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**References:** 1. Fleckenstein M, et al. *Ophthalmology*. 2018;125(3):369–390. 2. Jones D, et al. *Invest Ophthalmol Vis Sci*. 2022;63(7):A0145. 3. Sivaprasad S, et al. *Ophthalmol Ther*. 2019;8(1):115–124. 4. Apellis & The Harris Poll. 2022. Geographic Atrophy Insights Survey (GAINS). 5. Legge A. Keeping an eye on geographic atrophy. 2023. Available at: <https://www.optometrytimes.com/view/keeping-an-eye-on-geographic-atrophy> (Accessed January 2024).

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# Case report: Diversifying cataract outcomes

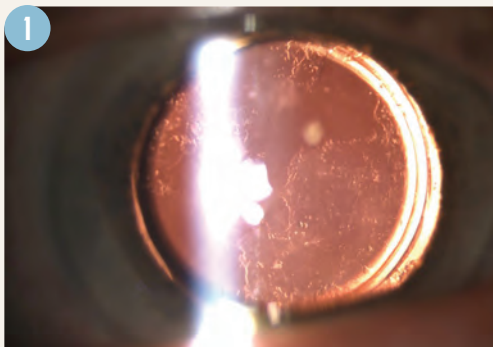
Many options with one single Nd:YAG laser

By Andreas F. Borkenstein, MD

Cataract surgery is one of the most common eye surgeries around the world. It usually has a high success rate, thanks to improvements in the materials and designs of intraocular lenses (IOLs). However, some patients may still develop posterior capsular opacification (PCO) after surgery. PCO, the most common complication that happens later on after cataract surgery, gradually clouds the back part of the lens capsule, affecting vision clarity in a way that is similar to the cataract itself. About 20.7% of patients show signs of PCO 2 years after their surgery, and 28.5% after 5 years.<sup>1</sup> To treat this issue, we use neodymium:yttrium-aluminum-garnet (Nd:YAG) laser capsulotomy. This involves making a small, precise opening in the cloudy capsule with a laser, which allows light to pass through. It is rated as a fast, effective and easy-to-use method. In some clinics, young doctors in training are already allowed to perform these procedures.

Given the widespread use of Nd:YAG laser treatments and the variety of devices available, choosing one that achieves the best results with minimal energy and fewer chances for complications like laser shots is crucial. We assessed the new VISULAS® YAG laser device. The laser had undergone numerous modifications over the years, introducing its latest version in 2023 to stay abreast of ophthalmic and technological fields. A notable feature is its optional camera system, which attaches to the slit lamp and captures high-resolution images and videos. These visuals are not only educational but also help in engaging patients more in their treatment process. (**Figure 1**)

Additionally, the camera system is very useful for documenting the grade of the opacification and also other co-pathologies in the anterior segment of the eye (**Figure 2a, 2b**). Its ability to capture and store high-quality images allows for sharing them with



**FIGURE 1.** shows Posterior capsular opacification (PCO) as seen through the slit lamp of the device, captured by its integrated camera system. The clouding of the capsule leads to visual impairment, giving the patient symptoms similar to the original cataract. This image is also useful as an educational tool to explain to patients the cause of their visual symptoms. Sometimes, PCO may only affect the periphery of the capsule but still cause visual problems in mesopic conditions. In such cases, imaging is an excellent way to demonstrate this to the patient and also serves as useful forensic documentation.

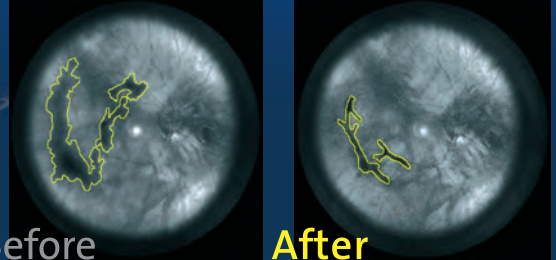
# cataract & refractive

patients, leading to a better understanding of their condition. Furthermore, the system aids in collaborative learning among medical professionals, enriching the overall educational experience. The device can also integrate these digital patient examinations into the optional data management solution platform, the ZEISS Forum. This integration enables more precise assessments and enhances therapeutic expertise.

Today, every cataract surgery is treated as a procedure aiming for high-quality vision, with both patients and surgeons expecting excellent results. When complications like PCO arise, the objective is to resolve them effectively to achieve the best possible visual acuity and overall quality of vision. This requires a careful approach during Nd:YAG capsulotomy, focusing precisely and using the least necessary energy. The device's switchable feature, moving from 4- to 2-point aiming, greatly improves safety and accuracy. It focuses the ideal amount of energy precisely where needed, leading to a safer and more effective procedure (see **Figure 3a, 3b**). The 2-point aiming beam is particularly useful for presbyopia-correcting IOLs, tinted IOLs, and in complex cases like tilted or decentered lenses. This enhances precision in these delicate situations (see **Figure 4**). Additionally, the new VISULAS Insight-View display offers a comprehensive view of the entire treatment area, energy levels, and procedural parameters, all in real time during the laser process. This helps in maximising treatment outcomes.

Nd:YAG laser capsulotomy is a generally safe procedure known for its well documented improvements in visual acuity, glare and contrast sensitivity, and the overall quality of vision.<sup>2</sup> Nevertheless, it is not devoid of complications. These complications include intraocular pressure (IOP) rise, cystoid macular oedema, vitreous prolapse, retinal tears and detachment, and IOL defects and refractive changes.<sup>3,4</sup> Among these complications, IOL defects, referred to as YAG-pits, are noteworthy and can remarkably impact the overall quality

## Floater Intervention Study

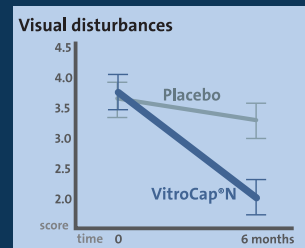


Before

After



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*"Look at vitreous – not just through it." Update on vitreous metabolism, nutrition, visual function, and therapeutic options for Vision Degrading Myodesopsia.*<sup>\*2</sup>

<sup>\*1</sup> Ankamah E, Green-Gomez M, Roche W, Ng E, Welge-Lüssen U, Kaercher Th, and Nolan JM. TVST 2021; 10(12):19, tvst.arvojournals.org

<sup>\*2</sup> Satellite Symposium ebiga-VISION: SAT19. International Congress of German Ophthalmic Surgery (DOC) 2023 Nuremberg

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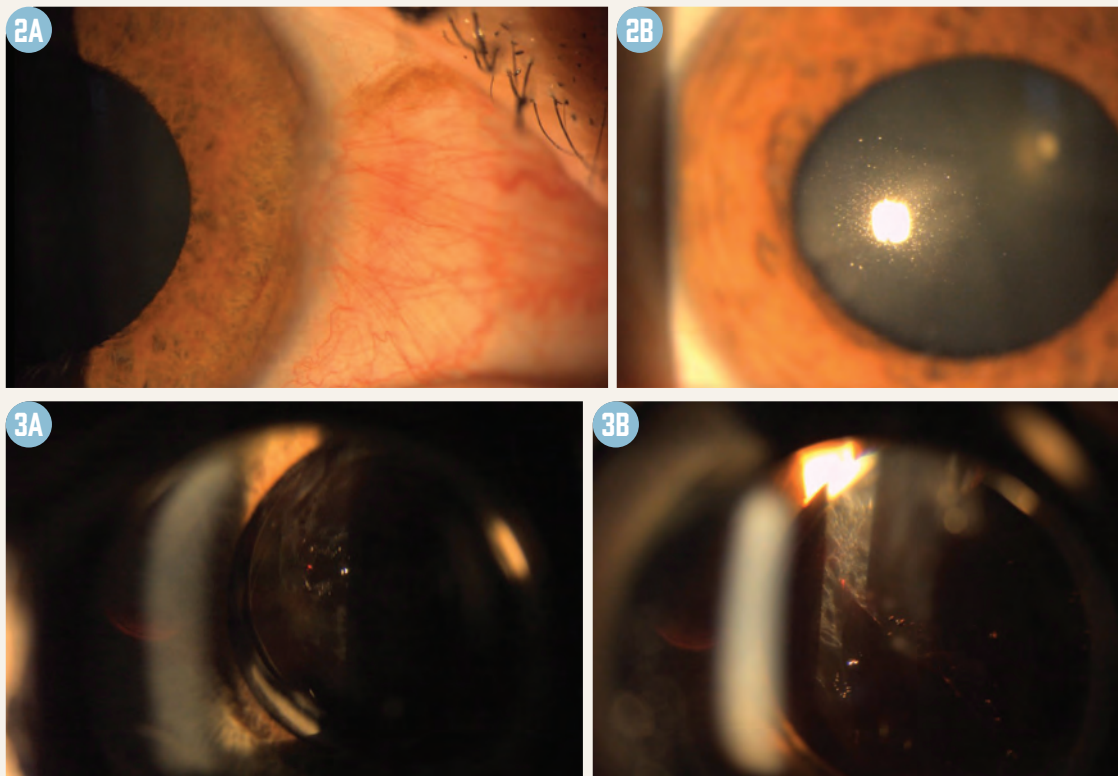
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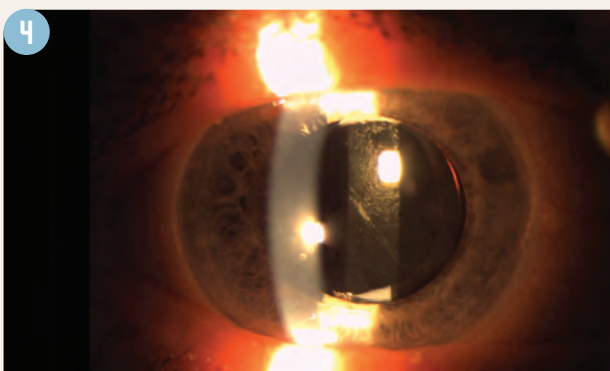
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**FIGURE 2.** The versatility of the camera system. Figure 2a displays an image of a pterygium, while Figure 2b shows keratoconjunctivitis sicca. The camera can be used for a broad range of anterior segment pathologies, not just cataracts and posterior capsular opacification, enhancing its educational value for patients, caregivers, and students. This approach is significantly more effective than using a traditional teaching tube on a slit lamp, where image quality is compromised during use, only one person can view it at a time and the patient is unable to see their own pathology.

**FIGURE 3.** A surgeon's view during posterior capsulotomy laser treatment is screen-captured from a recording. The view is clear and unobstructed throughout the procedure. The laser beam focuses to the posterior capsule, effectively removing the posterior capsular opacification.



**FIGURE 4.** Clear visibility is achieved during a posterior capsulotomy on a patient with a yellow-tinted IOL, which is typically considered challenging. The clarity of the views enhances the overall workflow. The ability to switch from a 4- to 2-point aiming beam is particularly beneficial in this scenario, given the complex nature of the IOL. This feature aids in efficiently and effortlessly removing the clouding in the posterior capsule.

of vision as highlighted by data from several studies.<sup>5-7</sup> These defects are often associated with improper beam focusing and high energy levels, underscoring the necessity of judicious parameters control to minimize the risk for such complication. As these defects can have permanent negative effects on the quality of vision, they should be avoided.

In summary, Nd:YAG laser stands as a pivotal intervention in the ophthalmic practice, effectively addressing posterior capsular opacification (along with other

several indications). The nuanced application of this procedure, with careful attention to parameters and safety features, ensures both efficiency and precision. ■

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Borkenstein is an Austrian ophthalmologist specialising in cataract and refractive surgery.

His focuses include optical bench analysis of intraocular lenses, evaluating lens designs, description and analysis of defects in IOLs and evaluation of new devices and viscoelastics. He regularly participates in multicentre clinical trials of new premium lenses.

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<b>Spot size</b>	8 μm
<b>Aiming beam</b>	Red, switchable 4 to 2-point aiming beam
<b>Optical breakdown</b>	2.6 mJ in air (typical start energy level)
<b>Energy distribution</b>	Super Gaussian
<b>Slit lamp quality</b>	ZEISS integrated LSL



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