

TOOLS OF THE TRADE

Instruments essential to any successful trabeculectomy.

BY JON M. RUDERMAN, MD, AND SARA R. GHOBRAIEL, MD



Trabeculectomies are the bread and butter of glaucoma surgery. This skill is learned during the latter part of residency and usually perfected during a year of fellowship. Each ophthalmologist performs

the surgery in a unique way learned through mentors and adjusted according to his or her experience. Often, modifications to technique are suggested by online videos at websites such as Eyetube.net and discussions at meetings, or they are inspired by studies published in the literature. That said, there are basic techniques that lead to successful glaucoma surgery, and the recommendations contained in this article represent opinions based on decades of experience.

Perhaps the most important aspect of glaucoma surgery is meticulous handling of the conjunctiva. Conjunctival flaps can be fashioned at either the limbus or the fornix. Prior to the 1990s, most trabeculectomies were performed using limbus-based flaps. The advantages of this approach are that patients are more comfortable postoperatively and leaks can be managed by either a contact lens or suture repair in the office. A gradual transition to fornix-based flaps occurred for a number of reasons. One is that improved visualization makes it easier for surgeons to appreciate the landmarks of the surgical limbus. Another is the need to work alone without an assistant. Additional reasons include the shorter linear length of the incision, the propensity to cause less scarring, and overall shorter operative time.

VISUALIZATION

With fornix-based surgery, the choice of lid speculum becomes less important than with limbus-based surgery. For limbus-based surgery, the eyelashes must be pulled out of the way so as not to interfere with the surgical field. To achieve this, a solid speculum such as the Lieberman is useful. With fornix-based surgery, it is easier to avoid the eyelashes, so we use either a wire or a clip speculum such as a Kratz-Barraquer. In addition, we use Tegaderm (3M) to isolate the lashes during surgery. The combination of Tegaderm and a light wire or clip speculum gives us good visualization of the surgical field.

CONJUNCTIVAL CARE

Again, meticulous care of the conjunctiva is paramount. Sharp-toothed instruments must be avoided. We use a smooth Bishop Harmon forceps (Figure 1) to delicately handle the conjunctiva and ensure that there are no accidental holes. A Pierse Hoskins forceps is an excellent alternative, because the instrument has a 0.2-mm notched tip at the end. We start our fornix-based flap 1 to 1.5 mm posterior to the insertion of the conjunctiva to the limbus. That creates a

small shelf of conjunctiva that aids in closure.

We use blunt Westcott microscissors to dissect Tenon capsule and conjunctiva from the sclera. Larger blunt-edged Westcott scissors are sometimes useful for more posterior dissection. It is essential not to use sharp-tipped instruments, because a buttonhole often dooms the surgery to failure.

SCLERAL MANIPULATION

After dissecting the conjunctival flap, it is important to inspect the area for bleeders. We use eraser-tip bipolar cautery to help achieve hemostasis. A 23-gauge needle tip cautery is useful to precisely stop bleeding vessels at the scleral



Figure 1. Smooth Bishop Harmon forceps.



Figure 2. Minicrescent blade (left) and 350-µm guarded blade (right).



AT A GLANCE

- Trabeculectomies are the bread and butter of glaucoma surgery.
- Perhaps the most important aspect of glaucoma surgery is meticulous handling of the conjunctiva. Sharp-toothed instruments must be avoided.
- The authors provide advice on creating uniform flaps that rarely leak when sutured. This allows highly controlled titration of flow from the sclerectomy.

flap or if bleeding is encountered in the ciliary body if the punch is too posterior.

We make our flaps as uniform as possible by using a Sharpoint guarded blade of 350 μm (72-3503; Surgical Specialties; Figure 2) to make the sides and back edge of the flap, which measures 3.5 to 4 mm by 3.5 to 4 mm. After lifting a posterior corner of the flap, we use a Sharpoint microcrescent blade (74-6910; Surgical Specialties) to dissect a flap of 50% scleral thickness. We recommend against using toothed forceps so as to avoid creating holes or tears in the scleral flap. Holes in the sclera make monitoring and titrating outflow at the end of the case much more difficult.

It is important to extend this flap far anterior to the blue line in order to avoid a posterior entry into the ciliary body, which might cause extensive bleeding and potentially a flat chamber.

ANTERIOR CHAMBER ENTRY

We use a 15° super sharp blade to create a paracentesis, while taking care not to lower the IOP. Subsequently, we enter the eye with the same blade at the anteriormost portion at the hinge of the scleral flap. With a Descemet punch, we remove part of the trabecular meshwork. At this point, a 0.12-mm forceps or Calibri forceps can be used to create a basal iridectomy with angled Van Ness scissors.

CLOSURE OF THE SCLERAL FLAP

In our experience, when created with the instruments we have described, the scleral flap has such an exact size and depth that it will rarely leak when tied with two 10–0 nylon sutures at the corners of the flap. This allows highly controlled titration of flow from the sclerectomy. After postoperative day 5, most patients undergo laser suture lysis. It is important not to perform this step earlier so as to avoid



WATCH IT NOW

Cynthia Mattox, MD, shares a trabeculectomy technique to minimize induced astigmatism.



<http://eyetube.net/video/inora/>

postoperative hypotony, inflammation, and decreased visual acuity immediately after filtration surgery.

CONJUNCTIVAL CLOSURE

The conjunctiva is closed in a variety of ways using both nylon and Vicryl (Ethicon) sutures. For a fornix-based flap, we use 10–0 nylon wing sutures to close the conjunctiva down to the limbus, thereby creating the most leak-free bleb possible. The small anterior shelf of conjunctiva that we originally created is used to cover the edge of the flap at the conclusion of the case.

CONCLUSION

Although there are many ways to perform a trabeculectomy, we believe that these tools and tricks will provide surgeons with consistent success. Care must be taken at every step to be precise so as to make every instrument work best for both the surgeon and the patient. ■

Sara R. Ghobrael, MD

- fellow in glaucoma, Northwest Feinberg School of Medicine, Chicago
- (312) 475-1000; sara.ghobrael@gmail.com
- financial interest: none acknowledged

Jon M. Ruderman, MD

- director glaucoma fellowship and associate professor of clinical ophthalmology, Northwest Feinberg School of Medicine, Chicago
- (312) 475-1000; j-ruderman@northwestern.edu
- financial interest: none acknowledged