Achieving a Wide-angle View During Vitreous Surgery

High-resolution images and wide-angle views of the fundus can contribute to a successful vitrectomy.

BY KAZUAKI KADONOSONO, MD, PhD

In this issue of Retina Today, Kazuaki Kadonosono, MD, PhD, discusses his surgical experience achieving visualization of the retinal fundus during vitrectomy with the Resight 700 fundus viewing system (Carl Zeiss Meditec AG, Jena, Germany).

We extend an invitation to readers to submit pearls for publication in Retina Today. Please send submissions for consideration to Ingrid U. Scott, MD, MPH (iscott@psu.edu); or Dean Elliott, MD (dean_elliott@meei.harvard.edu). We look forward to hearing from you.

—Dean Elliott, MD; and Ingrid U. Scott, MD, MPH

What is the key to successful vitreous surgery? No single answer would be acceptable to every surgeon. However, it is a fact that a clear view of the retinal fundus during surgery is one key to a successful vitrectomy. The recently developed wide-angle viewing microscope system, the Resight 700 (Carl Zeiss Meditec AG, Jena, Germany), which is now commercially available, allows surgeons to obtain clearer visualization much more easily than with previously available devices (Figure 1A).

Based on my personal experience, the Resight, which is incorporated into the Lumera 700 microscope (Carl Zeiss Meditec AG), provides clear and wide-angle images of the fundus (Figure 1A). With the BIOM (Carl Zeiss Meditec AG), a clear image can be obtained by controlling both the indirect lens (bottom arrow) and the operating microscope (top arrow; 1B), but with the Resight 700 only the reduction lens (red arrow) inside the operating microscope has to be controlled, and surgeons do not have to use the other lens (black arrows) for focusing (1C).

Figure 1. The Resight 700 provides clear, wide-angle images of the fundus (1A). With the BIOM, a clear image can be obtained by controlling both the indirect lens (bottom arrow) and the operating microscope (top arrow; 1B), but with the Resight 700 only the reduction lens (red arrow) inside the operating microscope has to be controlled, and surgeons do not have to use the other lens (black arrows) for focusing (1C).
Zeiss Meditec), offers several advantages over earlier widefield-viewing systems, as this article describes.

MECHANISMS OF WIDE-ANGLE VIEWING SYSTEMS

Vitreous surgery can be facilitated by indirect viewing systems that provide surgeons with a wide-angle view of the fundus.1-3 Although the image is sufficiently wide field with these devices, it is inverted, which can be confusing, especially when surgeons are performing complex maneuvers. The stereoscopic diagonal inverter (SDI), originally introduced to change the optics during vitreous surgery, made the wide-angle field of the panfunduscope possible.1

Wide-angle viewing systems consist of two components: an indirect ophthalmoscopic lens system and a stereo reinverter system that reinverts the image. The field of view depends primarily on the distance between the indirect-noncontact lens surface of the operating microscope and the corneal surface. As the noncontact lens approaches the cornea, the observed field grows larger. Another determinant of the observed field is the refractive power of the lens. The stronger the power of lens, the larger the field of the fundus that can be observed.

Focusing the operating microscope is as important as the visual field because it qualifies the image. The images obtained by noncontact lenses are inferior to those obtained by contact lenses, and the resolution of fundus images by wide-angle viewing systems has not been very good. Focusing the binocular indirect ophthalmoscope (BIOM; Oculus, Lynnwood, WA), which has been the most popular wide-angle viewing system, is complicated, requiring most surgeons to spend a great deal of time learning how to use the BIOM system.

There are two key elements to focusing with the BIOM system: (1) maintaining a suitable distance between the indirect lens and the corneal surface, and (2) maintaining the optimal distance between the height of the operating microscope and the corneal surface. This means that surgeons have to control both the indirect lens and the operating microscope at the same time in order to obtain high-resolution images of the fundus (Figure 1B).

RESIGHT FOCUSING SYSTEM

The Resight wide-angle viewing system has a unique focusing system. The Resight is equipped with an inner focusing system that allows the reduction lens set inside the microscope to be moved automatically. Surgeons can obtain clearer images by controlling this inner focus system alone (Figure 1C). The focusing system has been simplified even more in the Resight operating microscope.
The Resight wide-angle viewing operating microscope has several advantages over other operating systems. It facilitates obtaining both high-resolution images and a wide-field view of the fundus at the same time. This technology can provide great benefits when performing macular surgery to treat challenging cases.

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