Retinal Probes: Refining Our Laser Delivery Tools

Innovations in retinal probes have increased efficiency and precision in applying laser to the retina.

By Sam E. Mansour, MSc, MD

Recent advances in probe technology have allowed reproducible, accurate laser burns through 25- and 23-gauge probes.

DESIGN EVOLUTION

The first major design element to enhance delivery was the curved laser probe. With curves of 30° to 60°, these tips allow greater ease of manipulation and agility. A curved tip allows peripheral laser delivery often without the need for scleral depression. The second significant evolution in probe design was the introduction of an extendable retinal probe (the Adjustable and Intuitive Extended Reach [A&I XR] probe, Iridex). The surgeon can engage a button to transform a straight probe, sliding it out into a curved probe. I feel that extendable probes are the Swiss Army Knife of retinal probes; their flexibility and ease in moving around the vitreous cavity during surgery has made them indispensable for many surgeons (Figure 1).

There have been additional refinements in other aspects of probe technology such as cone angle and shaft stiffness. Cone angle refers to the angular divergence of the laser beam from the probe aperture. A tighter, smaller diameter allows the surgeon to achieve the same spot size at varying distances from the retina, minimizing issues with tissue irradiance. Consistency of burns is particularly important in patients with delicate retinas. Highly myopic eyes, retinas that have undergone atrophic thinning from chronic uveitis, and viral retinitis are examples of cases in which a very consistent laser burn is particularly important.

BENEFITS OF NEW PROBES

Most retinal surgeons recognize that a drawback of extendible probes is that there tends to be a reduction in power when the probe is fully extended. The surgeon then has to adjust for that loss of power either by placing the probe closer to the retina or by increasing the power of the laser. A&I XR probes have a narrow cone angle and a more consistent burn spot size and intensity (Figure 2). This allows the probe to remain at a greater distance from the retina compared with probes with a larger cone angle while providing a consistent laser burn. These probes also require much less titration by the surgeon when extending or contracting the probe.

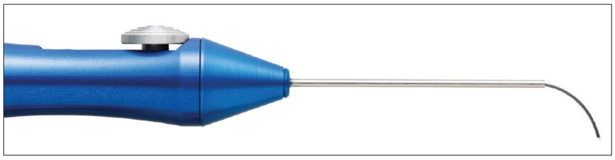

Figure 1. The ability to transform a straight probe to a curved one affords surgeons greater flexibility during intraoperative movements.

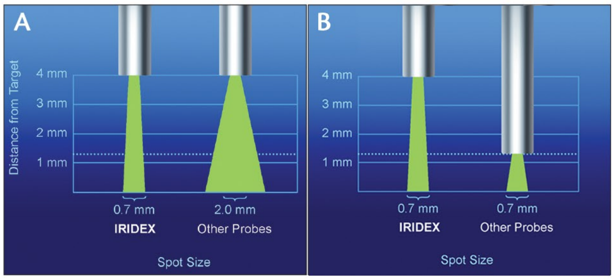

Figure 2. A tighter cone angle allows the surgeon to position the probe farther from the retina while minimizing changes in tissue irradiance and associated endpoint appearance that occur with variations in probe-retina distances.

A stiff probe shaft, such as seen in the A&I XR probes, allows more consistent duction of the globe. During surgery, we use the instruments to move the eyeball in various directions to access the entire peripheral retina. Small gauge instruments can be too pliable, making it difficult to roll the eye in the direction necessary. Extendable shafts, tighter cone angles, and solid probe shafts are ways that a good probe can make laser photocoagulation more efficient and precise. ■

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