

Why Using a New-Generation Nd:YAG Laser Matters With Premium IOLs

Using less energy is important.

BY RICHARD L. LINDSTROM, MD

Most of us likely view the Nd:YAG laser as a utility player in our ophthalmology practices. It is there when we need it, but it is not a piece of equipment that gets the spotlight. In general, the Nd:YAG laser enables us to safely and accurately create a capsulotomy or iridotomy using relatively low energy.

I have come to view Nd:YAG lasers in a different light, as my colleagues and I have incorporated more advanced-technology IOLs into our practice. Here are some key reasons why you should consider updating your Nd:YAG laser if you are implanting premium IOLs.

ACCURATE AND EFFECTIVE

At Minnesota Eye Consultants in Bloomington, my colleagues and I have found that the newer-generation Nd:YAG lasers, such as the Ultra Q Nd:YAG Laser (Ellex, Adelaide, Australia), more accurately aim and control the delivery of energy than older platforms. The red diode aiming beam on the Ultra Q ensures that we hit our target. Using less energy is particularly important in eyes with premium IOLs, because we do not want to mark the optic. Other manufacturers (Table 1) have also emphasized the accuracy with which energy is delivered. For example, the Visulas YAG III (Carl Zeiss Meditec, Inc., Dublin, CA) has a four-point focusing beam system, and the Q-switched Opto Global Advant YAG laser (Opto, Adelaide, Australia) offers a dual-spot aiming system.

Nd:YAG LASERS AND PREMIUM IOLs

With any of the premium IOLs available in the United States, including the Crystalens HD (Bausch + Lomb, Rochester, NY), the Acrysof Restor (Alcon Laboratories, Fort Worth, TX), and the ReZoom and Tecnis IOLs (both from

Abbott Medical Optics Inc, Santa Ana, CA), you must customize the capsulotomy for the most effective results.

With the Crystalens HD, for example, the opening must be within the edge of the optic, and the IOL's performance can be affected if the capsulorhexis is too small. A new-generation Nd:YAG laser can help to accurately and precisely enlarge the capsulorhexis and eliminate the need to return to the OR for capsular contrac-

TIPS FOR EFFECTIVE Nd:YAG CAPSULOTOMIES IN EYES WITH THE CRYSTALENS

The goal of selective Nd:YAG laser capsulotomy to treat capsular opacification with the Crystalens (Bausch + Lomb, Rochester, NY) and capsular contraction syndrome is to restore the capsular bag's equatorial diameter. When the overall diameter of the Crystalens is decreased by capsular contraction, the IOL shifts either anteriorly or posteriorly with no capability for further movement, thus reducing its effectiveness.

Selective Nd:YAG laser capsulotomy settings. Each laser has a different threshold in terms of the formation of plasma and how much of the capsule it will disrupt. I recommend titrating the laser energy to create a posterior capsular opening of approximately 0.25 mm per laser shot. With the Ellex Ultra Q laser (Ellex, Adelaide, Australia), for example, I use about 1.9 mJ of energy. For a central posterior capsulotomy, I start the treatment at the center of the optic such that it radiates outward. I simultaneously control the diameter of the capsulotomy so that it does not extend beyond the edge of the optic. The endpoint is a round, central posterior capsulotomy that is approximately 3 mm in size. Round capsulotomies will not extend as much as a cruciate capsulotomy, and the former are more easily controlled and titrated.

TABLE 1. CURRENTLY AVAILABLE Nd:YAG LASERS

Manufacturer	System	Wavelength/ Mode	Maximum Laser Energy	Features	Web Site
Carl Zeiss Meditec	Visulas YAG III	Super Gaussian, 1,064 nm	Single pulse: 10 mJ, double pulse: 23 mJ triple pulse: 35 mJ	Pulse repetition rate: maximum 2.5 Hz Focus diameter: 10 µm in air Aiming beam: diode, 670 nm Four-point aiming beam Focus shift: variable +150 µm, 0, -150 µm	www.meditec.zeiss.com
Ellex	Ultra Q	10Q- switched, 1,064 nm	Continuously variable, single pulse, 0.3 to 10 mJ,	Pulse duration: 4 ns Burst mode: 1, 2, and 3 pulses per burst, selectable Spot size: 8 µm Posterior offset: 100 to 350 µm, continuously variable Cone angle: 16° Repetition rate: up to 3 Hz Aiming beam: red diode, adjustable intensity	www.ellex.com
Lumenis	Aura PT	Fundamental Q-switched, 1,064 nm	Continuously adjustable from 0.2 to 10 mJ	Spot size: 8 µm Burst mode: 1, 2, 3 pulses each burst; separation between pulses is 20 µsec Pulse width: 4 nsec (typical) Repetition rate: 2.5 Hz Continuously variable from anterior (-)500 µm to posterior (+)500 µm; detent steps @ 0, 150, 250, and 500 µm Focus: focal length 107 mm Cone angle: 16° Aiming beam: laser dual-beam 635 nm diode, continuously variable intensity to 200 µW	www.ophthalmic. lumenis.com
Nidek Inc.	YC-1800	Fundamental Q-switched, 1,064 nm	Continuously variable, 0.3- 10.0 mJ/pulse	Spot size: 8 µm Burst mode: 2 or 3 pulse/trigger Cone angle: 16° Aiming beam: 635-nm diode laser Focal shift: 0-500 µm (continuously variable)	http://usa.nidek.com
Opto Global	Advant Yag Laser System	Q-switched, 1,064 nm	N/A	Firing rate of 2.5 Hz 500 µm between anterior and posterior segments	www.opto-global.com/ products.php?id=17

tion syndrome with a refractive error shift. In some cases, extending the capsulotomy under the hinge and haptic can reduce consecutive myopia and/or astigmatism. Occasionally, I will also perform anterior capsular relaxing incisions in areas of phimosis to treat a hyperopic shift. For best optical performance, multifocal IOLs need larger-than-standard capsulotomies that still stay inside the optic's edge.

The accurate focus and more efficient energy levels of the Ultra Q allow my colleagues and me to create effective iridotomies before the implantation of phakic IOLs. The laser is useful for lysing capsular or vitreous strands, treating some vitreous opacities, and dusting the lens' surface free of visually significant lenticular precipitates or pigment.

We have several different Nd:YAG lasers at our practice's multiple locations. The newest, the Ultra Q, is my favorite (see *Tips for Effective Nd:YAG Capsulotomies in Eyes With the Crystalens*). This laser can alleviate the need for more invasive surgical intervention in most cases, making treating unforeseen events less cumbersome for the patient and for me. ■

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