

# Should I Change My Incision?

Although clear corneal incisions are unforgiving, they are completely safe if the appropriate precautions are taken.

BY RANDALL J. OLSON, MD

**T**he introduction of clear corneal incisions made a dramatic impression on ophthalmologists across the US in the mid-1990s. Attracted by the elimination of conjunctival manipulation and sutures, many surgeons, including myself, adopted this approach. Twelve years later, it is interesting to assess how ophthalmologists' views of these incisions have evolved. Clearly, all of their pluses remain, but an increased incidence of endophthalmitis continues to raise concern. The question becomes whether surgeons should abandon the clear corneal incision.

## CLEAR CORNEAL INCISIONS AND ENDOPHTHALMITIS

My colleagues and I at the John A. Moran Eye Center in Salt Lake City had a quality care program to prospectively look at endophthalmitis. Unfortunately, it takes time to differentiate a trend from a cluster of cases when the incidence of disease is low. By 1999, however, my colleagues and I could detect a problem.<sup>1</sup> In a prospective, randomized study, Nagaki et al<sup>2</sup> found the incidence of endophthalmitis to be 4.6 times higher than with corneoscleral incisions and confirmed our findings.<sup>3</sup> Our own series of 15,000 cases<sup>4</sup> showed an incidence of endophthalmitis of approximately one in 400 for clear corneal incisions versus none for more than 1,200 corneoscleral tunnels performed during the same time period.

The confusing factor is that many ophthalmologists did not have a problem with clear corneal incisions.<sup>5</sup> For

example, I have not had a case of endophthalmitis with clear corneal surgery. Clear corneal incisions are therefore not responsible for the increased overall incidence of endophthalmitis in the US. Why, however, do they potentially increase the risk of this complication?

Some important clues suggest a rational approach for cataract surgeons. Work by my colleagues and me<sup>6</sup> showed a 44-fold increase in the rate of endophthalmitis when clear corneal incisions leaked. Studying such a case reveals the problem. With each blink, the tear film moves in and out of the eye with gross contamination that is

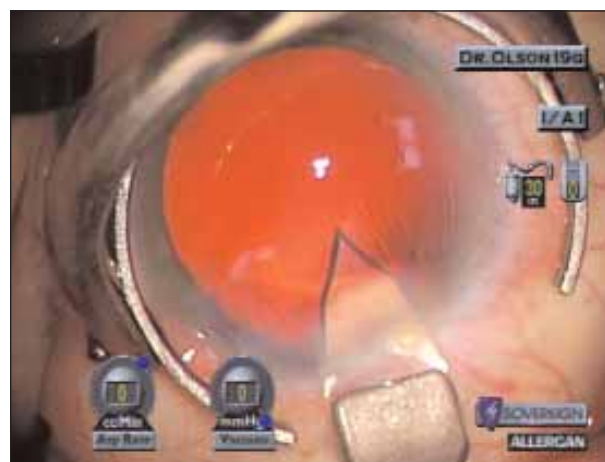
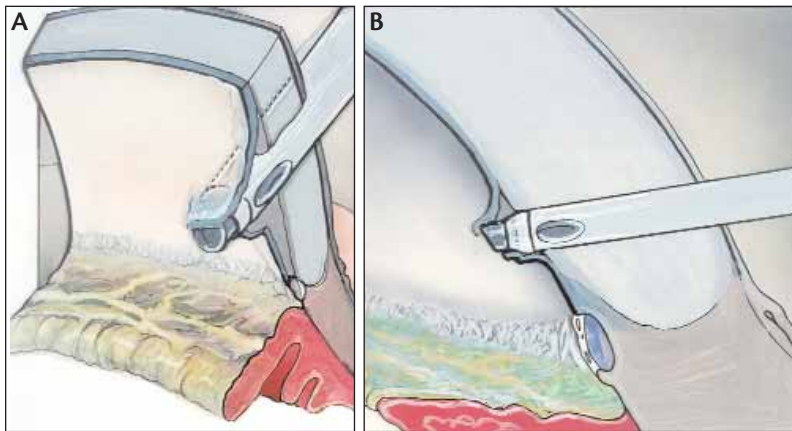


Figure 1. Because the entry to the wound was not parallel to the corneal plane, one side is shorter (concern about leakage), and one side is into the conjunctiva (concern about conjunctival ballooning).



**Figure 2.** Small single tears of Descemet's membrane are easily created (A and B) and missed. Without the endothelial pump to seal the wound, there is a greater risk of leakage.

dramatically different from a leak between sutures in which fluid always flows out of the eye. We also found a 14-fold higher risk of endophthalmitis if there were complications at the time of surgery such as zonular rupture or a broken capsule—a figure that is many times greater than in a previous study looking at endophthalmitis in association with vitrectomy after cataract surgery.<sup>6</sup>

Clear corneal incisions have been associated with a high incidence of hypotony soon after surgery.<sup>7</sup> Is this hypotony related to a shutdown ciliary body, or does it represent leakage of the wound? In their excellent study,<sup>8</sup> Masket and Belari showed that scrupulous attention to details of the incision resulted in no eyes with an IOP below 10 mm Hg among the patients they analyzed soon after surgery. Hypotony, as reported,<sup>7</sup> therefore probably represents incisions that are leaking, a major concern in the early postoperative period.

The key is careful scrutiny at the end of the cataract case to identify a marginal wound. Any unstable incisions deserve a suture, and such a careful approach can minimize the risk of endophthalmitis.

## MARGINAL WOUNDS

### Length

If marginal wounds are the cause of infection, then defining that term is important. To me, if any point across the wound is shorter than 2 mm, the incision is marginal. The shortened region often is at one edge of the wound or the other, either due to tearing of the periphery during the surgeon's manipulation of instruments or the entry of the keratome (particularly a diamond blade) not parallel to the corneal plane (Figure 1). A wound is only as strong as its weakest point.

My selection of 2 mm is based on a presentation by

Masket.<sup>9</sup> He showed, in human eye-banked eyes, that any wound shorter than 2 mm could leak, whereas clear corneal incisions that were 2 mm or longer at all points were very resistant to leakage. His findings certainly jibe with my clinical experience.

### Descemet's Detachment

Any area of Descemet's detachment (Figure 2) will result in a marginal incision. An intact Descemet's membrane is necessary for the endothelial pump to close the wound and produce a water-tight incision. Small, single tears of Descemet's membrane are not uncommon and can escape the surgeon's notice. The easiest way to see them is to

watch for the membrane to "flap in the breeze" during irrigation through the stab incision.

### Tears

A torn wound is a marginal one. Although tears are not always easy to detect, the key for me is to look at the incision at the end of the case to see how well it lines up. If it has a tendency to pout or looks distorted, particularly with obvious damage to either edge, I consider it a torn wound. This problem usually results when the surgeon tries to force instrumentation through too small an incision. Such wounds may appear to be closed after stromal hydration, but, again, I become concerned about potential leakage if their edges do not line up perfectly.

### Fishmouthing

"Fishmouthing" is an obvious change at the end of the case in which the incision gapes. The occurrence often relates to low scleral rigidity (eg, due to high myopia or keratoconus). I have also seen gaping wounds in cases of corneal transplantation, old lacerations near the incision, and scleral buckles.

### Approach

To me, all marginal wounds deserve a single 10-0 nylon suture. Any doubt about the incision's integrity on my part prompts me to place a suture. Although only necessary in a small percentage of my cases, suturing reassures me that I am addressing the risk of a leaky wound. I remove these sutures at 1 week. One pearl is not to bury the knot but to cut the sutures close to the knot, because trying to dislodge a knot from inside the incision may reopen it. It is easy to cut the knot with the edge of a hypodermic needle and remove it without placing stress on the wound.

## CONCLUSION

Clear corneal incisions are safe if appropriately cared for, but they are exceedingly unforgiving. It is essential to be scrupulous in the creation of the wound and to recognize and suture marginal incisions. I think that cataract surgeons need not abandon clear corneal incisions if they use this cautious approach. When reviewing videotapes of my surgeries, I find that I often spend more time checking the wound than I do removing the nucleus. ■

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