

Ablative Fractional Laser Resurfacing (AFLR) for Treatment of Cicatricial Ectropion & Periocular Scarring

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Cicatricial Ectropion & Lagophthalmos

- Cicatricial ectropion and lagophthalmos can result in **corneal exposure** and ulceration
- Scars can become **thickened** with **abnormal pigmentation and texture**



Traditional Management

- Non-surgical:
 - Massage, ocular lubrication
 - Steroid & 5-Fluorouracil (5-FU) injections
- Surgical:
 - Full-thickness skin grafts
 - Z-plasty
 - Flaps



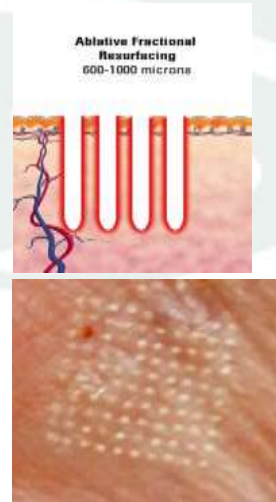
Full-Thickness Skin Grafting

- Donor site morbidity
- Graft shrinkage, necrosis, and re-cicatrization
- Mismatch in graft thickness, color, and texture



Ablative Fractional Laser Resurfacing (AFLR)

- Originally indicated for laser skin rejuvenation and reduction of wrinkles
- ABLATIVE Lasers: CO2 (10,600 nm), Erbium YAG (2960 nm), YSGG (2790 nm)
- FRACTIONAL: treats a fraction of surface area in a grid pattern creating microscopic ablation columns
- **Rapid healing without scar tissue formation**
- Stimulates removal of damaged collagen, wound healing cascade, formation of new collagen and improved tissue organization



POM 5 s/p Full + Fractional Laser Resurfacing x 1 for wrinkles



POM 5 s/p AFLR x 2 for lower eyelid / malar festoons



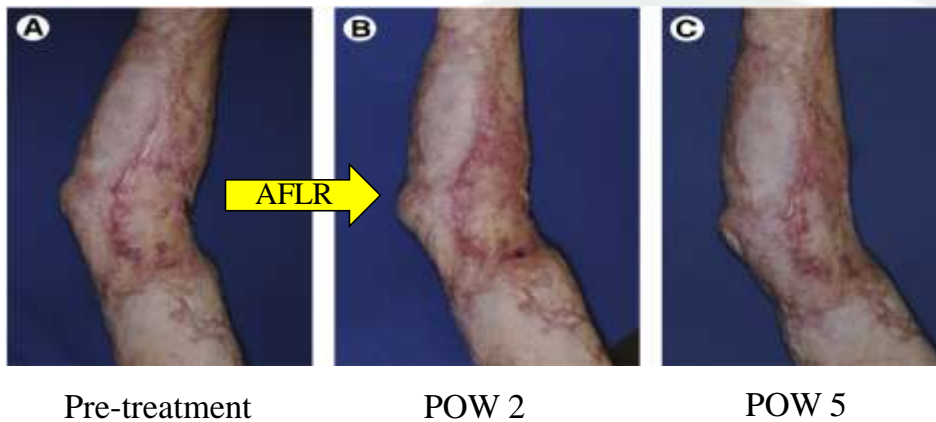
Ablative Fractional Laser Resurfacing (AFLR) for SCARS



- Treatment of hypertrophic scars, keloids & burn contractures
- In non-ocular tissues, shown to improve:
 - Scar pliability
 - Texture & appearance
 - Range of motion
 - Scar biology/cytokine profiles

Shumaker et al, 2012

AFLR improves range of motion for joint contractures



Photos from Uebelhoer NS et al. 2012.

Laser Assisted Drug Delivery (LADD)

- Laser microchannels can assist in drug delivery
 - Stratum corneum limits topical drug penetration
 - AFLR disrupts the epidermis, allowing topically applied medications to reach deep into the scar/dermis
 - Even distribution throughout target tissue

Waibel et al, 2013

Our Hypothesis

If periocular scars are like eyelid contractures, . . .

. . . perhaps AFLR and LADD can effectively treat cicatricial ectropion and periocular scarring.

Case #1

- 27-year old male presented 6 weeks after a motorcycle accident with 2nd to 3rd degree facial burns.
- Three weeks prior, he developed **progressive lagophthalmos** with associated burning, tearing, and foreign body sensation.

Slit Lamp Exam

- VAsc: **20/50 OD**, 20/20 OS
- Conjunctiva: mild injection OD, quiet OS
- Cornea: **2+ punctate epithelial erosions OD**, clear OS
- Rest of exam was normal



Following 3 injections of 5-FU/Triamcinolone



Following 3 injections of 5-FU/Triamcinolone

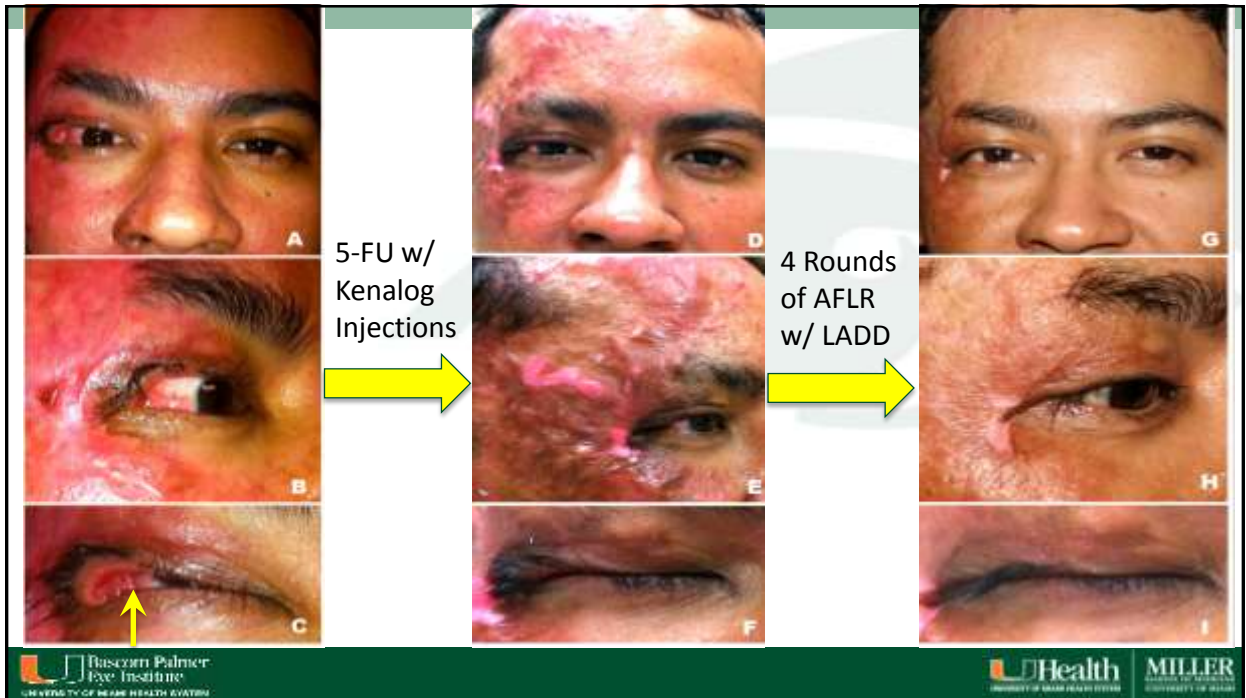


Following 4 sessions of AFLR with LADD (topical 5-FU)



Following 4 sessions of AFLR with LADD (topical 5-FU)





Ophthalmic Plastic & Reconstructive Surgery, 2017

ORIGINAL INVESTIGATION

Ablative Fractional Laser Resurfacing With Laser-Assisted Delivery of 5-Fluorouracil for the Treatment of Cicatricial Ectropion and Periocular Scarring

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Case Series

- Retrospective case series
- Inclusion criteria:
 - Cicatricial ectropion not requiring urgent surgery for corneal exposure
 - Completed 3 treatments of AFLR with LADD (with 5-FU) spaced 6-12 weeks apart
- Treatment parameters
 - YSGG laser (2790 nm)
 - Treatment density 5-15%, depth: 1-2 mm

Clinical Outcomes

- Improvement in lagophthalmos and ocular surface staining (fluorescein)
- Dry Eye Symptoms (**Ocular Surface Disease Index, OSDI**)
- Scar Appearance (**Patient and Observer Scar Assessment Scale, POSAS**)
 - Pliability
 - Pigmentation
 - Vascularity
 - Thickness, Relief, and Surface Area

Results

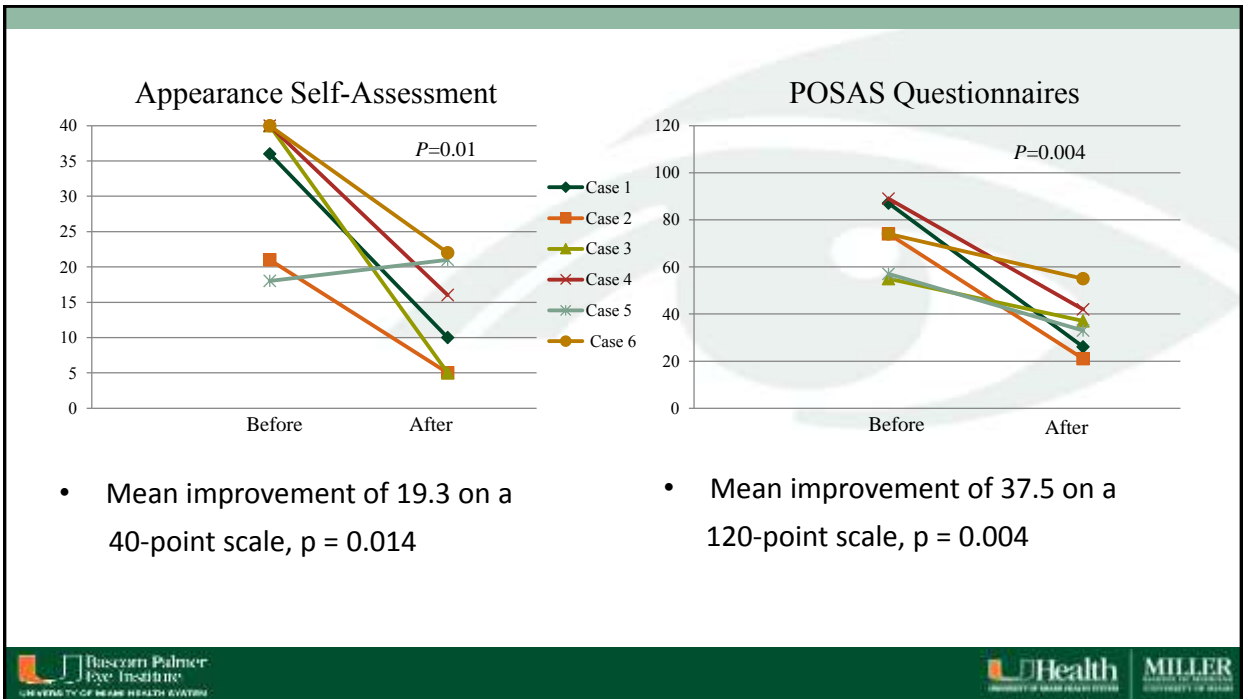
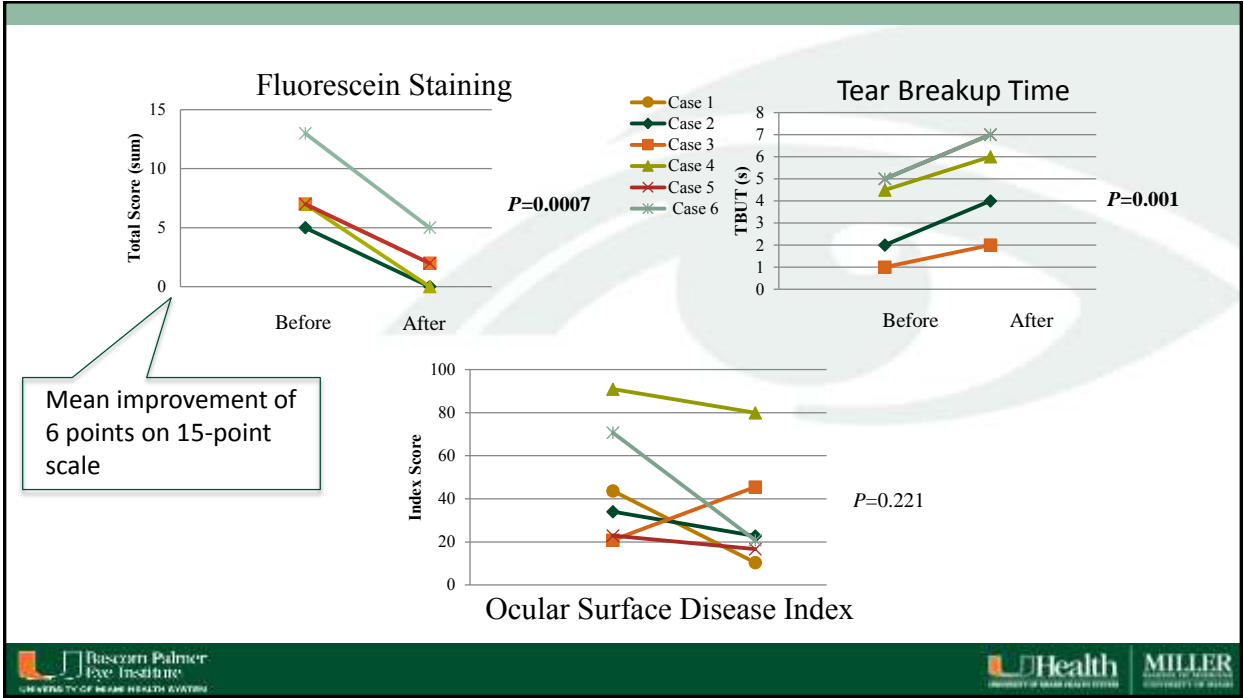
Patient demographics and clinical characteristics

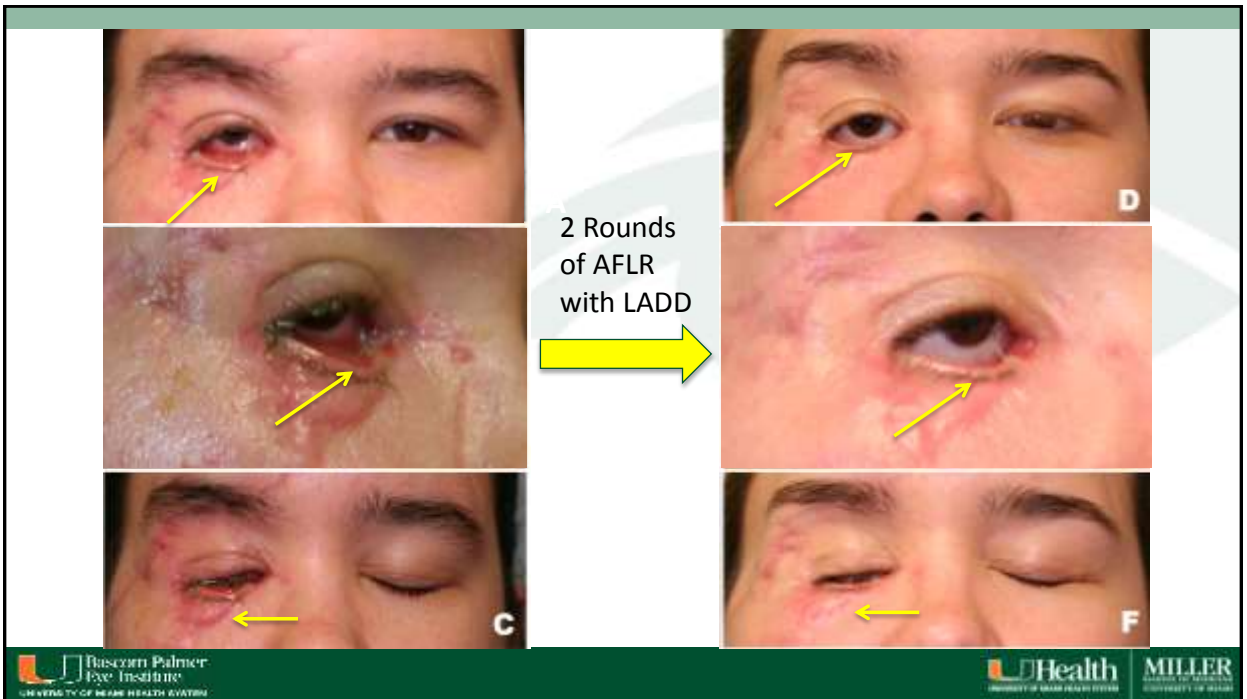
	Gender	Age	Fitzpatrick skin type	Scar etiology and eyelid pathology	Scar age at 1st treatment (months)	#AFLR treatments	Treatment details
Case 1	M	30	IV	Extensive facial and eyelid burns; cicatricial ectropion and brow elevation, lagophthalmos	4	4	Received both adjunctive intralesional 5-FU injections and AFLR with laser-assisted delivery of topical 5-FU
Case 2	M	84	II	Mohs reconstruction surgery; cicatricial ectropion	4	3	All 3 AFLR treatments performed with laser-assisted delivery of topical 5-FU
Case 3	M	73	II	Mohs reconstruction surgery with skin grafting; cicatricial ectropion and lagophthalmos	4	3	All 3 AFLR treatments performed with laser-assisted delivery of topical 5-FU
Case 4	F	23	III	Traumatic facial and eyelid lacerations; reconstructive surgery; cicatricial ectropion and lagophthalmos	3	3	All 3 AFLR treatments performed with laser-assisted delivery of topical 5-FU
Case 5	M	21	VI	Traumatic facial and eyelid lacerations; cicatricial ectropion and lagophthalmos	4	3	All 3 AFLR treatments performed with laser-assisted delivery of topical 5-FU
Case 6	M	30	V	Traumatic facial and eyelid lacerations; cicatricial ectropion and lagophthalmos	1	3	All 3 AFLR treatments performed with laser-assisted delivery of topical 5-FU

5-FU, 5-fluorouracil; AFLR, ablative fractional laser resurfacing.

Results

- Of 4 cases with lagophthalmos, all improved and two showed complete resolution.
- All showed improved scar thickness, pigmentation, and texture







Conclusions

- First study to use AFLR with laser assisted delivery of 5-FU in the periocular region
- Functional improvement in cicatricial ectropion, lagophthalmos, and exposure keratopathy
- Aesthetic improvement not achievable by surgery alone (e.g. scar thickness, pigmentation, pliability, texture)
- AFLR can be an effective non-surgical treatment option or part of a multi-modality reconstructive plan.



Shukran!

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