

Gonioscopy: Essential to Patient Care

Wallace L. M. Alward, MD, is dedicated to teaching residents and clinicians the skills they need to examine the iridocorneal angle.

BY JULIA T. LEWANDOWSKI, SENIOR ASSOCIATE EDITOR

Gonioscopy is one of the oldest—and most underutilized—methods of evaluating the angle of the eye. A retrospective review of Medicare beneficiaries in the United States who underwent glaucoma surgery in 1999 showed that only 49% of them had undergone a gonioscopic examination in accordance with the AAO's *Preferred Practice Patterns* during the 4 to 5 years preceding their operations.¹ Clinicians have instead begun relying on alternative methods such as ultrasound biomicroscopy (UBM) and anterior-segment optical coherence tomography (AS-OCT) when assessing the angle's status in glaucomatous eyes. These high-tech approaches, however, can be costly and only provide a fraction of the information

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that can be obtained during a slit-lamp examination with a goniolens.

Wallace L. M. Alward, MD, has long been a proponent of the lost art of gonioscopy. Dr. Alward is the Frederick C. Blodi Chair in Ophthalmology, Director of the Glaucoma Service, Department of Ophthalmology and Visual Sciences, University of Iowa Carver College of Medicine in Iowa City. In this article, he explains why every eye care specialist should know how to perform gonioscopy and shares tips for honing one's skills.

WHY PERFORM GONIOSCOPY?

According to Dr. Alward, ophthalmologists should perform gonioscopy on anyone who has glaucoma or is suspected of having the disease. "This examination tells us whether the patient has primary (open- or angle-closure) or secondary (pigmentary, pseudoexfoliation, or traumatic) glaucoma," he said in an interview with *Glaucoma Today*. "We need this information to determine how to manage the patient and decide what steps we should take to lower his IOP."

Unfortunately, Dr. Alward said, ophthalmologists often do not have the skills required to perform

(All images courtesy of Wallace L. M. Alward, MD.)

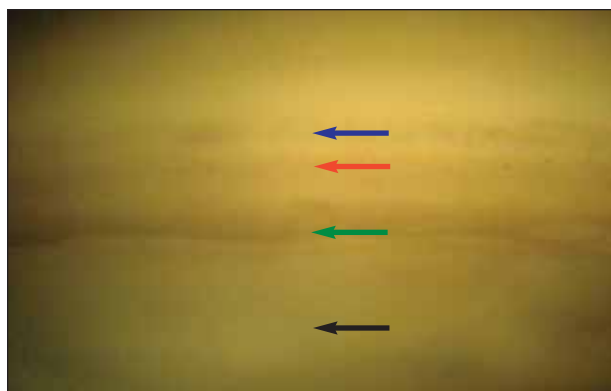


Figure 1. The iridocorneal structures visualized during gonioscopy of a normal eye include the iris (black arrow); the face of the ciliary body (green arrow); the trabecular meshwork (red arrow); and Sampaolesi's line at Schwalbe's line (blue). Although this eye has a Sampaolesi's line, this feature is not found in every pigmented angle.

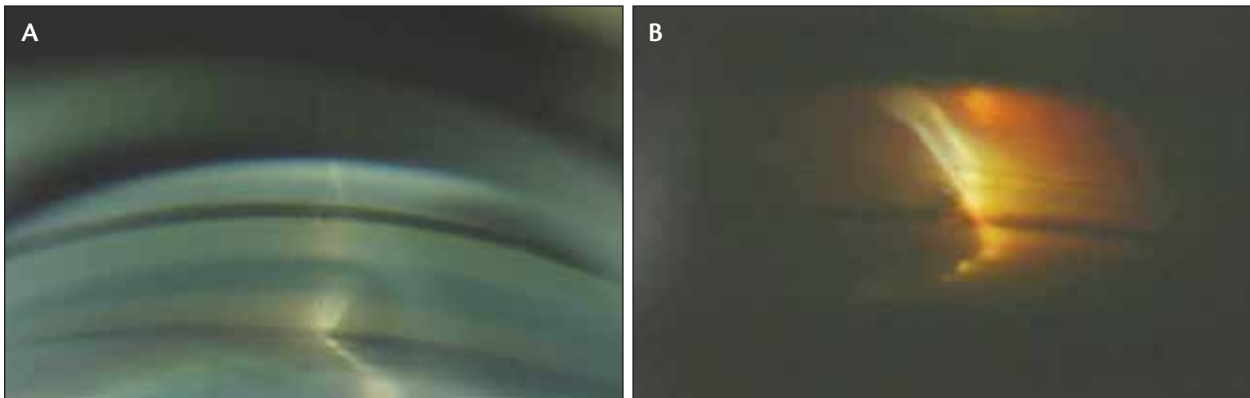


Figure 2. The corneal wedge technique, shown here in eyes with a narrow angle (A) and pigmentary dispersion syndrome (B), is useful for identifying the trabecular meshwork in difficult angles. In a normal eye, the distinct, sharp, internal image should join the more diffuse external image at Schwalbe's line.

gonioscopy. "The procedure is not difficult, but inexperienced physicians may find it challenging at first," he said. "UBM and AS-OCT are appealing alternatives, because these tests do not require special skills and can be delegated to technicians. I am concerned that glaucoma specialists will become so dependent on these imaging modalities that they will forget how to do gonioscopy and overlook vital diagnostic information."

Other physicians tend to avoid gonioscopy, noted Dr. Alward, not because they lack the skills but because they are out of practice. Whatever the reason, he stated, "ophthalmologists who do not include gonioscopy in a comprehensive glaucoma workup are not taking care of their patients appropriately."

HELP ON THE WEB

Dr. Alward has taken his crusade to raise physicians' awareness of the need for gonioscopy to the Internet by establishing <http://gonioscopy.org>. This Web site, which

is hosted and supported by the University of Iowa, is dedicated to teaching gonioscopy through videography. Visitors can access high-resolution videos that provide step-by-step instructions for using three- and four-mirror goniolenses, strategies for examining difficult eyes, and examples of diagnoses. Most of the videos are narrated by Dr. Alward, who clearly describes the anatomy of the iridocorneal angle and its pertinent landmarks.

Dr. Alward encourages residents who are new to gonioscopy to practice their technique on patients until they are comfortable with the procedure. Once doctors learn how to handle the goniolens, they can easily visualize the trabecular meshwork and other vital structures in the angle without distressing the patient (Figure 1).

CORRECTING COMMON MISTAKES

Physicians only require two instruments to perform gonioscopy: a goniolens and a slit lamp.

Dr. Alward usually employs a four-mirror goniolens,

PEARLS FOR GONIOSCOPY

- Patients should always undergo gonioscopy during their initial evaluation. Established patients should be examined annually if they have narrow angles that do not require immediate treatment and every 3 to 4 years if they have primary open-angle glaucoma.
- Perform gonioscopy after testing patients' visual acuity and IOP and before sending them for perimetry and a dilated examination.
- Always examine eyes in a dark room.
- Ultrasound biomicroscopy and anterior-segment optical coherence tomography are useful adjunctive examinations for determining the presence of plateau iris syndrome or if you cannot adequately visualize the structures in the iridocorneal angle with indentation gonioscopy.



Figure 3. Examples of indentation gonioscopy show angle closure secondary to apposition (A) and synechiae (B and C).

because it does not require the use of a coupling solution, unlike the three-mirror lens. "It may take some time to master the four-mirror lens, but physicians who become skilled with this tool will find they can examine patients quickly without interrupting their normal clinical routine."

In the "Basic Examination Techniques" section of his Web site, Dr. Alward presents tips for avoiding common mistakes while performing gonioscopy. "People who are not comfortable with this examination tend to push the lens against the eye too hard, which indents the eye and artificially opens the angle," he said. "I know I am using the right amount of pressure when air appears intermittently between the lens and the cornea."

Newcomers to gonioscopy often shine too much light into the eye during the examination, Dr. Alward added. "I make the [slit] beam very short so it does not go into the pupil," he said. "If the pupil constricts, it can open the angle. I also limit the amount of light entering the eye by performing gonioscopy in a dark room."

GONIOSCOPY AT THE AAO

The AAO is offering a skills transfer course on the "Top 10 Essentials of Gonioscopy: Stereoscopic Viewing and Interpretation" during its 2008 annual meeting in Atlanta. Using three-dimensional projections of stereoscopic gonioscopic and slitlamp images, course director Alan M. Zalta, MD, will illustrate the anatomy of the iridocorneal angle, demonstrate examination techniques with three- and four-mirror gonioprisms, and show attendees how to identify pathological variations in the anterior chamber.

For more information about this program, visit <http://www.aao.org/>.

EXAMINING CHALLENGING ANGLES

On his Web site, Dr. Alward states, "The iridocorneal angle is [sometimes] quite confusing, even for a seasoned examiner." In the section "Techniques for Difficult Angles," Dr. Alward describes strategies for identifying landmarks in eyes with lightly pigmented trabecular meshworks (corneal wedge; Figure 2) and narrow angles (indentation gonioscopy).

During indentation gonioscopy, the examiner depresses the cornea with the goniolens. This action pushes the iris away from the trabecular meshwork and helps the examiner determine if the structures are apposed or held together by synechial adhesions (Figure 3).

Another useful section of Dr. Alward's Web site includes videos of common diagnoses that can be detected with gonioscopy. Examples include plateau iris syndrome, iridocorneal endothelial syndrome, neovascular glaucoma, and tumors of the angle. "Physicians who do not perform gonioscopy may miss these conditions," said Dr. Alward. "Patients may achieve satisfactory outcomes if these pathologies are detected and treated early. If conditions like angle closure are overlooked, patients may find themselves in the OR undergoing emergency surgery."

CONCLUSION

Dr. Alward believes that all eye care specialists, including optometrists and general ophthalmologists, should know how to perform gonioscopy. "There is no downside to this examination," he said. "In the hands of a skilled practitioner, a goniolens is a valuable tool for visualizing the structures in the iridocorneal angle." □

Dr. Alward's video atlas of gonioscopy is available at <http://www.gonioscopy.org>.

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1. Coleman AL, Yu F, Evans SJ. Use of gonioscopy in Medicare beneficiaries before glaucoma surgery. *J Glaucoma*. 2006;15:486-493.