

Innovating Disruptive IOL Technology

BY GARY WORTZ, MD

Since completing my residency in 2008, my career has been anything but boring. The clinical practice of ophthalmology has proven to be fertile ground for learning through experience, which has become the general approach I take to the laboratory of my life. Every day is an experiment through which lessons are learned.

As my clinical practice has evolved and become more self-sufficient through the people and processes I have put in place, my capacity to pursue research and entrepreneurship has expanded. My research interests range from the pathophysiology of glaucoma and new targets for neuroprotection to the novel pathways that cause ocular surface disease. However, the majority of my research efforts during the past 2 years have focused on developing a lens implant that will greatly reduce postoperative refractive surprises for cataract patients (see *How to Bring an Idea to Life* in the February 2014 issue of *CRST*).

UNDERSTAND THE PROBLEM

It is impossible to develop a solution without thoroughly understanding the problem. In my opinion, the biggest problem in cataract surgery is the dramatic variability in refractive outcomes. The average US cataract surgeon will have a refractive surprise of more than 0.50 D about 50% of the time. For better or worse, most patients judge the quality of their cataract surgery by the quality of their vision. The most common cause of postoperative refractive surprises is the inaccurate prediction of effective lens position (ELP), which is the Achilles' heel of most IOL calculations in all but the most myopic patients. Despite the use of amazingly sophisticated femtosecond lasers, optical biometers, and intraoperative wavefront analyzers, ELP is still difficult to predict. I believe that the next disruptive IOL technology will precisely predict ELP and control it postoperatively. I founded Omega Ophthalmics with the goal of developing that technology.

CREATE A DISRUPTIVE INNOVATION

Innovations are generally either incremental improvements or paradigm-shifting disruptions. A great innovation is only disruptive in its first iteration. All downstream improvements produce incremental change. For example,

the first iPhone (Apple), while not nearly as sophisticated as the current generation, was much more disruptive than any of the subsequent models. Innovations that improve with time are generally easier to implement, but they are subject to the law of diminishing returns. Innovations that disrupt are much more difficult to develop but typically have a more dramatic impact.

Since the earliest IOL designs, few innovations in this area have been disruptive with the exception of the development of foldable lenses. Every IOL approved by the FDA has a central optic that is surrounded by haptics that hold the lens centrally within the x and y planes of the eye. All IOLs are thin and made from one of a select few materials. As long as the ophthalmic industry continues to develop IOLs that follow this design paradigm, a true breakthrough will not occur. In my research efforts, I considered all possible designs for an IOL, with deliberate disregard for the standard lens paradigms. The result has been a new category of lens implant that is currently going through the US and international patent process.

Innovation is a risky proposition. Ideas that lack a sizeable market will not likely be developed in the private sector. Fortunately, cataract surgery is still the most commonly performed surgical procedure in the United States, and its volume is predicted to double by the year 2020. The market for a real breakthrough in this field has likely never been better.

CONCLUSION

Innovation is the natural result of refusing to think that common problems are unsolvable. I enjoy taking on big challenges, because the solutions can have a dramatic and lasting impact. I hope my efforts will someday yield a solution that will help my colleagues and patients alike. ■

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