Adhesives for LASIK Epithelial Ingrowth Removal

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Have done research, consulting, or speaking for:
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Some of the information may represent off-label uses of approved drugs or devices.

Epithelial Ingrowth

Complication of LASIK surgery
- Incidence 0.5 to 15%
- Usually observed in first few weeks
- May be nonprogressive or progressive
- In most advanced stage may result in flap melt

Signs
- Isolated nests/sheets of cells
- Decreased UCVA and/or BCVA
- Induced astigmatism on refraction
- Irregular astigmatism on topography
Treatment - Removal

Removal
- Lifting and scraping epithelial cells
- Blunt spatula, Merocel sponge
- Ethanol used to supplement complete removal
- MMC – has no role in management
- PTK to remove additional cells can induce significant irregular astigmatism
- Nd:YAG Laser treatment
  Useful for stable pockets of ingrowth where the elevation of the cornea causing changes in comfort or vision

Treatment – Prevention of Recurrence

Prevention of Recurrence
- Suturing flap edges
  Induce striae, irregular astigmatism, requires suture removal, longer recovery
- Fibrin adhesive application
  Useful for recurrent cases
  Longer recovery

Tisseel Fibrin Glue

Baxter (tissuesealing.com)
- Mixture of:
  Fibrinogen & Thrombin
  Also has fibrinolysis inhibitor (bovine)
- Mixed on surface of the eye
- 30-60 seconds to manipulate it
- Thrombin can be diluted to slow the setting time
- 8-10 minutes to dry so BSCL can be placed
- Dissolves in 10-14 days
Fibrin Adhesive for Multiple Recurrences

- Soften Epithelium Around Gutter
- Remove Epithelium around Gutter
- Remove Epithelium from Stromal Bed & Gutter
Fibrin Adhesive for Multiple Recurrences
Remove Epithelium from Back of Flap

Fibrin Adhesive for Multiple Recurrences
Apply Fibrin Portion of Sealant (Blue/Thick)

Fibrin Adhesive for Multiple Recurrences
Apply Thrombin Portion of Sealant (Black/Thin)
Fibrin Adhesive for Multiple Recurrences
Allow Glue to Dry

Postoperative Day 1
Fibrin Adhesive following RK & LASIK

Results in Study of 39 Eyes

Facts
- LASIK surgery
- Epithelial ingrowth recurred despite prior removal or enhancement

Risk Factors
- Following LASIK enhancement: 32 eyes
- Epithelial flap: 1 eye
- IP-RK and LASIK enhancement: 4 eyes
- No history: 26 eyes

Prior Procedures
- 9 eyes with prior removals
- Up to 5 removal attempts previously
- Mean ± SD: 1.7 ± 1.3 removal attempts

Success
- No recurrence: 79.5%
- 3 clinically significant recurrences requiring subsequent removal (7.7%)
- No patient required 10/1000 or less visual acuity due to high residuals
- Average 23 ± 16.1 months follow-up

Hardten, et al., JCRS 2014, Combination of MECA Ointment & Duke University Eyes
Results
Eyes with > 3 months follow-up (3 to 66 months):
- Two eyes underwent flap amputation due to irregular astigmatism.
- One eye had ectasia with subsequent Intacs placement
- One eye had poor vision from glaucoma (2/200 to CF)
- 92.3% had unchanged or improved BCVA
- 5.1% lost one line of BCVA
- BCVA improved from 61% with 20/25 BCVA preop to 76% at 3 months postop and 84% at last follow-up.

Nd:YAG Laser
Epithelial Ingrowth Removal
- 0.6 mJ
- Variable number of spots depending on amount of ingrowth
- 40% of cases required 2 or more sessions

Epithelial Ingrowth
Nd:YAG Laser
30 eyes
Starting in the center of the ingrowth
Average energy 0.6mJ
FML TID 2 weeks postop
Opacities resolve fully in 80%
Mild opacity remained in 20%
Epithelial Ingrowth

Nd:YAG Laser

Before  Immediately After  2 months after

Conclusions

Fibrin Adhesive
- Tisseel/Artiss may be a useful adjunct in epithelial ingrowth removal in complicated cases
- May reduce incidence of recurrent epithelial ingrowth
- Tisseel/Artiss is well tolerated and there were no complications associated with its use
- Larger randomized studies would be needed to determine safety and efficacy of this technique as compared to primary removal or sutures
- Reports of ReSure along the graft edge shows it may also be useful
- Nd:YAG may be useful for stable long-standing ingrowth destruction

References:
- Yesilirmak, et al., JRS 2015;31:275
- Ayala, et al., AJO 2008;145:630
- Hardten, et al., JCRS 2003;29:1425
- Anderson, et al., JCRS 2014
- ReSure 2003:29 140
- Ayala, et al., AJO 2004;63:48