

# Small-gauge Endoscope Facilitates Difficult Cases

The 23-gauge endoscope is a versatile tool to enhance visualization.

BY JEFFREY S. HEIER, MD; AND CAROLYN CHEN, MD

**T**he invention of the ophthalmoscope by Helmholtz in 1851 opened up the world of the posterior segment. Subsequent advances in devices to aid visualization of structures within the eye have steadily improved our ability to understand and treat posterior segment pathologies.

The latest posterior segment visualization tool we have adopted in our practice is a triple-function 23-gauge laser endoscope (Endo Optiks). The device combines laser, light, and a high-quality image in 1 small-gauge probe. This device enables retina surgeons to perform some cases more easily or more effectively, and it facilitates some cases that would otherwise not be possible to address.

In surgeries with a complicating aspect, we have found that the 23-gauge endoscope can be very useful. We have been using 19-gauge or 20-gauge endoscopes for a number of years for complicated retina cases. These include eyes with a compromised anterior segment, whether from trauma or a congenital or acquired corneal disease; with dense pupillary membranes, as can be seen in advanced proliferative vitreoretinopathy or proliferative diabetic retinopathy; or any pathology that prevents adequate posterior view. In situations such as these, endoscopy is helpful to determine the eye's visual potential and often to initiate repairs before committing to a corneal transplant or other anterior segment reconstruction.

## FACILITATES COMPLEX CASES

The 23-gauge endoscope is a triple-use probe that provides the ability to work on many of these highly complicated cases without a large incision. We use it on any

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case where the view may be compromised, and we appreciate the fact that the endoscope fits through currently available 23-gauge cannula systems. This obviates the need for cannula removal and enlargement of sclerotomy. The resolution is 6000 pixels, which is more than adequate to treat retinal detachments, endophthalmitis, trauma cases, or completion of air-fluid exchanges and laser when air gets into the anterior chamber and/or condensation clouds the IOL.

Following are some indications for which we use the 23-gauge endoscope.

**Severe endophthalmitis.** Severe endophthalmitis is often addressed by vitrectomy in the presence of a totally opaque anterior segment, or, at the least, a highly compromised view secondary to anterior segment inflammation and corneal edema. The endoscope allows the surgeon adequate view to debulk large amounts of inflammatory and/or infectious material. In the past, this would have been performed almost blindly, with removal of only that which the surgeon could safely assume was in the center of the eye. Visualization increases the likelihood of saving the eye and preserving some vision.

**Glaucoma.** When glaucoma surgeons require a so-called "complete vitrectomy" in preparation of placing



Figure 1. Retinal detachment in a patient with a compromised cornea. A retinal break is seen through the 23-gauge endoscope.



Figure 2. Peripheral retinal breaks can be seen through the endoscope.

a posterior tube shunt, they rely on the retina surgeon to accomplish this using conventional methods. Unfortunately, a complete vitrectomy is rarely attainable. As a result, vitreous often finds its way to the tube, attracted to the path of least resistance. The 23-gauge endoscope facilitates visualization of the anterior and peripheral vitreous, the areas that typically harbors residual vitreous that can lead to tube compromise. After a more complete vitrectomy with the endoscope, the tube can be placed, and endoscopic visualization allows any residual vitreous to be identified and removed. Although scleral depression may allow the surgeon to achieve some of the same removal, it changes the anatomic position of the tube, often hiding material or tissues that would be in apposition to the tube in its true position.

**Combination cases.** The 23-gauge endoscope allows easy coordination between anterior and posterior segment surgeons in cases in which each has different procedures to perform. For example, in cases in which IOLs are dislocated or subluxated, the retina surgeon can use the endoscope to visualize and release the remaining fibrosed haptic. At the same time, the endoscope can be used to apply ciliary process laser ablation for IOP control from either an anterior or posteri-

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or approach, whichever is more appropriate. In cases of posterior capsular rupture, with compromised views due to corneal edema or a displaced IOL, the endoscope can be used to ensure that all lens fragments are removed, even those very anterior and directly behind the iris.

**Small pupil.** In the presence of a small pupil, in eyes with either significant rubeosis (and the risk of hemorrhage) or a history of exuberant fibrinoid response to previous manipulation, the endoscope allows the surgeon to work peripherally. It can facilitate laser application or dissection of tissues, for instance in eyes with chronic hypotony.

**Congenital anterior segment abnormalities.** Recently an 11-year-old boy with congenital anterior segment abnormalities was referred to our practice. He was blind in 1 eye from a chronic retinal detachment that had not been recognized due to anterior segment abnormalities. He had now developed a retinal detachment in his good eye. Because of the anterior segment abnormalities, 2 different surgeons felt they could not complete the surgery in a conventional manner. It would have taken a tremendous amount of work to fit him with a keratoprosthesis and then a transplant, and he otherwise had adequate visualization. He had a 2-mm pupil that was eccentric but that enabled him to function adequately until the onset of

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**Figure 3.** Laser surrounding retinal breaks following air-fluid exchange, applied under direct endoscopic visualization.

the recent detachment. We were able to perform the surgery with the 23-gauge endoscope in a relatively straightforward manner. The endoscope enabled us to fix the detachment without an elaborate amount of work that would carry additional risk and potential for failure. This case would have been extremely difficult to perform without the endoscope.

**Chronic inflammation.** Another patient was referred to us with pseudoexfoliation syndrome and chronic inflammation. He had had cataract surgery 5 years previously and had since undergone multiple vitrectomies for chronic inflammation. Scleral depression with wide-angle viewing during these vitrectomies

had revealed nothing. The referring physicians suspected intraocular lymphoma and sent him to me for endoscopic vitrectomy. Upon examination with the endoscope, we found a number of residual cortical pseudoexfoliation remnants that were trapped in anterior vitreous directly behind the peripheral iris. This material could not be seen with scleral depression but was visible with the endoscope. When we removed it, the patient recovered quickly and had no further bouts of inflammation.

**Opaque media.** A middle-aged woman with corneal decompensation presented with a retinal detachment (Figure 1). The 23-gauge endoscope was used to visualize the retina (Figure 2). A core vitrectomy was performed, followed by an air-fluid exchange and laser to the retinal breaks under direct endoscopic visualization (Figure 3).

## CONCLUSIONS

The 23-gauge endoscope is not a device that most surgeons will use for routine surgery, but it is an important addition to the surgical armamentarium. Endoscopy enables us to complete cases that would be difficult if not impossible without its enhanced visualization capabilities. In the past, we needed larger-gauge endoscopes because smaller instruments were just too fragile, but the current design has led to a device that is much stronger and capable of significant manipulation, including the ability to reach far anterior pathology without damaging the scope.

The versatility and size of the triple-function 23-gauge endoscope have made it an important tool in our practice for a number of difficult cases. It has simplified much of the work in the vitreous simply by providing an excellent view, and its small size will definitely enhance our ability to resolve cases with endoscopic repair. ■

*Jeffrey S. Heier, MD, is Director of the Vitreoretinal Service at Ophthalmic Consultants of Boston. Dr. Heier states that he is a member of the Endo Optiks scientific advisory board. Dr. Heier is a member of the Retina Today Editorial Board. He can be reached at [jsheier@eyeboston.com](mailto:jsheier@eyeboston.com).*



*Carolyn Chen, MD is a second-year vitreoretinal surgical fellow at the Ophthalmic Consultants of Boston-Tufts New England Eye Center.*



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