab a swab in sterile saline.) Don't forget to swab onto glass slides for Gram, KOH, PAS and Giemsa stains. If you are lucky, something

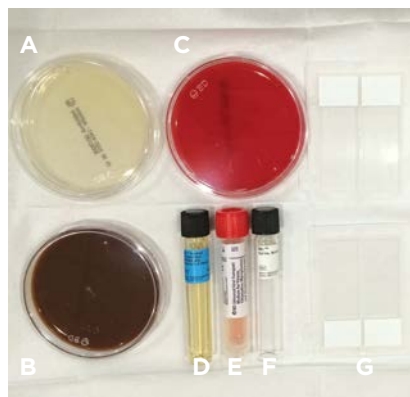


Figure 4. Corneal scraping should be prepared on the appropriate culture media: Sabaroud agar (A) for fungal culture; chocolate agar (B) for aerobes; blood agar (C) and thioglycolate broth (D) for aerobes and anaerobes; viral transport media (E) for viral and Chlamydia culture and sterile saline (F) to transport specimens that require plating in the lab with otherwise unavailable media. Glass slides (G) should be used to create smears for microbial stains.

seen on the stains will give you a clue about the diagnosis before the culture results are returned.

5. Don't wait for positive cultures to begin therapy.

The cultures could take days to come back. Alternatively, they may finalize with no growth despite a clinical diagnosis consistent with infectious keratitis. Frequent application of topical fourth-generation fluoroquinolone is a common first-line therapy because it is readily available and covers most commonly encountered bacteria.

6. Be familiar with your compounding pharmacy.

For severe ulcers that obscure the visual axis and are accompanied by stromal necrosis or hypopyon (Figure 5), consider use of fortified antibiotics. Remind the patient to refrigerate the drops. Some institutions have an in-house pharmacy to supply these; others will have you mix them yourself after hours.

7. Adjust to prior treatment, if needed.

If the patient is already being treated with antibiotics or was never cultured previously, the yield of a corneal culture may be low. Nonetheless, you should still make an attempt. In addition, be sure to question the patient about whether he or she still has the contact lens from when the infection began. If so, you can culture the lens, fluid and/or case.

8. Use a positive culture appropriately.

Heavy growth is unusual for eye cultures, but does a lone colony represent true infection or simply a contaminant? Always request speciation and sensitivities, as this will help you hone and adjust the antimicrobial regimen.

9. Use confocal microscopy or biopsy when needed.

In these situations, consider confocal microscopy to look for *Acanthamoeba* cysts (Figure 6). You could also perform a partial-thickness corneal biopsy, which accesses deeper stromal tissue than a scraping.

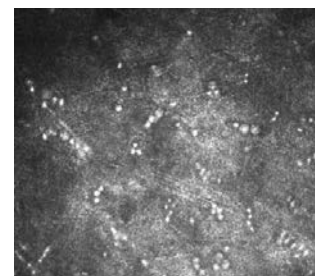


Figure 6. *Acanthamoeba* cysts can be seen on in vivo confocal microscopy.

10. Treat perforated ulcers carefully.

In such cases, consider the globe ruptured. If the perforation is less than 2 mm, use cyanoacrylate glue to seal the perforation. For perforations that are greater than 2 mm or have uveal or lens prolapse, surgical intervention is necessary.

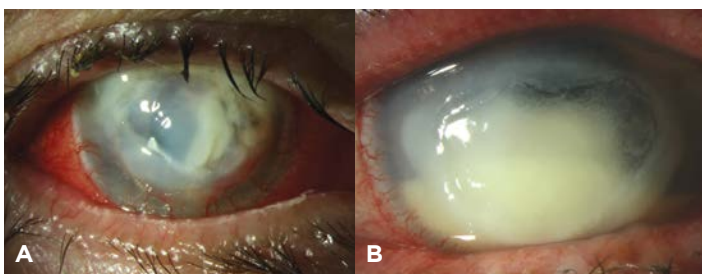


Figure 5. Fortified antibiotics should be employed for severe cases of infectious keratitis, such as infiltrates resulting in stromal necrosis (A) and hypopyon (B) along the visual axis.

Olivia L. Lee, MD, is a specialist in uveitis and cornea/external disease at the Doheny Eye Institute and assistant professor of ophthalmology at UCLA. She joined the YO Info editorial board in 2015.



Ophthalmic Drops 101

I started ophthalmology residency confident that I was at the top of my game. So when my upper level told me to go “start the drops” on a new patient, I was humbled by my ignorance of the rainbow of little bottles. Why hadn’t this been covered in pharmacology?

This is an introduction to the most common drops you’ll encounter in the first few months of residency. It

also includes indications as well as cautions. This is not a comprehensive list, nor should these descriptions be a substitute for medical advice or training. Eyedrops have multiple indications and side effects beyond what is listed here.

In the charts below, the brand name is listed in parentheses if it has not yet become generic.

Anesthetic Drops





Drug	Lid Color	Duration	Indications	Cautions
Proparacaine (Alcaine)	White	10-30 min	Topical anesthesia	Long-term use causes corneal ulcers
Tetracaine (Pontocaine)			Breaks down corneal epithelium Speeds absorption of subsequent drops	Check corneal sensation before use in setting of ulcers
Benoxinate + Fluorescein (Fluress)	N/A, dropper	10-20 min	Applanation tonometry Stains defects on corneal/conjunctival surface Topical anesthesia	Not for Seidel tests (use fluorescein paper strips) Patients may see yellow when they blow their nose

Dilation Drops

Drug	Lid Color	Duration	Indications	Cautions
Phenylephrine 2.5%, 10% (Neosynephrine)	Red	3 hours	Use with tropicamide for adult dilation	Avoid 10% in hypertensive crisis, pediatrics and the elderly
Tropicamide 1% (Mydracil)	Red	4-6 hours	Use with phenylephrine for adult dilation	
Cyclopentolate 1%, 2% (Cyclogyl)	Red	24 hours	Cycloplegic refractions	
Homatropine 2%	Red	1-2 days	No longer manufactured	
Atropine 1%	Red	7-10 days	Breaks posterior synechiae Decreases ache from ocular inflammation Fogging for amblyopia treatment	Avoid in angle-closure glaucoma





Glaucoma Drops

Drug	Lid Color	Duration	Indications	Cautions
Timolol 0.5% (Timoptic)	Yellow	BID	Beta blocker	Avoid in patients with asthma, COPD, CHF and bradycardia
Brimonidine 0.1%, 0.15%, 0.2% (Alphagan P)	Purple	BID-TID	Alpha agonist	Avoid in patients under 3 years of age Avoid in nursing women (only class B med)

Drug	Lid Color	Duration	Indications	Cautions
Dorzolamide (Trusopt)	Orange 	TID	Carbonic anhydrase inhibitor	Avoid in sulfa allergy Avoid in sickle cell patients with hyphema (can induce sickling in anterior chamber) Patients may complain of bitter or metallic taste
Bimatoprost 0.01%, 0.03% (Lumigan) Travoprost 0.004% (Travatan Z) Latanoprost 0.005% (Xalatan)	Teal green 	Qhs	Prostaglandin agonist	May reactivate herpes simplex virus keratitis Darkens hazel irides Conjunctival hyperemia is common Avoid in uveitic glaucoma and pregnancy
Dorzolamide/Timolol 0.5% (Cosopt)	White with dark-blue stripe 	BID	Carbonic anhydrase inhibitor + beta blocker	
Brimonidine 0.2%/ Timolol 0.5% (Combigan)	Dark blue 	BID	Alpha agonist + beta blocker	
Acetazolamide 250-mg tabs, 500-mg sequel (caps), slow release (Diamox)	N/A	BID	Carbonic anhydrase inhibitor	Avoid in sulfa allergy Avoid in sickle cell patients with hyphema (can induce sickling in anterior chamber) Avoid in patients with a history of kidney stones Beware with potassium-losing diuretics or digitalis Common side effects include peripheral limb tingling/weakness, bad taste with carbonated beverages and diarrhea
Methazolamide 25-mg tabs (Neptazane)	N/A	BID-TID	Carbonic anhydrase inhibitor	Same as above, but less severe

Steroid Drops

(In order from strongest to weakest)

Drug	Lid Color	Indications	Cautions
Difluprednate 0.05% (Durezol)	Pink 	Postoperative inflammation Iritis	Causes highest incidence of elevated IOP and cataracts compared with steroid drops below
Prednisolone acetate 1% (PredForte)	Pink/white 	Postoperative inflammation Iritis	Can cause elevated IOP and cataracts
Fluorometholone 0.1% (FML) Loteprednol 0.5% (Lotemax gel)	Pink/white 	Ocular surface inflammation/dry eye Postoperative inflammation	Can cause elevated IOP and cataracts, but to a much lesser extent than the two above
Loteprednol 0.2% (Alrex)	Pink/white 	Seasonal allergies	

(Continued on page 16)

Top 10 Eye Emergencies

Compiled by Purnima S. Patel, MD, James Chelnis, MD, and Edward Hu, MD, PhD

From ischemic optic neuropathy to orbital cellulitis — familiarize yourself with these eye emergencies.

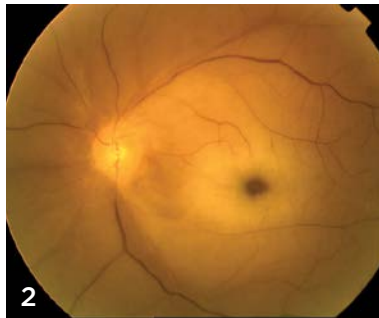
1. Ischemic optic neuropathy: rule out giant-cell arteritis (GCA)

Fundus photo showing a pale, swollen disc with a flame-shaped hemorrhage due to arteritic anterior ischemic optic neuropathy



2. Central retina artery occlusion: rule out GCA and causes of emboli/thrombus

Fundus photo showing diffuse retinal whitening and a foveal cherry-red spot



3. Mac-on rhegmatogenous retinal detachment

Fundus photo showing a superior mac-on retinal detachment



4. Acute third nerve palsy: rule out intracranial aneurysm

Photos of extraocular motility showing complete ptosis, the right eye down and out, inability to adduct, infraduct and supraduct the eye and a dilated pupil



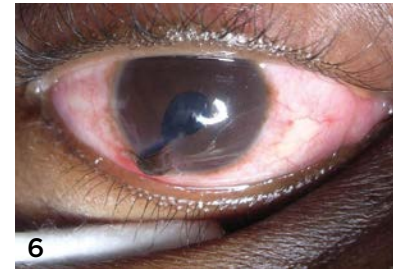
5. Corneal microbial keratitis: culture and treat with empiric antibiotics and follow closely

Slit-lamp photo showing conjunctival injection and focal white infiltrates with hypopyon



6. Open globe: rule out intraocular foreign body

Slit-lamp photo showing a peaked pupil pointing toward an inferotemporal, perilimbal corneal perforation with iris prolapse



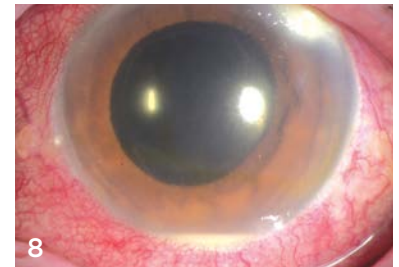
7. Acute angle-closure glaucoma

Slit-lamp photo showing conjunctival injection, corneal haze with microcystic edema, a fixed, mid-dilated pupil and a shallow anterior chamber



8. Endophthalmitis

Slit-lamp photo showing conjunctival injection, mild corneal edema and haze and anterior chamber hypopyon



9. Alkali injury: requires urgent and copious irrigation

Slit-lamp photo showing perilimbal conjunctival blanching, conjunctival injection and diffuse corneal haze



10. Orbital cellulitis

External photo (top) showing lid swelling and erythema with proptosis, and CT scan (bottom) showing signs of orbital inflammation — other signs, such as pain with eye movement, ophthalmoplegia, optic nerve involvement, fever and leukocytosis, confirm the diagnosis



How to Classify the Diabetic Eye

Managing diabetic retinopathy (DR) is all about the labeling. If you learn the basic classification system early, it makes this multifaceted disease easier to manage — and helps your diabetic patients preserve their vision.

The landmark Early Treatment for Diabetic Retinopathy Study (ETDRS) in the 1980s established a series of disease stages that have structured subsequent studies. Learning these stages will inform every diabetic patient encounter that you'll have.

It's initially helpful to consider diabetic macular edema (DME) and DR as distinct, parallel disease processes. Both result from microvascular damage, but you treat them differently.

Diabetic Macular Edema

DME commonly involves microaneurysms, exudate and cystic intraretinal fluid. Based on its distribution in the macula, you can describe DME as focal or diffuse. As defined by the ETDRS, clinically significant macular edema involves either:

1. Retinal thickening within 500 microns of the foveal center;
2. Exudates within 500 microns of the foveal center and with adjacent retinal thickening or
3. Retinal thickening at least one disc diameter in size and within one disc diameter of the foveal center.

You usually treat visually significant DME with intravitreal pharmacotherapy or macular laser and monitor the patient every three to four months.

Diabetic Retinopathy

DR is classified two ways, depending on symptoms. If the patient has dot-blot hemorrhages, cotton-wool spots, venous beading or intraretinal microvascular anomalies (IRMAs) in the absence of neovascularization, classify the DR as nonproliferative. Define the severity based on the symptoms:

- A few microaneurysms: The eye has mild nonproliferative diabetic retinopathy (NPDR).
- Findings like cotton-wool spots and dot hemorrhages (i.e., beyond microaneurysms): moderate NPDR.
- An eye with four quadrants with intraretinal hemorrhaging, two with venous beading or one with IRMAs: severe NPDR.

You can usually follow NPDR every three to six months, based on severity. Occasionally you may treat severe NPDR with a panretinal photocoagulation laser.

Proliferative diabetic retinopathy (PDR) is defined by the presence of neovascularization of the disc (NVD) or elsewhere (NVE) or vitreous hemorrhage. Although you use further criteria to identify a subcategory called high-risk PDR, you should initially deem any eye with PDR at high risk of progressing to a vision-threatening event like a tractional retinal detachment or dense vitreous hemorrhage.

PDR is classically treated with panretinal photocoagulation. With tractional detachments and persistent vitreous hemorrhage, you may need to perform vitrectomy. For all diabetic eyes, and especially those with PDR, remember to look for neovascularization of the iris (rubeosis iridiae) and the angle. If the IOP is elevated as a consequence, the eye also has neovascular glaucoma.

Beyond the Retina

Diabetic eye disease often extends beyond the retina:

- Diabetic papillitis is comparable to a nonarteritic anterior ischemic optic neuropathy and usually involves unilateral optic disc edema in the setting of DR.
- Diabetes is also associated with dry eye disease, neurotrophic keratopathy, posterior subcapsular cataract and strabismus from microvascular ischemic cranial nerve palsies.

As you can see, a thorough diabetic evaluation touches on multiple aspects of the standard eye exam. Don't rush to the retina and forget to look for motility deficits, anterior segment changes and optic nerve edema. Know how to stage DR precisely and it will guide your management and follow-up. The classification system is onerous at first, but learn it early and you'll find that the disease becomes a lot simpler to handle.

D. Wilkin Parke III, MD, is a vitreoretinal specialist with Vitreo Retinal Surgery, PA in Minneapolis and has been a member of YO Info's editorial board since 2015.



Mild NPDR with microaneurysms and exudate



Severe NPDR with cotton-wool spots, intraretinal hemorrhage and IRMAs



PDR with NVE and vitreous hemorrhage

Residents' Timeline

2016

Academic year begins

New PGY-4 residents entering their final residency year (and who are not applying for an American Society of Ophthalmic Plastic and Reconstructive Surgery [ASOPRS] oculoplastics fellowship) should submit **fellowship applications** to SF Match

New PGY-2 residents should begin exploring **research projects** for residency research day, meeting submission, etc.

Jul

Aug

For PGY-4s, registration deadline for ABO (American Board of Ophthalmology) written exam — registration information is frequently disseminated through the residency program or via www.abop.org

Sep

Fellowship interviews

Prospective residency interviews

Oct

AAO 2016 — the largest single meeting on the ophthalmology calendar (Subspecialty Day occurs immediately beforehand and requires specific registration)

Fellowship interviews

Prospective residency interviews

Oculoplastics fellowship application (**ASOPRS**) opens for PGY-3 residents

Nov

Fellowship interviews

Prospective residency interviews

Dec

Association for Research in Vision and Ophthalmology (**ARVO**) **poster/paper submissions deadline** (this generally requires study design information, but results don't need to be finalized at this point)

2017

Jan

Start OKAP studying ASOPRS fellowship interviews

Residency match

SF Match fellowship rank lists due

SF Match fellowship results released (about one week later)

Prospective residency interviews

Feb

OKAPs season heats up

ASOPRS fellowship interviews

Mar

OKAP exam

ASOPRS fellowship interviews

Apr

ASOPRS rank lists due

ASOPRS match

Academy's Mid-Year Forum

May

PGY-3 residents (soon to be PGY-4) **begin preparation for SF Match fellowship applications** (personal statement, CV preparation, identifying letters of support, etc.)

ARVO's annual meeting

Jun

Local residency research day presentations/ recognition of graduating residents

PGY-3 residents continue preparation for the fellowship match (except for the ASOPRS oculoplastics fellowship)



Brian Chan-Kai, MD

The 8-Point Eye Exam

The key to any examination is to be systematic and always perform each element.

1. Visual acuity

- In the clinic, visual acuity is typically measured at distance. Otherwise, in a consult setting outside of the clinic, it's measured at near. Don't forget to have a near card with you.
- Make sure the patient is wearing his or her correction. Always have a pair of +3.00 readers with you, as many people in the emergency room won't have their glasses with them. A pinhole occluder will also reduce the impact of uncorrected refractive error.
- If the patient is unable to see the biggest optotype on the card, the progression (from better to worse) is counting fingers (CF), hand motions (HM), light perception (LP) with projection, LP without projection and no light perception (NLP).
- For children who are too young to use Allen pictures, employ the "central, steady, maintain (CSM)" approach. *Central*: Is the corneal light reflex in the center of the pupil? *Steady*: Can the patient continue fixating when the light is slowly moved around? *Maintain*: Can the patient maintain fixation with the viewing eye when the previously covered eye is uncovered?

2. Pupils

- Look for anisocoria. If present, carefully check the pupil size in both well-lit and dark conditions.
- Check the reactivity of each pupil with a penlight or Finoff transilluminator.
- Use the swinging flashlight test to look for a relative afferent pupillary defect.

Cartoon:

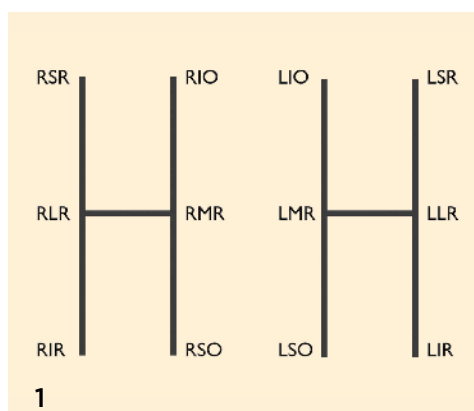
<https://www.youtube.com/watch?v=HSYo7LhfV3A>

Patient:

<https://www.youtube.com/watch?v=A6My6rI0p-A>

3. Extraocular motility and alignment

- Have the patient look in the six cardinal positions of gaze. Test with both eyes open to assess versions — repeat monocularly to test ductions. Figure 1 shows which



muscle is tested in each position.

- Use the cover/uncover test to assess for heterotropias.
- Use the alternate cover test to assess for the total amount of deviation. This amount minus any heterotropia is the amount of heterophoria.

4. Intraocular pressure

- Goldmann applanation tonometry is the gold standard and should be used in the clinic whenever possible.
- Outside of the clinic, Tono-Pen tonometry is much more practical.
- If you suspect a ruptured globe, skip this part of the exam.

5. Confrontation visual fields

- Assess each quadrant monocularly by having the patient count the number of fingers that you hold up. If acuity is particularly poor, have the patient note the presence of a light.
- Use the colored lid of an eyedrop bottle to define the position of a scotoma more accurately.

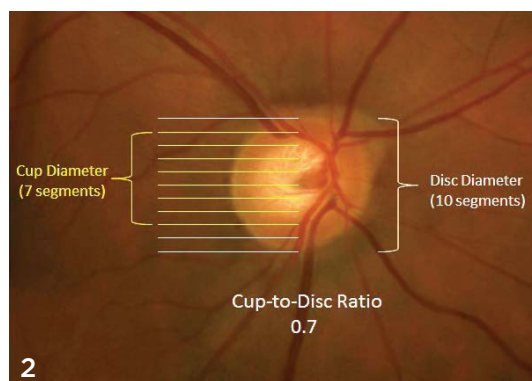
6. External examination

- Look for any ptosis by measuring the margin-to-reflex distance, which is the distance from the corneal light reflex to the margin of the upper lid.
- Look for lagophthalmos.
- Note any unusual growths or lesions that may require a biopsy.
- Palpate lymph nodes and the temporal artery if indicated by the history or exam.
- Measure proptosis or enophthalmos with an exophthalmometer.
- Perform a full cranial nerve exam for patients with diplopia or other neurologic symptoms.

7. Slit-lamp examination

- **Lids/lashes/lacrimal system**: Normal anatomy and contours? Any lesions?
- **Conjunctiva/sclera**: White and quiet? Injection? Lesions?
- **Cornea**: Clear? Epithelial disruptions? Stromal opacities? Endothelial lesions?
- **Anterior chamber**: Deep? Cell or flare?
- **Iris**: Round pupil? Transillumination defects? Nodules?
- **Lens**: Clear? Nuclear, cortical or subcapsular cataract?
- **Anterior vitreous**: Inflammation? Hemorrhage? Pigmented cells?

The 8-Point Eye Exam



8. Fundoscopic examination

- **Optic nerve:** Cup-to-disc ratio (see Figure 2)? Focal thinning? Pallor? Symmetric?
- **Macula:** Foveal light reflex? Drusen, edema or exudates?
- **Vessels:** Contour and size? Intra-retinal hemorrhage?
- **Periphery:** Tears or holes? Lesions? Pigmentary changes?

Jason D. Rupp, MD,

PhD, is a PGY-4 resident at Washington University/Barnes Jewish Hospital in St. Louis. He will be staying to complete a glaucoma and complex anterior segment surgery fellowship during the 2016–2017 academic year.



Ophthalmic Drops 101 *(Continued from page 11)*

Antibiotic Drops

Drug	Lid Color	Indications	Cautions
Moxifloxacin (Vigamox)	Tan	Fourth-generation fluoroquinolone	
Gatifloxacin (Zymaxid)		Postoperative Corneal ulcers	
Ofloxacin (Ocuflox)	Tan	Third-generation fluoroquinolone Postoperative	
Erythromycin (Emycin)	N/A, ointment/tube	Macrolide Bacterial conjunctivitis Sterile corneal defects to prevent infection Prevents ophthalmia neonatorum	
Bacitracin ointment (Bacitracin)	N/A, ointment/tube	Cationic polypeptide Methicillin-resistant <i>Staphylococcus aureus</i>	
Tobramycin/Dexamethasone ointment (Tobradex)	N/A, ointment/tube	Aminoglycoside Gram negatives (<i>Pseudomonas</i>)	
Neomycin/Polymyxin/Dexamethasone ointment (Maxitrol)	N/A, ointment/tube	Aminoglycoside + cationic polypeptide + strongest topical steroid Postoperative Common gram positives	Neomycin is the most common cause of contact dermatitis



Natasha Herz, MD



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aao.org/yo

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yo@aao.org

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