



BLEB NEEDLING FOR **REVIVING** **A FAILED FILTER**

Restoring function while preserving
future surgical options.



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Bleb needling, or revision, is an age-old technique for restoring function when subconjunctival filtration surgery fails. A colleague once jokingly remarked, “Why don’t we just perform primary trabeculectomies, let them fail, and then needle them, since the outcomes after needling seem better than the primary surgery?”

Although said in jest, this comment highlights that bleb needling is an effective method of revitalizing a previously functional filtration procedure while preserving future surgical options. For that reason, bleb needling has become our preferred intervention before proceeding to the implantation of a glaucoma drainage device.

This article focuses on bleb needling after traditional subconjunctival filtration procedures, including trabeculectomy and Ex-Press glaucoma filtration device (Alcon) surgery.

FACTORS INFLUENCING SUCCESS

Successful bleb needling depends on several important considerations:

- Bleb appearance and configuration;
- Choice of needling technique (ab interno vs ab externo);
- Use of antifibrotic agents and corticosteroids intra- and postoperatively;
- Use of a spacer such as an OVD;
- Selection of the appropriate setting (slit lamp vs OR); and
- Postoperative management and patient expectations.

How much time has passed since the original filtration surgery may also influence outcomes. The biology of wound healing changes over time. Active fibroblast proliferation and ongoing inflammation may predispose newer blebs to recurrent fibrosis after needling, whereas older blebs often exhibit a more mature, stable healing response.

Occasionally, ab interno removal of an Ex-Press device may be necessary during a needling procedure if the implant is contributing to filtration failure.

OR- VERSUS OFFICE-BASED NEEDLING

Although bleb needling can be successfully performed at the slit lamp,

we increasingly prefer to perform the procedure in the OR. The OR provides greater patient comfort while allowing more aggressive adhesiolysis, wider posterior dissection, and greater flexibility should additional maneuvers become necessary.

TAILORING THE TECHNIQUE TO BLEB MORPHOLOGY

The appearance of the bleb significantly influences the surgical approach. A flat bleb with minimal vascularity behaves differently from a highly vascular, diffuse bleb or a dome-shaped bleb containing a dense Tenon cyst.

In eyes with a thick Tenon cyst, an ab externo approach can facilitate the disruption of the cyst wall and the release of encapsulated fibrosis. In contrast, an ab interno approach may better address a relatively avascular bleb by elevating the scleral flap and reestablishing communication with the subconjunctival space.

Regardless of technique, the objective is to re-create communication between

the subscleral and subconjunctival spaces. Whether using a large-gauge needle, a microvitrectomy blade through an ab externo approach, or a spatula for ab interno manipulation, successful revision is characterized by visualization of the instrument as it traverses both tissue planes, elevation of the bleb, and softening of the globe, which confirms the restoration of aqueous filtration. Dissection should extend posteriorly toward the fornix whenever possible, encouraging the formation of a broad, diffuse posterior bleb rather than a localized cystic elevation.

ANTIFIBROTIC THERAPY AND SURGICAL ADJUNCTS

The use of antifibrotic agents is strongly recommended. In the OR, we prefer to administer an antifibrotic after the needling procedure is complete. For office-based procedures, the antifibrotic can be injected with lidocaine and remain in place for approximately 5 to 10 minutes before needling. Delaying administration until filtration has been restored minimizes reflux of the antifibrotic into the anterior chamber.

OVD has become another valuable adjunct. Both intracameral and subconjunctival injections of an OVD can serve as temporary spacers that help maintain anterior chamber depth, reduce the likelihood of postoperative hypotony with a shallow anterior chamber, and mechanically support the newly created filtration space during the critical early healing period.

Cycloplegic agents should be administered at the conclusion of surgery, and a depot corticosteroid such as triamcinolone acetonide (Kenalog, Bristol-Myers Squibb) can provide prolonged suppression of postoperative inflammation and fibrosis.

POSTOPERATIVE MANAGEMENT

Early postoperative hypotony is not uncommon and may persist for several weeks. During this period, treatment

with topical corticosteroids and atropine is often necessary to promote favorable wound modulation while maintaining anterior chamber stability.

Topical corticosteroids should be tapered slowly over approximately 6 to 8 weeks to minimize recurrent fibrosis while allowing gradual wound maturation.

CLINICAL OUTCOMES

The needling of mature blebs has consistently demonstrated meaningful reductions in IOP and the medication burden. Kim and colleagues evaluated patients undergoing intraoperative bleb needling 4.3 years on average after trabeculectomy and reported a qualified success rate of 70% at 1 year, with a mean IOP reduction of 25% (95% CI = 13.8%–36.4%).¹ At 5 years, the qualified success rate remained 52%, with a 44.3% reduction in IOP (95% CI = 34.9%–53.6%).¹ These findings suggest that even long-standing failed blebs can often be successfully revived.

Patients who undergo needling earlier in the postoperative period have also demonstrated favorable outcomes. Das and colleagues prospectively showed significant reductions in IOP and the medication burden at 6 months after bleb needling in patients with failed trabeculectomies.² Outcomes may be less predictable, however, in eyes with blebs that fail early because of active postoperative inflammation and aggressive fibrosis. In this situation, restarting glaucoma medications, maintaining intensive therapy with topical corticosteroids, and allowing the eye to become less inflamed before attempting needling may improve the likelihood of long-term success.

One of the greatest advantages of bleb needling is that the procedure is repeatable. If filtration gradually declines over time, repeat needling often restores function without sacrificing future surgical options.

Several factors, including race, have been associated with poorer outcomes after bleb needling, but additional patient-specific and bleb-specific characteristics undoubtedly influence long-term success.

CONCLUSION

Bleb needling remains a safe, repeatable, and highly effective method for restoring function after the failure of traditional subconjunctival filtration surgery, including trabeculectomy and Ex-Press shunt placement. A careful assessment of bleb morphology, the thoughtful selection of surgical approach, the appropriate use of antifibrotic and antiinflammatory adjuncts, and meticulous postoperative management can produce durable reductions in IOP while delaying or avoiding the implantation of a glaucoma drainage device. Before proceeding to additional glaucoma surgery, bleb needling merits consideration whenever a previously functioning filtration procedure can be salvaged. ■

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