

THE EVOLUTION OF IOL TECHNOLOGY

FACULTY



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DEFINING ELEMENTS OF IOL DESIGN, MATERIALS, AND OPTICS | DR. ROWEN

- **Design**
 - All surgeons are used to the single-piece, continuous design; it's easy to implant and centers well.
 - Three-piece IOLs are a great option in certain situations (e.g., zonular dehiscence, sulcus implantation).
 - Square-edged lenses are thought to delay the development of PCO, but to truly prevent PCO the capsule must remain stretched (new technologies by LensGen and Omega may offer improvements).
 - Dr. Rowen predicts that eventually, cataract surgeons will no longer do YAG laser capsulotomies. They can cause significant floaters.
- **Materials**
 - Materials include PMMA/acrylic, silicone, collamer, hydrophobic/hydrophilic, hydrogels.
 - She still likes silicone material because of its biocompatibility, and its refractive index is most like the natural eye's.
 - Hydrophilic lenses are easy to implant but have a higher rate of PCO, in her experience.
- **Optics**
 - Dr. Rowen and Dr. Zhu are not fans of blue-

light filters. Dr. Rowen feels they compromise mesopic and scotopic vision.

- The size of the optic and the design of its edge may relate to the rate of positive and negative dysphotopsias. If the diameter of the lens is too small, patients will get glare, etc. (positive dysphotopsia). Also, the higher the refractive index, the more chance of internal reflections.

NEW IOL TECHNOLOGIES TO KNOW | DR. ZHU

- Some patients want more than one focal point in an IOL. Many are tired of wearing glasses and are getting surgery at a younger age.
- Dr. Zhu chooses lenses by looking at subjective and objective data. Objective data: patient exams; normal pathology from the tear film to the back of the lens (because trifocals and multifocals will only work in healthy eyes).
- EDOF lenses are a little more forgiving to slight visual pathology.
- Subjectively, she looks at personality and lifestyle. Type A people prefer the best-quality vision possible. (The greater the range of vision, the lower the overall quality.)
- The Vivity IOL (Alcon) is her EDOF lens of choice.
- Hydrophilic acrylic lenses are prone to PCO, bag contracture, and calcification risk (with PPV/EK). Silicone IOLs can have opacification with silicone oil.
- Dr. Rowen: Trifocals won't tolerate visual pathology. Counsel patients to expect halos (30% will be moderate-to-severe). If halos are severe (approximately 2% of patients), you'll have to decide whether to explant/exchange. Trifocals can also lack contrast sensitivity, and objects won't look crisp. The PanOptix IOL (Alcon) will always give patients reading vision (J2). Dr. Rowen starts by implanting the multifocal in the nondominant eye. She may blend Vivity or LAL (Calhoun Vision) in the dominant eye to achieve crispness.
- Although her primary IOLs are currently

PanOptix and Vivity, Dr. Rowen implants the LAL in patients without prior refractive surgery and is achieving up to J2 vision.

- The IC-8 Aphthera IOL (AcuFocus) provides extended depth of focus via a pinhole aperture.
- The Gemini Refractive Capsule (Omega Ophthalmics) is in clinical trials (<https://www.clinicaltrials.gov/ct2/show/NCT04574102>). This is not a lens, but a lens carrier. The capsule inserts into the bag, and you can implant your lens of choice. This makes it easy to upgrade lenses.

GETTING TO KNOW YOUR PATIENTS' VISUAL NEEDS & EXPECTATIONS | DR. MICHELETTI

- There is not a 'perfect for everyone' IOL available yet, but overall excellent patient satisfaction is obtainable. Every patient is unique and needs to be matched to the proper IOL. It's about marrying an IOL to an eye.
- While most patients have reduced spectacle independence after implantation of presbyopia-mitigating IOLs, it is important not to guarantee an outcome, but to inform patients that this type of IOL technology is their best chance of reducing their need for glasses. Set expectations with care: underpromise and overdeliver.
- EDOF IOLs can be considered in eyes with posterior pathology, such as an ERM or glaucoma.
- The Acufocus Aphthera and Lenstec ClearView 3 are recently FDA-approved IOLs that will expand presbyopia-correcting options for patients who might otherwise not have been candidates.

Additional Resources: Two fellow YoungMD Connect members, Drs. Matt Hirabayashi and Gurpal Virdi, developed an app called "eyeSpace," which is designed to allow surgeons and trainees to quickly search for and learn about FDA-approved, currently marketed IOLs (visit <https://eyeSpace.ai/>). The app also features an outcome-tracking feature with built-in analysis tools that allows students and residents to learn more about the current lens options.

Dr. Hirabayashi initially posted the "IOL Cheat Sheet" (that eventually became "eyeSpace") after being inspired at ME Live. Read more about the resource here: <https://eyewire.news/news/new-app-allows-surgeons-to-search-for-fda-approved-iols?c4src=article:infinite-scroll>