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Keratome for sutureless cataract surgery

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In sutureless small incision cataract surgery, the incision is typically triplanar with an initial scleral groove, a scleral lamellar pocket incision extending into clear cornea, and a final nonhorizontal corneal entry into the anterior chamber. Key in producing a reliably leakproof wound is the final vertical entry from the corneal stroma into the anterior chamber.

Typically the final vertical entry into the anterior chamber is accomplished in two steps. First, the surgeon tunnels a straight keratome tip approximately 1 mm into clear cornea through a previously made lamellar scleral pocket. Second, the surgeon angles the keratome blade tip downward at about a 45-degree angle to the horizontal, pressing downward with the keratome tip. When this final nonhorizontal part of the incision is made, the peripheral cornea is usually dented inward. If an anterior chamber paracentesis is made for a lens manipulator before the phacoemulsification incision is made, the eye is softer, the final leg of the phaco incision is more vertical, and the wound is more predictably leak proof.

There are problems with using a straight keratome tip to produce a 90-degree angled or even an acute angled entry into the anterior chamber. If the corneoscleral pocket is too deep in the cornea, creating the final leg of the incision may cause the posterior cornea to rip, forming a tag of Descemet's membrane and a less predictable seal to the wound. In addition, the scleral edge of the corneoscleral pocket may rip if the keratome is pulled upward during the attempt to angle the keratome vertically downward. If the keratome is pointed downward, there is also a risk of iris damage during entry, especially when the pupil cannot be fully dilated.

The keratome described here has its tip angled downward at 45 degrees to the horizontal. Figures 1 through 4 demonstrate the use of the angled keratome for cataract surgery with the pupil relatively small.

After a conjunctival opening is created, a scleral pocket is made, often with a Beaver #66 blade (Figure 1). Figure 2 shows the keratome tip as it is about to be fitted into the lamellar corneoscleral pocket. The lamellar pocket extends 1.5 mm to 2 mm into clear cornea.

Next, the surgeon slides the angled keratome into the corneoscleral pocket to a point 1 mm into clear cornea (Figure 3). To accomplish this tunneling, it is best to apply slight upward pressure to avoid piercing the sclera before reaching the intended entry point. At a point near the end of the pocket, the surgeon allows the blade to plunge into the posterior corneal stroma. The blade just barely perforates the stroma at this point.

Finally, the surgeon uses forward rather than downward pressure, and the blade guides itself down to perforate the anterior chamber (Figure 4). The surgeon may angle the leading edge of the keratome five degrees downward to avoid scraping the corneal endothelium with the body of the keratome blade.

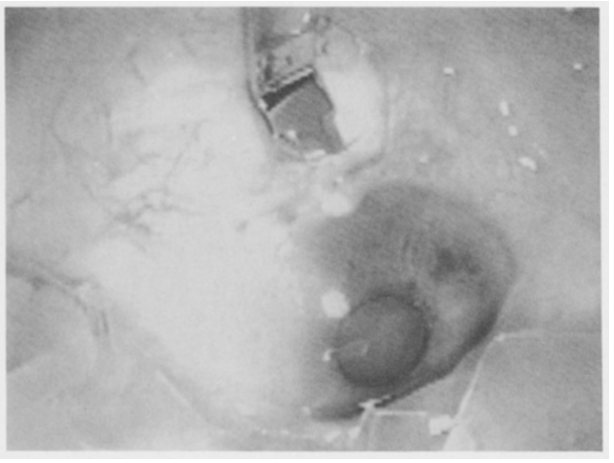

Fig. 1. (Laurence) A Beaver blade is used to create a lamellar scleral pocket extending into clear cornea.

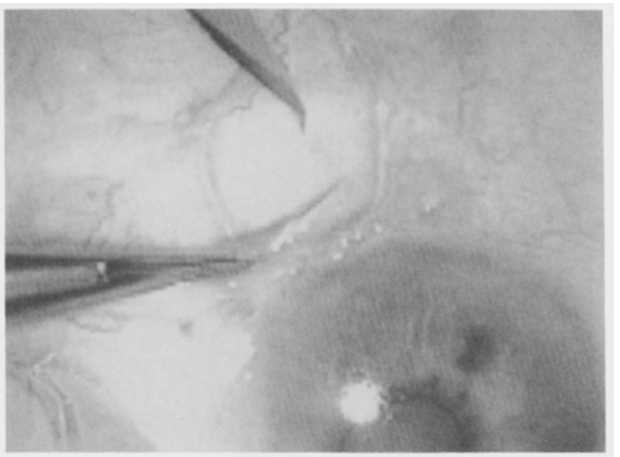

Fig. 2. (Laurence) The angled-tipped keratome is about to be inserted into the lamellar scleral pocket.

The angled-tipped keratome is manufactured by Medical Sterile Products, Rincon, Puerto Rico under the name Laurence No-Stitch Blade. The authors have no proprietary or financial interest in the device described.

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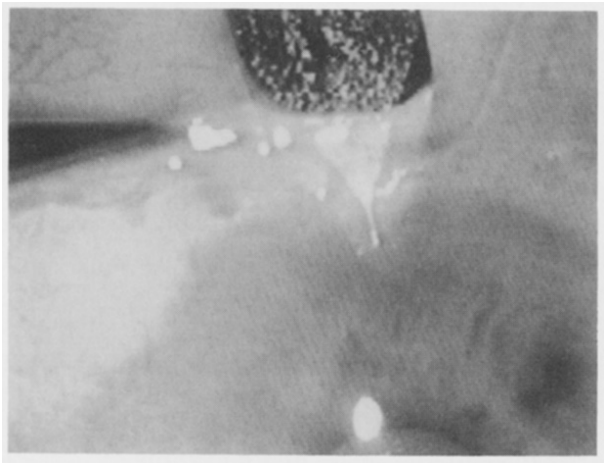

Fig. 3. (Laurence) High magnification view of blade within cornea; note the leading edge of blade pierces nearly vertically into the anterior chamber.

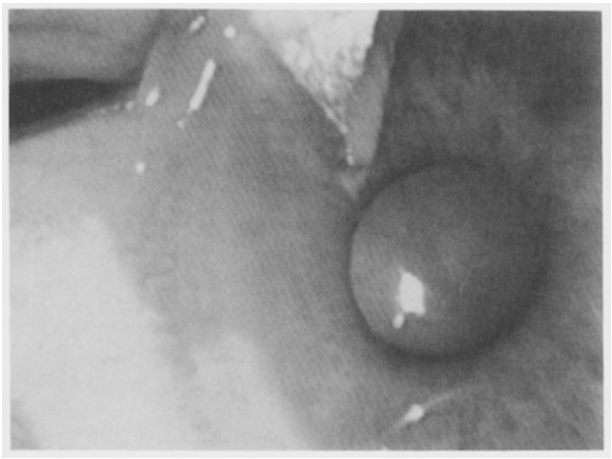

Fig. 4. (Laurence) Keratome pushed horizontally to extend incision for phacoemulsification; note the small pupil.

The keratome may also be used after performing an anterior chamber paracentesis for a second instrument. For patients with wide pupils, the tip of the keratome can also be used as a cystotome to start a continuous tear capsulotomy. On the other hand, since we keep the body of the blade rather horizontal, we are able to make the final downward plunge through the cornea with less risk of iris or lens puncture than if using a straight blade.