

Selecting the Right Tools for the Job

ILM peeling with the FINESSE SHARKSKIN ILM Forceps from Alcon.

BY YANNEK LEIDERMAN, MD, PhD



The internal limiting membrane (ILM) is a thin, transparent, acellular membrane comprising the innermost lamina of the retina. The ILM is important in pathologies associated with vitreoretinal interface disorders, including macular hole, macular pucker, and macular traction maculopathy secondary to high myopia.¹⁻³ Removal of the ILM is

performed to aid in restoring macular morphology and improve function in macular hole and other maculopathies requiring vitrectomy.³⁻⁵

Peeling the ILM is a technically difficult maneuver,⁶ particularly in the setting of complex anatomy, such as detached retina or significant macular edema (ME). Instrument selection for initiating and performing the peel may be important in mitigating risk factors associated with complications.

In my hands, the new FINESSE SHARKSKIN ILM Forceps (Alcon) are an ideal tool for gaining an edge during an ILM peel and atraumatically delaminating membrane during delicate surgical maneuvers (Figure 1). Oftentimes, I am able to complete the peel using only a single instrument.

INDICATIONS FOR ILM PEELING

ILM peeling may be beneficial in a number of pathologies. My most common indications for performing this step are in repair of macular holes and when epiretinal membrane is present. There are several additional scenarios in which peeling the ILM may address tractional forces affecting the retina:

- **Diabetic tractional retinal detachments.** Attached hyaloid and proliferative membranes on the surface of the retina should be removed. In addition, I remove the ILM in some, but not all,

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cases of tractional retinal detachment.

- **Diabetic ME.** ME refractory to pharmacotherapy where surgery is required, particularly if there is evidence by OCT imaging that a tractional etiology is contributing to diabetic ME.
- **Myopic macular schisis.** Complete removal of tangential and epiretinal traction is often required to address myopic schisis, particularly in highly myopic eyes and those with staphylomatous anatomy.
- **Rhegmatogenous retinal detachment (RRD) with associated macular hole.** In some cases, I also peel the ILM in the detached retina.
- **Lamellar macular hole.** If surgery is indicated, care must be taken to avoid creating a full-thickness macular hole.
- **RRD with wrinkling of the macula.** Less frequently, I peel ILM in some cases of RRD with wrinkling of the macula, particularly in younger patients, as this may represent very early proliferative vitreoretinopathy.

Fundamentally, the common causative element in most of these pathologies is traction on the retina either from an attached posterior hyaloid when it is present or from epiretinal proliferation, such as epiretinal membrane. Epiretinal proliferation that has a contractile element may wrinkle the retina, create a macular hole, or otherwise distort macular anatomy with associated visual dysfunction. The ILM itself is not contractile tissue; rather, when it is removed, it serves as a surrogate for removal of any epiretinal cellular proliferation.

Correspondingly, it is the overlying epiretinal cellular elements that induce tractional forces causing pathology or may serve as a reservoir for postoperative repopulation.

ILM PEELING COMPLICATIONS: INFLUENCE OF TECHNIQUE VERSUS INSTRUMENTS

Surgery to remove epiretinal tissue is associated with an element of risk. With respect to ILM peeling, risks can arise from surgical tactics, technique, and instrumentation. One element of the procedure that confers risk is lifting the edge of a membrane or ILM to initiate the peel. This requires utilizing instrumentation at the surface of the neurosensory retina, and the surgeon must selectively grasp and elevate the ILM without exerting undue mechanical force on the retina.

Initiating the peel can lead to a number of complications. Local hemorrhage at the site might indicate mechanical and/or microvascular injury to the retina. More significant damage may occur if a partial- or full-thickness retinal

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hole is induced. One way to mitigate risks associated with mechanical trauma to the retina is to avoid initiating a peel or grasping an edge close to the center of the macula. Although a number of factors may dictate where the peel is initiated and how it is performed, the nature and extent of the pathology is arguably the most crucial factor. During the peel, the surgeon must ensure that enough ILM is peeled to be effective in alleviating pathology without increasing risk via multiple instrument passes and without spending excess time working at the surface of the retina. In very large macular holes, I tend to initiate the peel relatively far away from the center of the macula and peel a larger area in order to achieve more complete alleviation of epiretinal traction.



Figure 1. The FINESSE SHARKSKIN ILM Forceps.

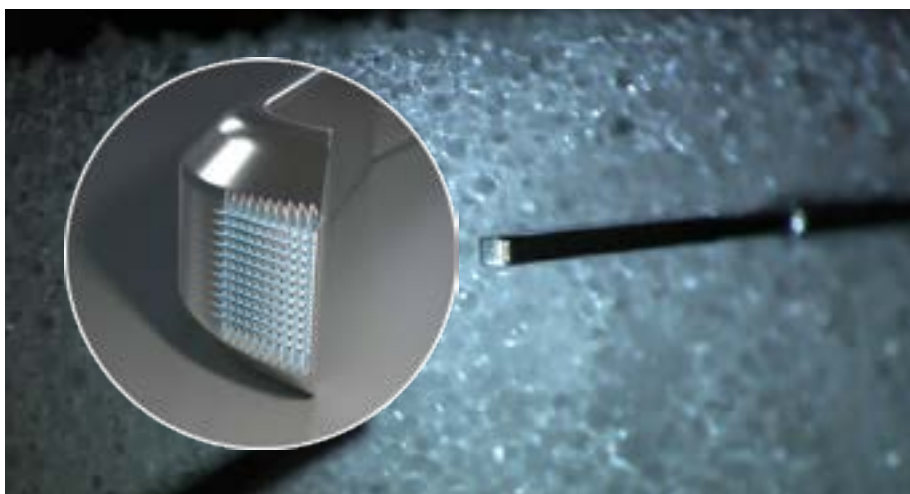


Figure 2. The laser-ablated microsurface of the SHARKSKIN ILM Forceps.

In smaller holes, I start closer to the macula when I am comfortable that more limited peeling is sufficient to achieve hole closure. Other factors, such as ergonomics and the design of the instrument, can also dictate where the peel is initiated.

The strength of the adhesion between epiretinal proliferation and the underlying retina, or the ILM and associated

retina, plays an important role. The potential cleavage plane between the retina and ILM can vary, and thus, there is potential to delaminate part or all of the nerve fiber layer. Use of stains or dye to aid in visualization and identification of the ILM may be useful in reducing this risk.

Electrophysiology studies have shown decreased sensitivity in areas

where ILM peeling is performed, suggesting that the use of higher concentration of indocyanine green for ILM staining might result in transient retinal dysfunction of the underlying retina in some cases.⁷ However, the implications of these findings for long-term visual function are unclear.

Finally, ILM peeling tends to be more challenging in certain pathologies. For example, profound and diffuse edema in the retina can compromise the counter traction that aids in delamination of the ILM. It can be both difficult to visualize the ILM and engage the retina with forceps in eyes with very severe pathologic myopia.

INSTRUMENT SELECTION

Microsurgical instrument design is integral in facilitating complex surgical tactics such as those employed in removal of the ILM. The FINESSE SHARKSKIN ILM Forceps offer a large end-grasping platform and the outer edge of the tips are scored. The design elements of the forceps are intended to support atraumatic initiation⁸ of the ILM peel and mitigate tearing of the membrane during delamination.⁹

The SHARKSKIN ILM Forceps differ from other instruments used for membrane peeling. I favor a pinch-and-peel technique: other forceps require the surgeon to grasp part of the membrane in between the tines and elevate without engaging and lifting up on the retina. The laser-ablated microsurface of the SHARKSKIN ILM Forceps confers friction for initiating the initial edge in membrane and ILM peeling (Figure 2). It behaves like a membrane scraper in this regard, built into the forceps (see Watch it Now).

WATCH IT NOW

ALCON'S FINESSE SHARKSKIN ILM FORCEPS

Yannek Leiderman, MD, PhD, presents his initial experience with the FINESSE SHARKSKIN ILM Forceps used for membrane peeling in a patient with diabetic eye disease.



▶ EYETU.BE/BCLAD

CONCLUSION

Minimizing risks associated with peeling the ILM requires a multifactorial approach. Judicious case selection, selection of appropriate tactics, and utilizing OCT imaging to formulate a strategic approach to ILM removal aid in maximizing outcomes and minimizing complications. Surgical instrumentation is certainly an important consideration. In my initial experience, the FINESSE SHARKSKIN ILM Forceps incorporate a number of design elements that aid in macular surgery. The texturized tip facilitates initiation of a leading edge when starting the peel, while the grasping platform maintains control of the membrane through the peel. The excellent ergonomics of the forceps and its actuation behavior are critical design elements that have become synonymous with Grieshaber instruments (Alcon). ■

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GRIESHABER® DSP Important Product Information

Caution: Federal (USA) law restricts this device to sale by, or on the order of, a physician.

Indications for Use:

GRIESHABER® DSP instruments are a line of single-use vitreoretinal microinstruments which are used in ophthalmic surgery, for cases either in the anterior or the posterior segment. The GRIESHABER® Advanced Backflush Handles DSP are a family of instruments for fluid and gas handling in vitreoretinal surgery.

Warnings and Precautions:

- Potential risk from reuse or reprocessing GRIESHABER® DSP instruments include: foreign particle introduction to the eye; reduced cutting or grasping performance; path leaks or obstruction resulting in reduced fluidics performance.
- Verify correct tip attachment, function and tip actuation before placing it into the eye for surgery.
- For light fiber instruments: Minimize light intensity and duration of exposure to the retina to reduce risk of retinal photic injury. The light fiber instruments are designed for use with an ALCON® illumination source.
- Good clinical practice dictates the testing for adequate irrigation and aspiration flow prior to entering the eye. If stream of fluid is weak or absent, good fluidics response will be jeopardized.
- Use appropriate pressure supply to ensure a stable IOP.
- If unwanted tissue gets engaged to the aspiration port, it should be released by interrupting aspiration before moving the instrument.

Attention:

Please refer to the product labeling for a complete listing of indications, warnings, and precautions.