



Competent Gonioscopy in the Age of Advanced Imaging

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Gonioscopy is one of the most frequently neglected or poorly performed examinations in routine ophthalmology practice.¹ However, the equipment for gonioscopy is available in all ophthalmology clinics, the examination can usually be completed within a few minutes, and the information obtained may directly alter diagnosis and management.

The problem is not merely whether gonioscopy is performed. What matters is whether it is performed competently and interpreted correctly. Placing a goniolens on the cornea and assigning a single-digit number to the angle does not necessarily produce useful information.

The consequences of an incorrect angle assessment are not theoretical. A patient at risk of acute angle closure may lose vision because a necessary laser peripheral iridotomy (PI) was not performed.² Another patient with advanced chronic angle-closure glaucoma may undergo an unnecessary PI when the real problem is extensive synechial closure and established glaucomatous damage. A patient with plateau iris configuration may be treated as though relative pupillary block is the only mechanism. An eye with lens-related angle closure, aqueous misdirection, angle

neovascularization, trauma, or abnormal pigmentation may be placed under an imprecise label such as “narrow angle” or “open angle.”

The gonioscopic appearance of the normal anterior chamber angle varies with age, race, refractive status, iris configuration, lens position, and pigmentation.^{3,4} These normal variations in the angle must be understood before abnormality can be recognized. The examiner must understand which angle elements are being observed, where the iris inserts, what the configuration of the peripheral iris is, how wide the angular approach is, how much pigment is present, and whether the angle changes during indentation.

The Shaffer system has historical value and remains familiar to generations of ophthalmologists, but it must be recognized that no single figure can adequately describe the complex three-dimensional structure of the angle. A Shaffer grade 4 angle, for example, may be entirely healthy, but it may also contain 4+ pigment, exfoliative material, abnormal vessels, blood, silicone oil, or evidence of trauma. Similarly, a Shaffer grade 1 angle may represent uncomplicated age-related narrowing, relative pupillary block, plateau iris configuration, lens-induced narrowing, aqueous misdirection, or chronic synechial closure.

Calling an angle “narrow” is often no more informative than describing a patient as “unwell.” The description may be true, but it does not explain the cause, severity, or mechanism of narrowing, or the action required. Clinically useful documentation should define the features, including the level of iris insertion, the configuration of the iris, the most posterior visible angle element, and the amount and distribution of pigmentation. Other findings such as peripheral anterior synechiae, neovascularization, angle recession, foreign material, or abnormal vessels should also be recorded.^{5,6} Gonioscopy helps physicians determine whether the angle is capable of closing, whether there is closure at the time of examination, and whether previous

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iridotrabecular contact has produced any adhesions. It can clarify whether the mechanism is primarily pupillary block, plateau iris, lens-related crowding, or another process. These findings influence whether the patient should be observed, undergo PI, lens extraction, or another glaucoma procedure, or be managed differently.

Anterior segment optical coherence tomography (AS-OCT) has provided clinicians with certain tools to quantify, document, and analyze anterior segment structures. However, AS-OCT does not provide the same direct, dynamic, and circumferential assessment of the angle.⁷ It cannot reproduce the information obtained through indentation, nor can it reliably demonstrate all clinically relevant findings mentioned above involving pigmentation, fine vessels, subtle synechiae, angle recession, or foreign material. It commonly samples selected meridians, whereas gonioscopy permits examination of the entire angle circumferentially. Additionally, imaging systems such as AS-OCT are associated with substantial costs.

The description of imaging as “objective” and gonioscopy as “subjective” has also created confusion. Objective is not interchangeable with accurate, relevant, or clinically sufficient. A highly reproducible measurement can still be inaccurate or irrelevant to the clinical decision at hand. Every image in ophthalmology requires acquisition, selection, interpretation, and clinical judgment. Gonioscopy depends on examiner skill, but so does every other examination method, including slit-lamp biomicroscopy, optic disc evaluation, and visual field interpretation. The correct response to a skill-dependent examination is to teach it properly and practice it until it becomes reliable, not to abandon it.

Competent gonioscopy is also essential in the era of microinvasive glaucoma surgery (MIGS). MIGS procedures depend on accurate identification of the angle structures. The surgeon must understand the individual anatomy preoperatively, identify the target tissue, and maintain a clear gonioscopic view intraoperatively. A surgeon who is not comfortable with diagnostic gonioscopy is unlikely to become consistently competent in operative gonioscopy. MIGS has made mastery of the examination even more necessary.

Why, then, is gonioscopy underused? The most common reason is that it is often taught as a technical ritual rather than as a method of clinical reasoning. Trainees may learn how to place the goniolens on the eye but not how to identify angle structures, control illumination, avoid corneal folds, and perform dynamic gonioscopy.⁸ They may be asked to record only a single-digit Shaffer grade. When such an examination fails to guide management, the clinician may conclude that gonioscopy itself has little value. The

conclusion should not be that gonioscopy is useless. Poorly performed and poorly interpreted gonioscopy is useless.

Competent gonioscopy can be learned.² It requires a knowledgeable teacher, repeated examination of normal and abnormal angles, careful comparison of findings, and honest recognition of uncertainty. Residents should be taught to characterize what they actually see during gonioscopy rather than what they expect to see. Ophthalmologists should regard gonioscopy as a mandatory component of routine examination, particularly when glaucoma, ocular hypertension, angle closure, trauma, inflammation, or angle surgery is being considered. Glaucoma specialists should set a high standard by routinely documenting gonioscopic findings in a manner that supports diagnosis and management.

Once mastered, a careful gonioscopic evaluation of both eyes, including appropriate documentation, usually requires only a few minutes. Those minutes may prevent an attack of acute angle closure, reveal chronic synechial damage, explain an unexplained rise in intraocular pressure, identify a secondary mechanism, or prevent an inappropriate procedure. Few ophthalmology examinations provide so much clinically relevant information at such a low cost.

The anterior chamber angle should not remain uncharted territory. We should move beyond the question of whether gonioscopy was performed and ask whether it was performed well enough to help the patient. Anterior segment imaging must remain an adjunct. It should never be accepted as a substitute for direct clinical examination of the angle. The responsibility for understanding the angle remains with the clinician. When gonioscopy is skillfully performed, thoughtfully interpreted, and accurately recorded, it becomes what it has always had the potential to be: an essential examination for preserving vision.

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