Concentric Intrastroma Boxed Suturing Technique

Placing sutures in the layers of tissue deep underneath a phaco wound burn aids healing without inducing significant corneal astigmatism.

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Corneal wound burns induced by phacoemulsification present a difficult problem. Due to the thermal shrinkage of nearby tissue, some superficial corneal tissue is missing across the wound, and hence, traditional sutures do not work. Even if the surgeon uses multiple superficial sutures across the wound, causing a significant amount of corneal astigmatism, the wound may still leak because tissue is missing. Although a corneal transplant with a patch graft should work, the approach is only theoretical, because this type of tissue typically is not available in the standard cataract surgery setting. This article describes a new suturing technique for closing a phaco wound burn when superficial cornea is missing.

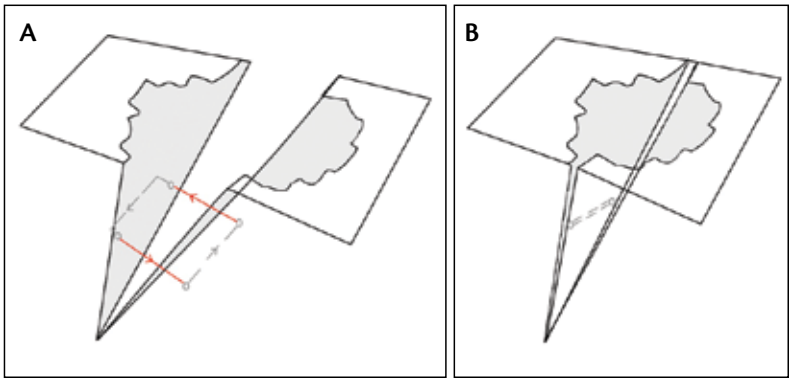

Figure 1. Diagram of the intrastroma boxed suture (A), which closes only the deeper wound tissue, leaving the superficial tissue gaped open to passively fill itself (B).

THE TECHNIQUE

Unlike traditional suturing techniques that focus on superficial wound closure, a concentric intrastroma boxed suturing technique does not attempt to close the superficial tissue layer (including the corneal epithelium) of the wound. Instead, we only attempt to close the intrastroma and deeper layers. We then place a bandage contact lens and allow the wound to passively fill itself via the wound-healing process during the weeks after cataract surgery.

Our first step is to pass a 10–0 nylon suture (Ethicon, Inc.) deep in the wound parallel to the corneal surface. It enters the corneal side of the incision, travels concentrically with a significant bite, and exits from deep in the wound. We then pass the suture through the limbal side parallel to the surface and have it exit back inside the lips of the wound. The suture is tied deep inside the wound. We cut the tails and then gently rotate it to bury the knot (Figure 1A and B).

TWO CASE REPORTS

An 86-year-old woman with a history of severe age-related macular degeneration and choroidal neovascularization treated with multiple antivascular endothelial growth factor injections presented with a BCVA of count fingers in her right eye and 20/400 in her left eye. She was found to have 3+ dense nuclear sclerosis in both eyes. She underwent cataract surgery in her right eye and developed a phaco corneal wound burn due to the dense cataract. We placed a bandage contact lens over the wound for several weeks. Five months postoperatively,

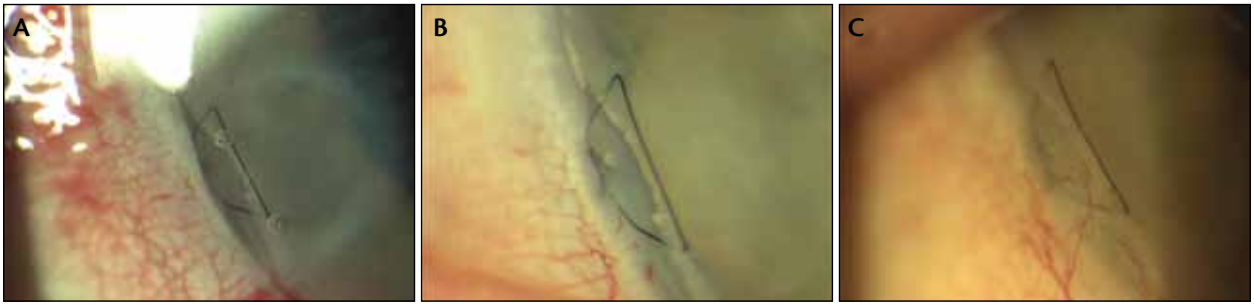

Figure 2. Intrastroma boxed suture 1 day postoperatively (A) and 1 (B) and 2 months postoperatively (C).

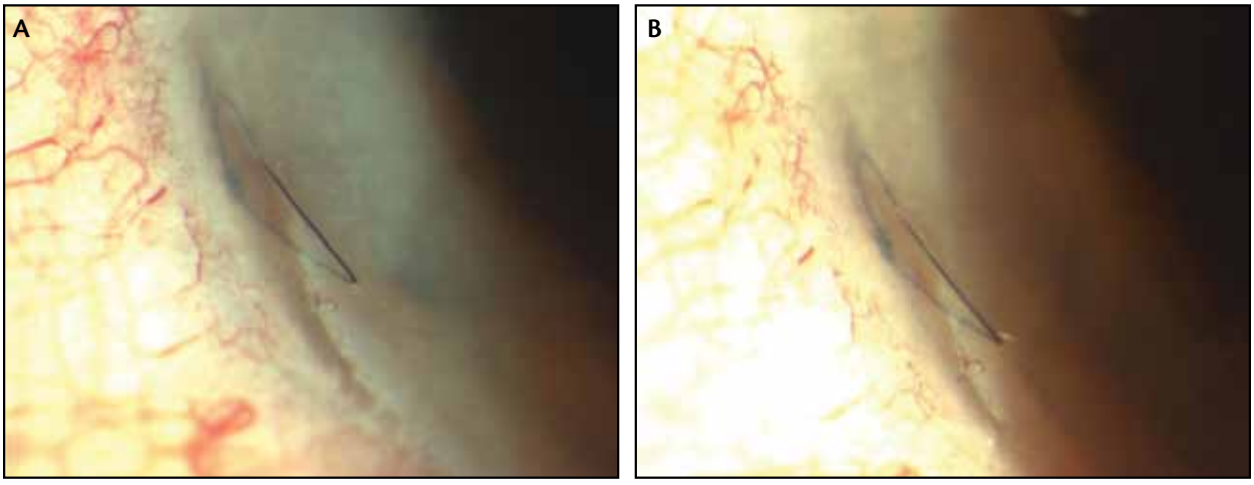

Figure 3. Intrastroma boxed suture 1 day (A) and 1 month postoperatively (B).

the patient's BCVA was 20/100, and her vision was limited by extensive geographic atrophy. The phaco wound burn healed well, and tissue filled in the superficial layer over the course of 8 to 12 weeks (Figure 2A-C), causing no significant induction of corneal astigmatism as a result of the suture.

A 74-year-old man presented with a BCVA of 20/30, myopic shift, and 3+ to 4+ nuclear sclerosis. He underwent complicated cataract surgery in his right eye with a phaco wound burn. Six months postoperatively, the patient's UCVA was 20/40, and the patient felt his vision was continuing to improve. The superficial wound gape filled with tissue over the next few weeks. No significant induction of corneal astigmatism developed as a result of the suture (Figure 3A and B).

CONCLUSION

This suturing technique is designed to effectively close a phaco wound burn when superficial tissue is missing. Osher and Osher have described similar ways to close a wound,[1] but their techniques externalize the ends of the suture to the ocular surface. In contrast, our technique buries the sutures in the deeper layers of tissue, allowing the wound to be sealed even if significant superficial tissue is missing. This intrastroma boxed suturing technique closes the deeper wound tissue, while leaving the superficial wound open. In our experience, the visual outcomes with this suturing technique have been successful without inducing significant degrees of corneal astigmatism, as demonstrated in the two cases we described. ■

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1. Osher RH, Osher JM. Wound gape: two closure techniques. *Cataract & Refractive Surgery Today*. June 2011;11(6):73-74.