

# Evolutions and Revolutions in Glaucoma Surgery

BY NATHAN M. RADCLIFFE, MD

While I was refining my suturing technique during the plastic surgery rotation of my internship, my mentor, a successful plastic surgeon on the island of Oahu, gave me some advice. He noticed that I varied my suturing technique a bit with each needle pass and made an insightful statement that I will never forget: for anything you do, there are thousands of inefficient methods and only one truly efficient method. He showed me how to suture efficiently, and now, I have no reason to vary my technique. At least one part of my surgical technique has stopped evolving.

## TRABECULECTOMY

Last year, during his American Glaucoma Society Surgery Day lecture titled “Ethical Considerations in Conception, Design, and Execution of New Glaucoma Procedures,” George Spaeth, MD, called for the standardization of every aspect of our trabeculectomy technique. He cautioned us that the lack of a standardized trabeculectomy technique has held up the progress of and meaningful research on glaucoma surgery. Although Dr. Spaeth is undoubtedly correct, as one who believes that we have not yet arrived at the perfectly efficient trabeculectomy technique, I still welcome variations on the theme that may promote the evolution of glaucoma surgery.

Enter Steven Vold, MD, and his 2-minute Eyetube.net video featuring Ex-Press mini glaucoma shunt (Alcon Laboratories, Inc., Fort Worth, TX) implantation surgery with an Ologen Collagen Matrix Implant (Optous, Roseville, CA) (Figure 1) (<http://eyetube.net/?v=hocri>). Dr. Vold’s technique addresses many problems with standard trabeculectomy that frequently embarrass the glaucoma surgeon: intraoperative, early postoperative, and long-term complications. Intraoperative complications, including shallowing of the anterior chamber, may be addressed by the lack of sclerostomy and iridectomy with the Ex-Press, and anterior chamber stability is demonstrated after the device’s placement in this video. Early



Figure 1. The surgeon demonstrates implantation of the Ex-Press mini glaucoma shunt with an Ologen Matrix Implant.

postoperative complications, such as hyphema and inflammation (with a resulting decrease in visual acuity), may be reduced by avoiding an iridectomy.<sup>1</sup>

Finally, many patients with initially successful glaucoma surgery encounter late complications. Consider one study examining patients after trabeculectomy with adjunctive mitomycin C (MMC) (a reasonably modest application of 0.2 mg/mL for 2 minutes). By 24 months postoperatively, 26% of patients had a bleb leak, and almost all had transconjunctival oozing, which will require indefinite monitoring.<sup>2</sup> Ologen can decrease the bleb’s avascularity compared with MMC, although this benefit may come with a cost of more modest IOP lowering.<sup>3</sup> The Ex-Press Ologen technique presented by Dr. Vold is a supercharged trabeculectomy, with safety and simplicity at the forefront. As seen in the video, his technique is streamlined in many ways. His conjunctival dissection is minimalistic, consisting of a 5- to 6-mm peritomy using a supersharp blade followed by hydrodissection (only) below the Tenon’s layer.

His trapezoidal scleral flap is dissected with a 56 Beaver blade (Becton, Dickinson and Company, Franklin Lakes, NJ), extending 1 mm into clear cornea. Dr. Vold uses a sapphire blade to enter the anterior chamber, and he notes the anterior chamber's stability upon implanting the Ex-Press device. Finally, the Ologen Collagen Matrix is implanted under the Tenon's layer instead of MMC.

Despite its augmentations, Dr. Vold's surgery is actually sleek and simple, with almost no bleeding. I hope that forthcoming data will help clinicians determine the cost-effectiveness of these and other augmentations of the trabeculectomy procedure as well as alternatives. Most of us would agree that the mature evolution of a safe and effective glaucoma surgery would be priceless.

### TRABECULAR MICROBYPASS iSTENT SURGERY

Continuing the subject of safer glaucoma surgery, last year brought several exciting developments, including the presentation of a trabecular microbypass iStent surgery (Glaukos Corp., Laguna Hills, CA) phase 2 trial to the FDA's Medical Devices Advisory Committee. The primary outcome of the surgery, an IOP below 21 mm Hg without medications, was achieved in 68% of patients with the iStent plus cataract extraction and 50% of patients who underwent cataract extraction only. The panel voted favorably on the safety (7-1-0), effectiveness (6-2-0), and risk/benefit ratio (7-1-0) of the device. There is a little more to the story. Despite the favorable panel recommendations, the device has not yet received FDA approval. I highly encourage interested readers to access the FDA's document online.<sup>4</sup> If you have never seen an iStent implanted, tune in to Eyetube.net to see Carlos Buznego, MD, place the world's smallest medical device into the trabecular meshwork (<http://eyetube.net/?v=fedili>).

For those interested in international ophthalmology, be sure to check out "Making a Difference in Armenia," the story of a collaborative humanitarian effort by Eric D. Donnenfeld, MD, and Kerry D. Solomon, MD, who traveled to Armenia along with the Glaukos team to implant the iStent in an underserved population. The video includes touching stories of these doctors' experiences with Armenian ophthalmologists, as Drs. Donnenfeld and Solomon share their knowledge of ophthalmic surgery and perform iStent procedures on many grateful patients in a poor population.

### SUPRACHOROIDAL TECHNIQUES

Are some newer techniques for glaucoma surgery more revolutionary than evolutionary? The new wave of suprachoroidal techniques certainly seems revolutionary. However, as eye surgeons begin to move from conjunctiva-

based glaucoma procedures to ab interno angle and suprachoroidal surgical techniques, perhaps it is time to review a classic and often forgotten glaucoma surgery—the intentional formation of a cyclodialysis cleft. Kenneth J. Baum, MD, of the Hawaii Permanente Medical Group presents his anterior approach to cyclodialysis surgery in "The Two Minute Glaucoma Surgery" (<http://eyetube.net/?v=linee>).

Dr. Baum presents eight cases in a row, all demonstrating the simplicity of this technique, and he describes its evolution. He first used the Kelman Cyclodialysis Cannula (Geuder AG, Heidelberg, Germany), but he eventually moved to the "sharper," rounded cyclodialysis spatula when he began deepening his cleft as his comfort level increased. Dr. Baum performs the procedure on pseudophakic patients after cataract extraction and IOL surgery, while the eye is still filled with viscoelastic. He uses the spatula to perform a twisting movement in the angle until he feels a "pop." Next, he performs a 2- to 3-clock hour sweep at a depth of 2 to 4 mm, while maintaining a 30° upward angle to protect the uvea and maintain contact with the sclera. After performing this single sweeping motion, Dr. Baum elevates the IOP with an injection of balanced salt solution for 2 minutes to tamponade the bleeding. The technique is fascinating to watch and provides an interesting perspective, because the intentional formation of a cyclodialysis cleft is the basis of several new glaucoma surgical devices under development.

### CONCLUSION

Keep tuning in to Eyetube.net to see evolutions and revolutions in glaucoma surgical techniques as they become available. □

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