South Beach Symposium
medical + aesthetic dermatology
CELEBRATING 20 YEARS
OF PREMIER MEDICAL & AESTHETIC DERMATOLOGY EDUCATION

REIMAGINING
MEDICAL AND
AESTHETIC
DERMATOLOGY

Using EBDs to Treat Acne and Rosacea

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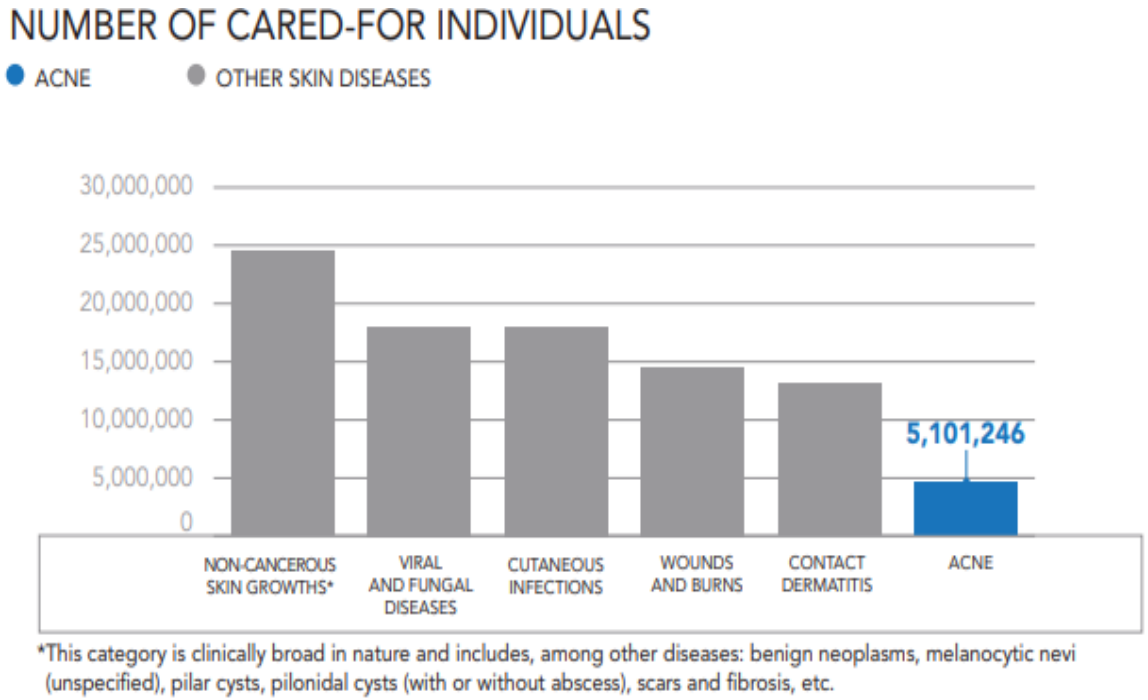
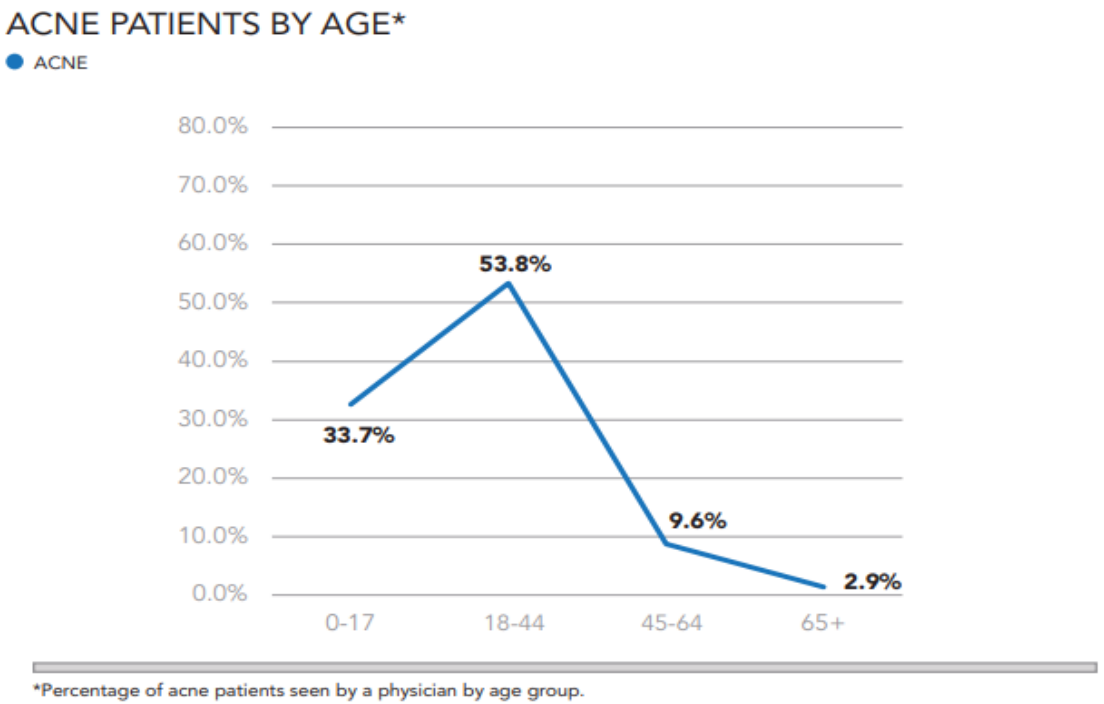
ACNE: WHY DO WE CARE

- Affects
  - >80% of adolescents
  - >40% of adults over than 25
- Genetics plays a role
- Associated with
  - Disfigurement
  - Pain
  - Loss of confidence
  - Depression
- Effects on quality of life are comparable to those suffering from chronic diseases like asthma, seizures and diabetes

Acne remains under-treated



*This category is clinically broad in nature and includes, among other diseases: benign neoplasms, melanocytic nevi (unspecified), pilar cysts, pilonidal cysts (with or without abscess), scars and fibrosis, etc.



*Percentage of acne patients seen by a physician by age group.

AAD Website

Conventional Acne Treatment Model

Diagnose

Prescribe

Wait & See

Problem #1 with the Conventional Model: Unpredictable and Provides Limited Efficacy. Patients increasingly do not want drugs

Figure 2: Global Alliance Acne Treatment Algorithm

Acne Severity: MILD → MODERATE → SEVERE

	Comedonal	Mixed and Papular/pustular	Mixed and Papular/pustular	Nodular[2]	Nodular/Conglobate
1st Choice	Topical Retinoid	Topical Retinoid + Topical Antimicrobial	Oral Antibiotic + Topical Retinoid +/- BPO	Oral Antibiotic + Topical Retinoid + BPO	Oral Isotretinoin[2]
Alternatives[1]	Alt. Topical Retinoid or Azelaic acid* or Salicyclic acid	Alt. Topical Retinoid Antimicrobial Agent + Alt. Topical Retinoid or Azelaic Acid*	Alt. Oral Antibiotic + Alt. Topical Retinoid +/- BPO	Oral Isotretinoin or Alt. Oral Antibiotic + Alt. Topical Retinoid	High Dose Oral Antiobiotic +Topical Retinoid + BPO
Alternatives for Females[1,4]	See 1st Choice	See 1st Choice	Oral Antiandrogen + Topical Retinoid/ Azelaic Acid* +/- Topical Antimicrobial	Oral Antiandrogen[3] + Topical Retinoid/ +/- Oral Antibiotic +/- Alt. Antimicrobial	High Dose Oral Antiandrogen[3] + Topical Retinoid +/- Alt. Topical Antimicrobial
Maintenance Therapy	Topical Retinoid		Topical Retinoid +/- BPO		

1. Consider physical removal of comodones. 2. With small nodules (<0.5cm). 3. Second course in case of relapse.
4. For pregnancy, options are limited. 5. For full discussion see Gollnick H. et al. MAD 2003;49 (Suppl):1–37.
*Note: Azelaic acid is not approved for the treatment of acne in Canada.
Originally published in Thiboutot D, Gollnick H, Bettoli V, et al. New insights into the management of acne: an update from the Global Alliance to Improve Outcomes in Acne group. J Am Acad Dermatol 2009;60(5 Suppl):S1–S50. Copyright Elsevier 2009. Reprinted with permission.

Patients and physicians need a more effective, predictable, and cost-effective, cost-efficient approach to addressing acne for the modern patient

Acne Vulgaris

- This presentation will cover lasers and IPLs that can be used for the treatment of acne vulgaris
- It is beyond the scope of this presentation to cover all the lasers and RF microneedling devices that can be used to treat acne scars
- Most devices that we use for acne scars can treat active acne through the generation of heat into the sebaceous gland and surrounding areas

The Fate of Active Acne and Acne Scars Following Treatment With Fractional Radiofrequency
J Drugs Dermatol. 2019;18(12):1268:1272

ORIGINAL ARTICLE
JOURNAL OF DRUGS IN DERMATOLOGY

The Fate of Active Acne and Acne Scars Following Treatment With Fractional Radiofrequency

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ABSTRACT

Introduction: Acne vulgaris (AV) is a common skin disorder that may result in long-lasting acne scars. Techniques such as delivering fractional radiofrequency (RF) energy through miniature pins or needles have been utilized to manage active acne and acne scars. Skin restoration through dermal remodeling, neo-collagenesis, neo-elastogenesis, and epidermal re-newal are typical results of such treatments.

Methods: 15 subjects suffering from acne received 3 sessions of facial treatments, 3-4 weeks apart, using a fractional RF device with 24 pins tip of 2500µm in length. The treatment's safety and efficacy were evaluated up to 6 months after the last treatment.

Results: Facial photos and classifications of active acne, acne scars, and overall skin appearance demonstrated improve-ments in follow-up visits compared to baseline. No significant or unexpected adverse events were detected.

Conclusion: The current study supports the safety and efficacy of the fractional RF treatment modality for acne condition.

J Drugs Dermatol. 2019;18(12):1268-1272.

Devices for Acne
Expert Review of Dermatology 2006

Novel treatment options for severe inflammatory acne vulgaris

Michael H Gold

Acne vulgaris is one of the most common dermatological disorders encountered in everyday practice. Treatment options for this often psychologically scarring disease are numerous and, for many individuals, provide relief from the disorder. However, factors such as antibiotic resistance and, slow onset of action from many topical therapies has led researchers to seek out alternative therapies, especially for those suffering from moderate to severe inflammatory acne vulgaris.

Expert Rev. Dermatol. 1(1), 13–23 (2006)

Energy-Based Devices in Treatment of Acne Vulgaris
Dermatol Surg 2016;42:573-585

REVIEW ARTICLE

Energy-Based Devices in Treatment of Acne Vulgaris

MARC Z. HANDLER, MD,* BRADLEY S. BLOOM, MD,† AND DAVID J. GOLDBERG, MD*†‡

BACKGROUND Acne vulgaris is a chronic dermatologic complaint with a multifactorial cause. Traditionally, antibiotics and retinoids have been used to manage the condition; patient compliance has been an ongoing issue. A variety of energy-based devices have been reported to be effective in the treatment of acne vulgaris.

OBJECTIVE To review and summarize the current literature specific to treatment of acne vulgaris with energy-based devices.

METHODS A review of the current literature of energy-based devices used for the treatment of acne vulgaris.

RESULTS AND CONCLUSIONS Although limited randomized controlled trials for the treatment of acne have been performed, significant clinical improvement of acne vulgaris, especially of inflammatory lesions, has been demonstrated with a variety of energy-based devices. Newer approaches may lead to even better results.

The authors have indicated no significant interest with commercial supporters.

Energy Based Devices, Indications, and Mechanisms of Action
Dermatol Surg 2016;42:573-585

TABLE 1. Energy Based Devices, Indications, and Mechanisms of Action

Energy-Based Device	*Wavelength (nm)*	*Target Acne Type*	*Mechanism of Action*	*Efficacy*
IPL	400–1200	Mild-to-severe Inf	Porphyrin activation and destruction of *P. acnes*; thermal destruction of sebaceous glands	>90% (Inf)
IPL with suction[4]	400–1200	Mild-to-severe Inf	Broadband light with mechanical clearance of sebaceous duct	Up to 90% (Inf)
Blue LED	400–500	Inf	Keratinocyte normalization, photosensitizes coproporphyrin III and protoporphyrin IX leading to destruction of *P. acnes*	Up to 77% (Inf)
Red LED	620–660	Inf and NI	Activates protoporphyrin IX leading to destruction of *P. acnes*	Up to 66% (Inf); 59% (NI)
Blue-red LED	400–500; 620–660	Inf and NI	Keratinocyte normalization and porphyrin activation leading to destruction of *P. acnes*	Up to 90% (Inf); up to 54% (NI)
IR	700 nm to 1 mm	Inf	Targets water in sebaceous gland	Up to 84%
PDL	595	Inf	Unknown, possible effect on sebum production	Up to 53% reduction
KTP	532	Inf	*P. acnes* bactericidal; sebaceous gland disruption	Up to 26%
PDT	N/A	Inf and NI	Activation of protoporphyrin IX destroying *P. acnes* and the pilosebaceous gland	Up to 100%
RF	N/A	Moderate Inf and NI	Thermal destruction of sebaceous glands	Up to 90% (Inf)
Particle assisted + Diode	800	Inf	Destruction of the pilosebaceous infundibulum and glands	Up to 61% (Inf)

Inf, inflammatory lesions; N/A, not applicable; NI, noninflammatory lesions.

Energy-Based Device Targets
Dermatol Surg 2016;42:573-585

TABLE 2. Energy-Based Device Targets

Target	*Device*
P. acnes	Blue LED, combination blue-red LED, IPL, KTP, PDL
Sebaceous gland	RF, PDT, IR, PDL, KTP, IPL
Vascular supply of sebaceous gland	IPL

Acne Vulgaris

- Laser/Light technology
  - Lasers/light sources to reduce the *P. acnes* population
    - Blue Light Sources - Blu-U
    - Red Light Sources
    - Intense Pulsed Light Devices– Quantum/Vasculight/Lumenis One/M22/Stellar M22, Ellipse, elos Plus, BBL/Joule, Harmony XL, Lumecca, Isolaz
    - Vascular Lasers –Cynergy, V-Beam Perfecta, N-Lyte, AdvaTX
    - Short-Pulsed 650 usec 1064 nm – Aerolase Neo

Acne Vulgaris

- Phototherapy and PDT with blue light is beneficial in the treatment of acne vulgaris
  - Process works through the photo-excitation of the *C. acnes*’ porphyrins after exposure of appropriate wavelength of light
    - Leads to the formation of singlet oxygen within the bacteria
  - Ultimate destruction of the P. acnes bacteria
  - Acne lesion will resolve leaving alone surrounding tissue and structures

Studies With Low-Level LED and Laser Light in Acne Vulgaris
Dermatol Surg 2016;42:573-585

TABLE 4. Studies With Low-Level LED and Laser Light in Acne Vulgaris

Author of Trial	*Type of Study*	*Device*	*Number of Patients in Study*	*Duration or No. Treatment*	*% Reduction in Inf or NI*
Liu and colleagues[13]	OL	Blue-red LED	50	9 ± 3.34 treatments	>90 in 44% of subjects
Kwon and colleagues[31]	DBRCT	Blue-red LED	35	2.5 minute bid for 4 weeks	77 (Inf); 54 (NI)
Goldberg and Russell[29]	OL	Blue-red LED + microdermabrasion	24	2 treatments per week for a total of 8 sessions	81 (Inf)
Lee and colleagues[32]	OL	Blue-red LED	24	2 per week for 4 weeks	77.8 (Inf); 34.3 (NI)
Gold and colleagues[33]	SBRCT	Blue LED	30	Twice daily for 2 days	77 (Inf)
Akaraphanth and colleagues[34]	OL	Blue LED	20	Once per week for 4 weeks	56.7 (Inf)
Wheeland and Koreck[35]	OL	Blue LED	31	Twice daily for 8 weeks	60 (Inf)
Gold and colleagues[36]	OL	Blue-violet LED	17	Twice per week for 4 weeks	36.4% complete clearance
Na and Suh[37]	SBRCT split face	Red LED	28	Twice daily for 8 weeks	66 (Inf); 59 (NI)
Aziz-Jalali and colleagues[38]	SBRCT split face	Red LLLT+ 2% topical clindamycin	28	Twice per week for 12 sessions	26 (Inf)

DBRCT, double-blinded randomized controlled trial; Inf, inflammatory lesions; NI, noninflammatory lesions; OL, open label; SBRCT, single-blinded randomized controlled trial.

Acne Vulgaris

- Previous studies with blue light
  - Gold 2003 AAD poster presentation
    - 43% improvement in inflammatory acne lesions with ClearLight PhotoClearing device for mild to moderate acne vulgaris
    - 40 patients evaluated with 2x/week therapy for 4 weeks
    - *All patients included in the results – responders and non-responders*

Acne Vulgaris

- Blu-U device FDA cleared for inflammatory acne
  - Used originally for ALA-PDT therapy
  - Works for mild to moderate inflammatory acne vulgaris as well
  - 2004 AAD Poster Presentation; J Drugs Dermatol 2004– Gold, Goldman, Rao
    - Blu-U more effective in inflammatory acne lesions than 1% clindamycin solution
    - Safety and efficacy proved

Blue Light/Acne
Gold/Goldman

A MULTICENTER CLINICAL EVALUATION OF THE TREATMENT OF MILD TO MODERATE INFLAMMATORY ACNE VULGARIS OF THE FACE WITH VISIBLE BLUE LIGHT IN COMPARISON TO TOPICAL 1% CLINDAMYCIN ANTIBIOTIC SOLUTION

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Abstract

Background: Blue light sources have been shown to be effective in the treatment of mild to moderate inflammatory acne vulgaris lesions.

Objective: We evaluated the safety and efficacy of a new blue light source in the treatment of mild to moderate inflammatory acne vulgaris in comparison to topical 1% clindamycin solution.

Results: Blue light therapy reduced inflammatory acne vulgaris lesions by an average of 34%, as compared to 14% for topical 1% clindamycin solution.

Conclusions: The blue light source presented in this report is a safe and effective rreatment option available to our patients wirh mild to moderate inflammatory acne lesions.

- IPL Technology

Acne Vulgaris

- Laser/Light technology
  - Intense Pulsed Light (IPL) technology for acne-many systems exist
    - Quantum, VascuLight, Lumenis One, M22, Stellar M22
    - Other systems – Harmony, BBL, Isolaz, Elos Plus, Lumecca
    - ClearTouch, SkinStation
      - Ross V (2002 ASLMS) – 50% inflammatory acne lesion improvement
      - Elman M, Lebzelter J. Light therapy in the treatment of acne vulgaris. Dermatol Surg 2004; 30: 130-146.
        - 85% > 50% improvement; 15-20% non-responders

Studies With IPL in Acne Vulgaris
Dermatol Surg 2016;42:573-585

TABLE 3. Studies With IPL in Acne Vulgaris

Author of Trial	*Type of Study*	*Device*	*Number of Patients in Study*	*Duration of Treatment*	*% Reduction in Lesions, Inf or NI*
Liu and colleagues[13]	OL	IPL	50	6 ± 2.15 treatments	>90 (Inf)
Shamban and colleagues[4]	Retrospective	IPL + pneumatic	56	4 treatments	90 (Inf)
Berger (unpublished)	OL	IPL + pneumatic	15	1 treatment every other week × 2 sessions	75 (Inf)
Gold and Biron[14]	OL	IPL + pneumatic	11	4 treatments	78.8 (Inf)
Wanitphakdeedecha and colleagues[15]	OL	IPL + pneumatic	18	4 treatments	65 (Inf)
Elman and Lask[16]	OL	IPL	19	8 treatments	85 (Inf); 87 (NI)
Yeung and colleagues[17]	OL	IPL	30	4 treatments per week at 3-week intervals for 12 weeks	22 (Inf); 44 (NI)
Baugh and Kucaba[18]	OL	IPL	25	2 treatments per week for 2 weeks	20 (Inf)
Sadick[19]	OL	IPL	8	3 treatments spread over 12 weeks	32 (Inf)
Myers and colleagues[12]	OL	IPL	7	1 treatment every 3 weeks	70 (Inf)

Inf, inflammatory lesions; NI, noninflammatory lesions; OL, open label.

4 Different Treatment Groups

ST – Skin Treatments

- Aesthetic and cosmetic applications requiring selective photothermolysis
- Mild to moderate inflammatory Acne

PL – Pigmented Lesions

Benign epidermal lesions

HR – Hair Removal

Permanent hair reduction

VL – Vascular Lesion

Benign cutaneous vascular lesions

Dedicated ACNE notch filter*

Propionibacterium acnes produce endogenous porphyrins as part of their normal metabolism

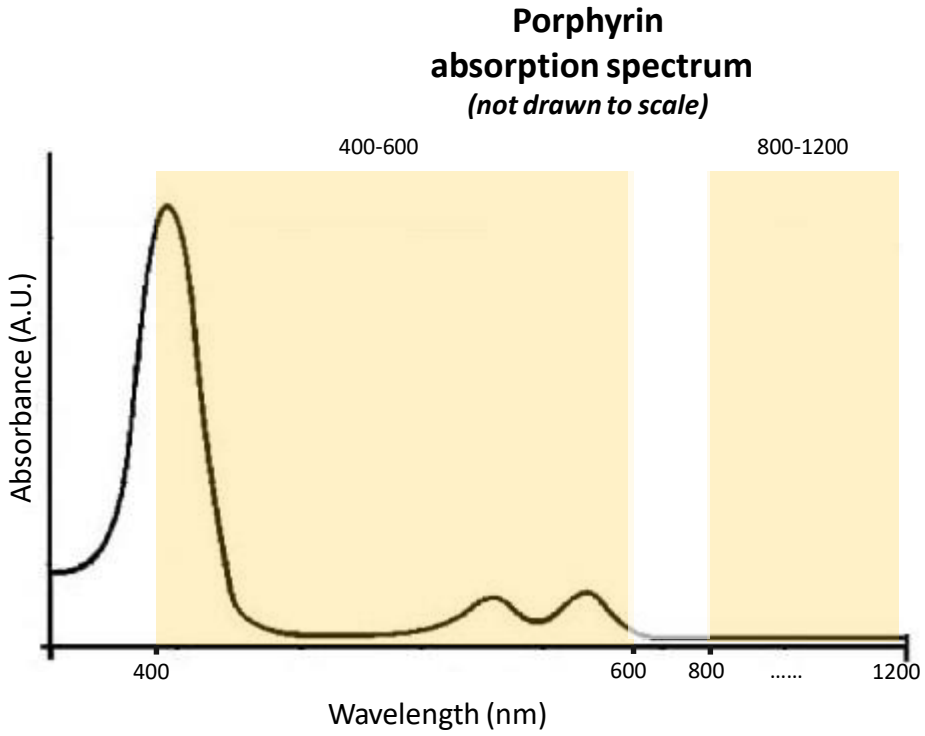
The notch filter 400-600 & 800-1200nm is ideal for inflammatory acne:

When exposed at 400-600nm (with a peak at the Soret band around 400-420nm)

- Porphyrins are excited to release Singlet Oxygen which eradicate P. Acnes
- Superficial inflammation is reduced

When exposed at 800-1200nm

- Light penetrates deeper to reach the sebaceous glands
- The “shrinkage” of the sebaceous glands reduces the anaerobic environment necessary for the bacteria to proliferate

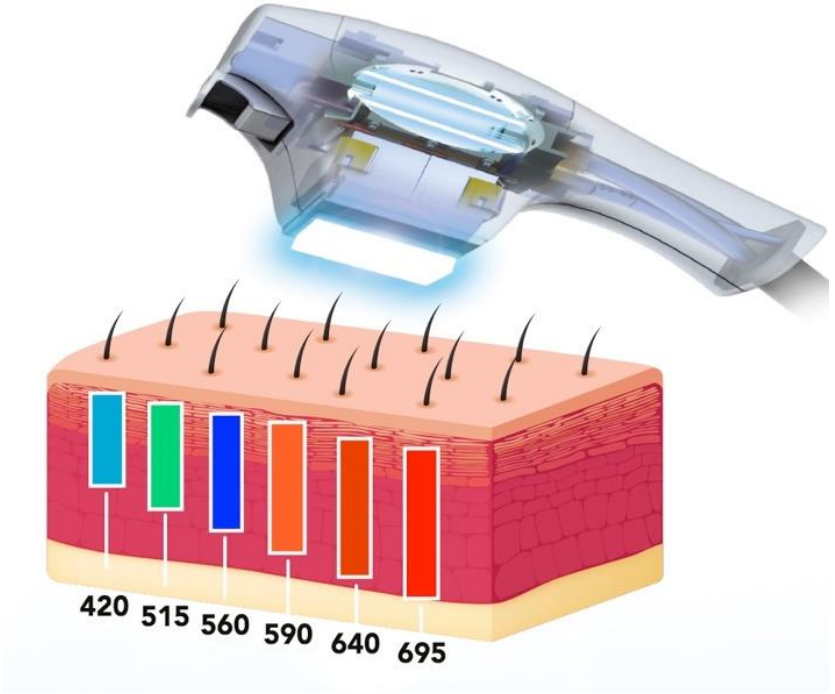


Rejected band of 600-800nm

**** Optional***

BBL™ easy to change Smart Filters™

- BBL uses Smart Filters™ allowing for quick and easy adjustment of wavelengths on a single hand piece.
- This allows you to address multiple skin concerns without having to use or change multiple hand pieces.



How is BBL different from other IPLs?

BroadBand Light (BBL) is the most advanced and versatile broadband light system in its class.

What truly sets BBL apart?

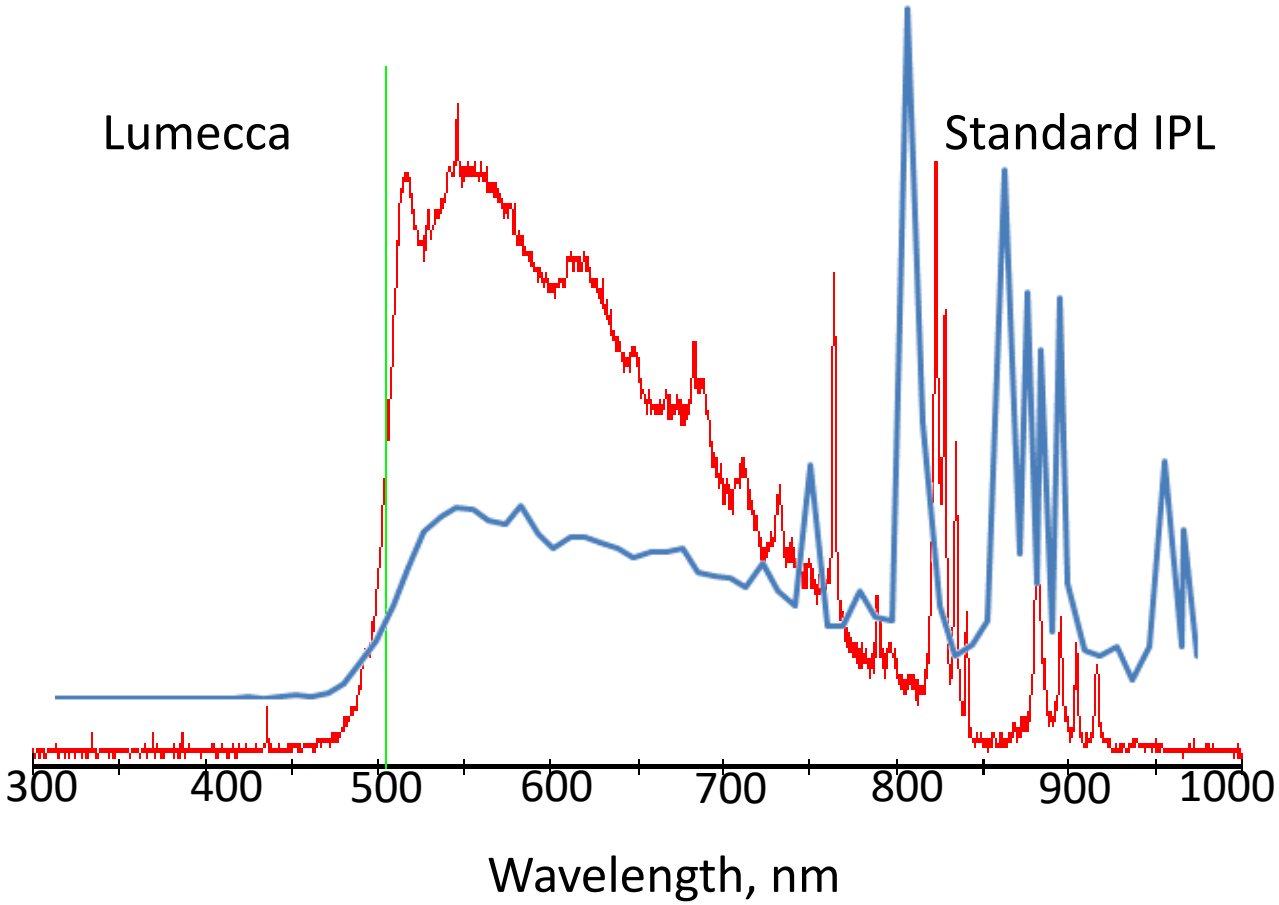
- Advanced Intelligent Treatment Driven Interface
- Longer lamp lifetime with the DuraLamp Technology
- Snap on adaptors and Smart Filters for fast adjustments during treatment
- Precise and consistent treatments
  - Square Wave and True Pulse Width control
- Range of spot sizes, including large
- CoolComfort technology features:
  - Powerful cooling; 1-30 °C in 1 °C increments
  - Treat large areas with no lag

Lumecca 515/580 Specifications

Specifications	
Technology:	IPL
Spot Size:	10x30mm
Pulse Repetition:	1pps at all energies
Wavelength:	515-1200nm 580-1200nm
Fluence:	5-30J/cm2
Peak Power:	3,300 w/cm^2
Pulse Duration:	Short/Long • SHORT = 30% of the Fluence # in msec • LONG = 50% of the Fluence # in msec
Cooling:	Controlled

INNOVATION IN IPL – Lumecca “Lase-Like” IPL

- The spectrum of Lumecca is more LASER-LIKE
- Lumecca is thus more efficient than other IPLs:
  - Lumecca: 65% of the energy is in 520-650nm spectrum
  - Other IPL’s: 25% in 520-650nm
- “Sweet spot” of best absorption of melanin and hemoglobin in target with minimal absorption in surrounding tissue
- Treatment parameters are much lower than other IPLs, therefore much safer for darker skin



TheraClear® X Acne Therapy System

What is TheraClear X?

- The TheraClear X Acne System is used to deliver an in-office procedure that combines negative pressure vacuum and broadband light thru a water-cooled, hand-held wand.

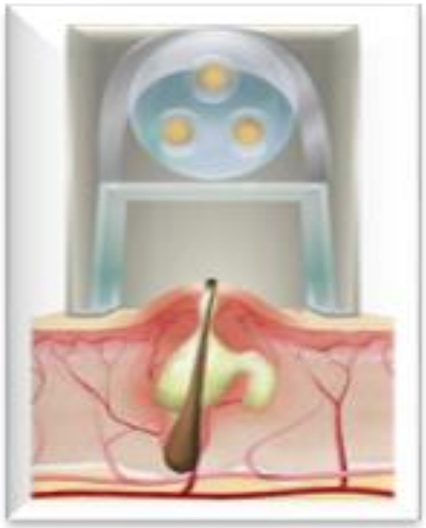
How does it work?

- Negative pressure suction draws in skin, removing blockages and impurities from the pore known to encourage bacteria growth, followed by pulsed delivery of broadband light to the affected areas.
- Helps eliminate key bacteria such as C. acnes.
- Most acne patients will require 4-6 treatments, conducted every 2-weeks for 2-3 months.

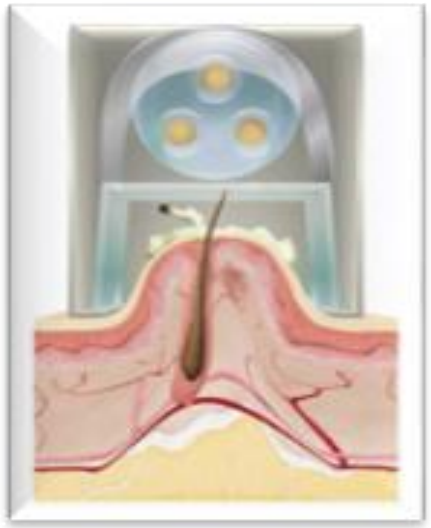
What are the results?

- Visible improvement seen as early as treatment #2 (24-48 hrs. post).

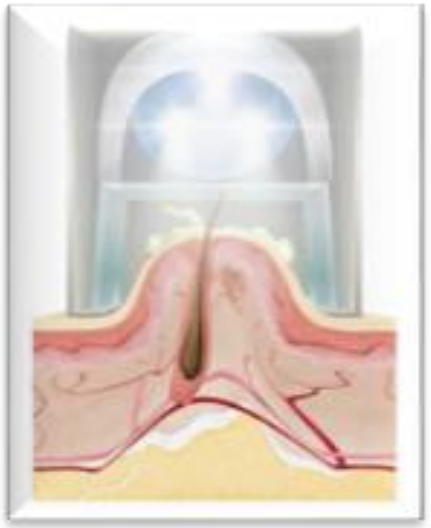
TheraClear® X Application



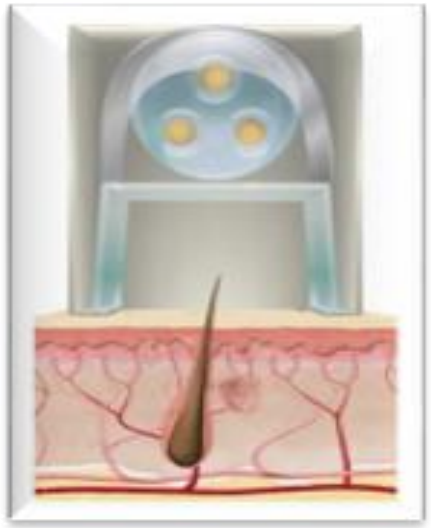
Theraclear™ hand piece covers and seals treatment area



Pneumatics disrupts blockage and extracts sebaceous material



Light flashes twice coagulating small blood vessels, heating the sebum making it less viscous



Obstruction in the pilosebaceous apparatus is removed and skin normalizes

Clinical Expectations for TheraClear® X Patients

- Throughout the course of treatment, expectations include:
  - Painless procedure that takes approximately 15 minutes to administer
  - Treatments easily delegated (aesthetician), varies depending on state laws
  - Marked improvement can be seen as early as treatment #2
  - Reduced redness and inflammation
  - Decrease in number and severity of inflammatory lesions
  - Decrease in the amount of oil production

- <u>Commercial availability beginning July 2022</u>

ADVATx

- Solid-state 589/1319nm
  - ND Yag Diode Crystals
    - No Consumables

- Scanner Hand piece
  - Single spot or fractional
  - 1mm spot size
  - Multi-pattern up to 10x10mm
  - Both wavelengths delivered with the same hand piece

Treatments – 589nm

- Telangiectasia
- Spider veins, both facial and leg
- Rosacea
- Hemangiomas
- Port wine stains
- Venous lakes
- Red or hypertrophic scars
- Melasma
- Hyper pigmentation
- Skin rejuvenation

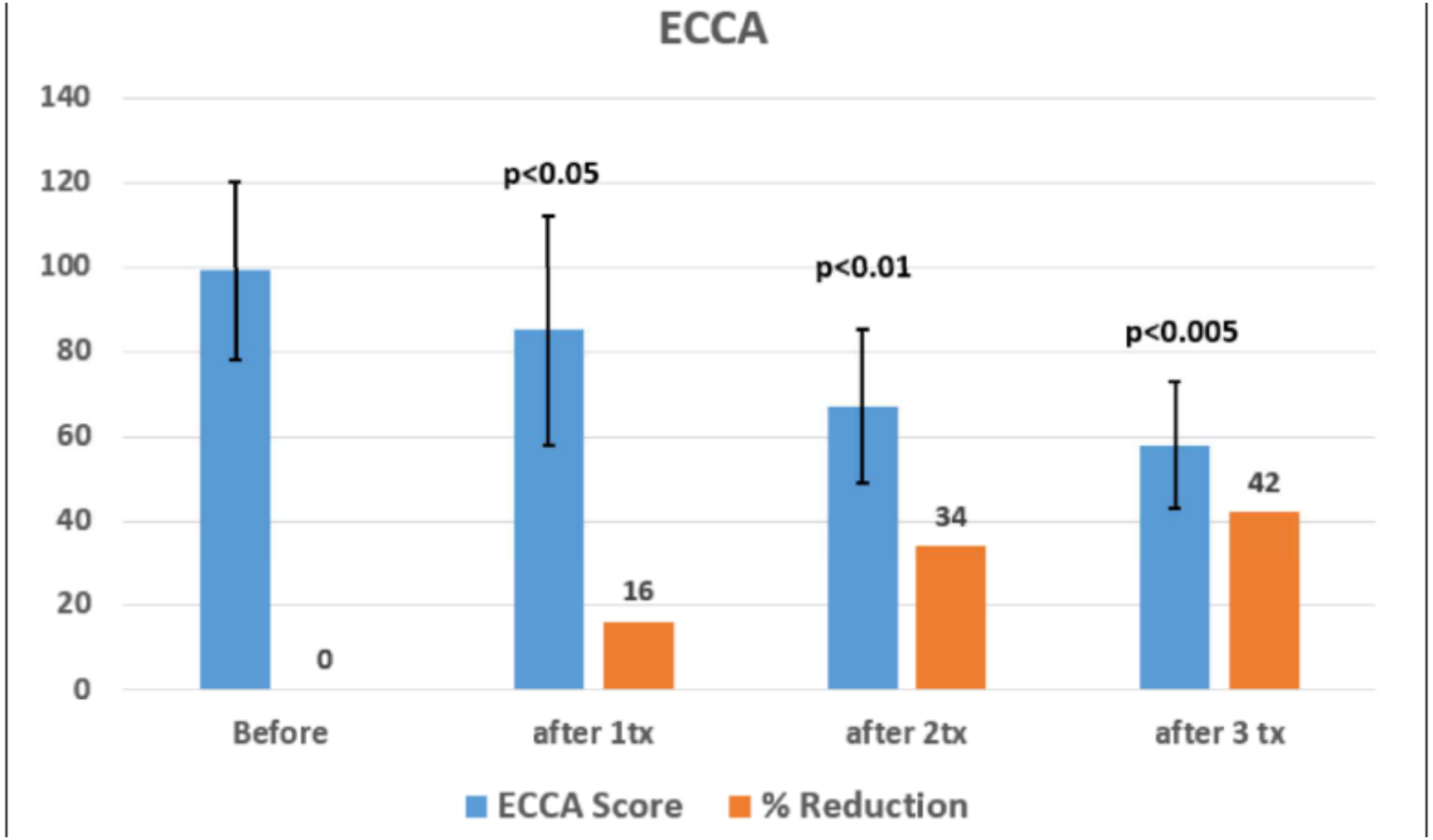
Treatments 1319nm

- Skin rejuvenation
- Reduction of acne scars
- Reduction in the appearance of pores
- Mild and moderate inflammatory acne vulgaris

Background and Objectives for TCRC Study

- Facial acne scarring is a prevalent disease
  - Physical and psychosocial sequelae
- Innovative solid state, dual-wavelength laser investigated
  - 589/1319 nm
  - No consumables
  - No dye kits

ECCA Scale


ECCA
140
120
100
80
60
40
20
0
p<0.05
p<0.01
p<0.005
0
16
34
42
Before
after 1tx
after 2tx
after 3 tx
ECCA Score
% Reduction

Treatment of Acne Scaring with a Novel Dual-Wavelength Laser
J Cosmetic Dermatol. 2019;18:1290-1293

ORIGINAL CONTRIBUTION

JCD Journal of Cosmetic Dermatology | WILEY

Treatment of acne scarring with a novel dual-wavelength laser

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Funding information
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Abstract

Background: Facial acne scarring is a prevalent disease with both physical and psychosocial sequelae.

Aims: This study aims to evaluate an innovative solid state dual wavelength 1,319 and 589 nm laser, which does not require consumable dye, for the treatment of acne scars.

Patients/methods: A total of 12 patients (11 female, 1 man - Fitzpatrick skin phototypes II & III) with acne scar for more than one year, were treated with 1,319 nm and subsequently by 589 nm, all having four-sessions, one every other week. A full face was covered in approximately 30 minutes. Acne scars were scored by one physician evaluator using the ECCA grading scale before, 2 weeks after each treatment and 1 month and 6 months after the 4th treatment. Safety was measured by recording subject discomfort scores and adverse effects.

Results: 12 subjects were enrolled into the study, 10 completed all 4 treatments and 2 were lost to follow up. Fluence used was 28 J/cm² ± 2.4 J/cm² at 1,319 nm and 16 ± 2.9 J/cm² at 589 nm. At baseline, mean ECCA score was 98 ± 23. This score was reduced to 88 ± 30 ($p<0.02$), after one session, to 68 ± 21 ($p<0.01$) after 2 sessions, to 58 ± 17 ($p<0.01$) after 3 sessions to reach 58 ± 15 ($p<0.01$) 1 month after the 4th and finally 66 ± 11 ($p<0.01$) at 6 month follow up. This observation corresponds respectively to 14%, 33 %, 42 %, 40% and 30% reduction of the ECCA score. Only one patient (ECCA score: 120) did not improve after 3 sessions. Slight to moderate erythema was sometimes observed without dryness or bruising. No or minimal burning or stinging was reported. No crust was observed.

Conclusion: Improvement in scarring was noted in almost all patients with minimal discomfort and minimal downtime. Combining both minimal side effects with effective acne scar reduction, this laser appears to be highly effective. Long-term evaluation remains necessary to confirm the efficacy of this new laser.

KEYWORDS
acne, ECCA, near-infrared laser, scarring, yellow laser

Studies With KTP Laser in Acne Vulgaris
Dermatol Surg 2016;42:573-585

TABLE 7. Studies With KTP Laser in Acne Vulgaris

Author of Trial	*Type of Study*	*Device (nm)*	*Number of Patients in Study*	*Duration of Treatment*	*% Reduction in Inf or Noninflammatory Lesions*
Baugh and Kucaba[58]	OL	532	26	2 treatments per week for 2 weeks	20.7 (Inf)
Yilmaz and colleagues[60]	OL	532	16	Once weekly for 4 weeks	21 (Inf)
Yilmaz and colleagues[60]	OL	532	16	Twice weekly for 4 weeks	26 (Inf)
Sadick[59]	OL; split face	532	8	One treatment every 3–4 weeks for total of 3 treatments	32 (Inf)

Inf, inflammatory lesions; OL, open label.

Studies With IR in Acne Vulgaris

TABLE 5. Studies With IR in Acne Vulgaris

Author of Trial	*Type of Study*	*Device*	*Number of Patients in Study*	*Duration of Treatment*	*% Reduction in Inf or NI*
Aziz-Jalali and colleagues[38]	SBRCT split face	890-nm LLLT +2% topical clindamycin	28	Twice per week for 12 sessions	15 (Inf)
Sadick[47]	OL	830-nm LED + blue LED	11	Two 20-minute sessions per week for 4 weeks	44.2 ± 23.99 (Inf); 48.8 ± 23.99 (NI)
Orringer and colleagues[48]	SBRCT	1320-nm Nd:YAG	37	3 treatments every 3 weeks	0 (Inf); 27 (NI)
Deng and colleagues[49]	OL	1320-nm Nd:YAG	35	Every other week for 12 weeks	51 (Inf); 35 (NI)
Jih and colleagues[50]	OL	1450-nm Nd:YAG	20	Every 3 weeks for total of 3 sessions	70.6 (Inf)
Glaich and colleagues[51]	OL	1450-nm Nd:YAG +595-nm PDL	15	1 session every 4–6 weeks for total of 3 sessions	84 (Inf)

Inf, inflammatory lesions; NI, noninflammatory lesions; OL, open label; SBRCT, single-blinded randomized controlled trial.

Studies With PDL in Acne Vulgaris
Dermatol Surg 2016;42:573-585

TABLE 6. Studies With PDL in Acne Vulgaris

Author of Trial	*Type of Study*	*Device*	*Number of Patients in Study*	*Duration of Treatment*	*% Reduction in Inf or NI*
Seaton and colleagues[55]	DBRCT	PDL	41	1 treatment with 12-week posttreatment evaluation	49 (Inf); 40 (NI)
Jasim and colleagues[56]	OL; split face	PDL	10	1 treatment	30% of patients had 25%–50% improvement; 20% had >75% improvement

DBRCT, double-blinded randomized controlled trial; Inf, inflammatory lesions; NI, noninflammatory lesions; OL, open label.

- 650-microsecond technology for up to 255 J/cm2 in a single pulse duration
- More than 50 FDA cleared medical aesthetic indications
- Ability to perform anesthetic, gel & skin contact free treatment on all skin types
- Eliminates pain, burns or adverse effects of the previous generation of lasers
- No costly service contracts

Current treatments of acne: Medications, lights, lasers, and a novel 650-μs 1064-nm Nd: YAG laser
J Cosmet Dermatol 2017:1-16

REVIEW ARTICLE

WILEY JCD journal of Cosmetic Dermatology

Current treatments of acne: Medications, lights, lasers, and a novel 650-μs 1064-nm Nd: YAG laser

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Funding information
Aerolase, Inc.

Summary

The treatment of acne, especially severe acne, remains a challenge to dermatologists. Therapies include retinoids, antibiotics, hormones, lights, lasers, and various combinations of these modalities. Acne is currently considered a chronic rather than an adolescent condition. The appropriate treatment depends on the patient and the severity of disease. The purpose of this study was to review current therapies for acne of all severities and to introduce the 650-μs 1064-nm laser for the treatment of acne.

KEYWORDS

inflammatory, infrared, *Propionibacterium acnes*, pulse duration, sebaceous, thermal relaxation time

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DOI: 10.1111/jocd.13480

ORIGINAL CONTRIBUTION

JCD Journal of Cosmetic Dermatology WILEY

650 usec 1064nm Nd:YAG laser treatment of acne: A double-blind randomized control study

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Funding information
Skin Laser and Surgery Specialists of NY & NJ received funding from Aerolase for this study.

Abstract

Background: A variety of energy-based devices have been used to treat acne. However, all studies have been subjective and have not involved double-blind and randomized controlled studies.

Aims: We undertook a randomized controlled study evaluating the use of a 650 usec 1064 nm Nd:YAG laser compared with a sham in the treatment of acne.

Patients/Methods: A total of 20 subjects with moderate-to-severe acne were randomized to receive either 650 usec 1064nm Nd:YAG laser or sham treatment. All subjects received 3 treatments, two weeks apart, plus an additional session undertaken 4 weeks after the 3rd treatment. Subjects were evaluated for investigator global improvement, improvement in inflammatory lesions, improvement in comedonal lesions, total porphyrin score, and total sebum score.

Results: The laser-treated group showed an Investigator's Global Assessment Scale (IGA) improvement of 26% compared with 7% for the sham group (a 271% improvement over sham treatment group). The treatment group also showed a decrease in the number of inflammatory lesions of 42% compared with 26% in the sham group (a 62% improvement over sham). The laser-treated cohort also experienced a reduction in total number of comedones similar to that seen with inflammatory lesions and a decrease in total porphyrin score. There was also an 18% reduction in sebum production in the treated group, compared with 9% in the sham group (a 100% improvement).

Conclusion: This is the first study that has compared laser treatment of acne compared with a sham treatment. A 650 usec 1064nm Nd:YAG laser can effectively treat acne.

KEYWORDS
acne, laser, Nd:YAG

1 | INTRODUCTION

Acne vulgaris is one of the most common conditions treated by dermatologists.[1] The pathogenesis of acne is multifactorial. Epidermal hyperproliferation and excess sebum production result in blockage of the pilosebaceous units. This is followed by increased proliferation and activity of commensal skin bacteria *Propionibacterium acnes*, resulting in subsequent inflammation.[2,3] Moderate acne is traditionally treated with topical cleansers, retinoids, and antibiotics. Moderate-to-severe acne may sometimes require additional treatment with systemic antibiotics or retinoids.[4] Treatments can often be irritating, unsatisfactory, and the chronic exacerbations and remissions throughout adolescence and adulthood can have a major impact on patient quality of life.[5,6] Devices and lasers are often employed as an adjunctive treatment for acne and acne scarring. Common treatments include chemical peels, nonablative radiofrequency,

A randomized, double-blind, controlled study to determine the efficacy and tolerance of a 650 microsecond YAG laser therapy in the treatment of moderate to severe acne vulgaris

David J. Goldberg, MD, JD & Katarina Kesty, MD, MBA

The first study of it's kind to be completed:

- 271% improvement in acne vs. sham
- 42% reduction in inflammatory lesions
- 18% reduction in sebum production

doi:10.36849/JDD.2020.5108

JUNE 2020 646 VOLUME 19 • ISSUE 6

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Treatment of Moderate to Severe Acne and Scars With a 650-Microsecond 1064-nm Laser and Isotretinoin

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ABSTRACT

Background: Laser procedures for acne and acne scars have traditionally been postponed for at least 6 to 8 months after the end of systemic isotretinoin therapy. Lower dosages with more modern laser devices having unique energy parameters of high power in microsecond pulse durations have made it possible to administer laser therapy during or shortly after completion of isotretinoin therapy, thus reducing the risk of side effects of isotretinoin.

Methods: Patients with moderate to severe facial acne (n=46) and atrophic scars enrolled in a 6-month study. Genetic analysis of patients revealed the presence of polymorphisms of genes Col1A2, MMP3, ESR1, MMP1, and MMP7, which can lead to scar formation. Patients underwent low-dosage isotretinoin therapy (0.2-0.3 mg/kg/day) in combination with facial laser treatment using a 650-microsecond, 1064-nm Nd:YAG laser. Acne severity was graded using the Investigators Global Assessment (IGA) scale and quality of life was evaluated by the Dermatology Life Quality Index (DLQI).

Results: IGA parameters decreased from 1.8 ± 0.2 (mean ± SD) initially to 0.5 ± 0.4 at the end of the study, a 72.3% reduction which was significant ($P<0.01$). The DLQI index decreased from 10.1 ± 1.3 initially to 2.8 ± 1.2, a 72.3%, a significant reduction ($P<0.01$). Inflammatory elements resolved without scarring. Laser treatment was well tolerated and improvement in pre-existing scars was noticeable.

Conclusions: The 650-microsecond, 1064-nm laser in combination with low-dose isotretinoin is safe and effective in patients with acne complicated by atrophic scars and genetically prone to post-acne scarring.

J Drugs Dermatol. 2020;19(6):646-651. doi:10.36849/JDD.2020.5108

INTRODUCTION

Tradition holds that laser procedures to treat acne vulgaris should be postponed at least 6 to 8 months after the end of systemic therapy with isotretinoin. This is based on data suggesting that dermabrasion or laser therapy during isotretinoin treatment may induce keloid formation or delay the repair of skin integuments (ie, skin scar tissue).[1-7] The validity of this practice has recently been questioned.[8-12] In their consensus recommendations, Spring and colleagues[10] reported insufficient evidence that physicians should delay manual dermabrasion, cutaneous surgery, superficial chemical peels, laser hair removal, and fractional ablative and nonablative laser procedures in patients receiving or recently completing therapy with isotretinoin. The authors did not, however, recommend mechanical dermabrasion and fully ablative laser therapy while patients underwent systemic isotretinoin treatment.

Two months later the American Society of Dermatologic Surgery reported its consensus recommendations regarding the safety of lasers, dermabrasion, chemical peels, energy devices, and skin surgery during and after isotretinoin use.[11] The Task Force concluded that evidence was lacking that physicians should delay procedures with chemical peels and nonablative lasers (ie, hair removal lasers and lights, vascular lasers, fractional devices) in patients currently or recently exposed to isotretinoin, and that superficial and focal dermabrasion, when performed by a well-trained professional, may also be safe.

Mysore and colleagues,[12] after reviewing published studies, reported that evidence for avoiding a variety of procedures (fractional CO2 resurfacing, fractional Nd:YAG laser, fractional infrared lasers, laser hair removal, microdermabrasion using

Treatment of Moderate to Severe Acne and Scars with a 650-microsecond 1064nm Laser and Isotretinoin

Published by Michael H. Gold, MD

TREATMENT OF MODERATE TO SEVERE ACNE AND POST ACNE SCARS WITH 650 MICROSECOND 1064nm LASER COMBINED WITH LOW DOSE ISOTRETINOIN

Authors and Disclosures

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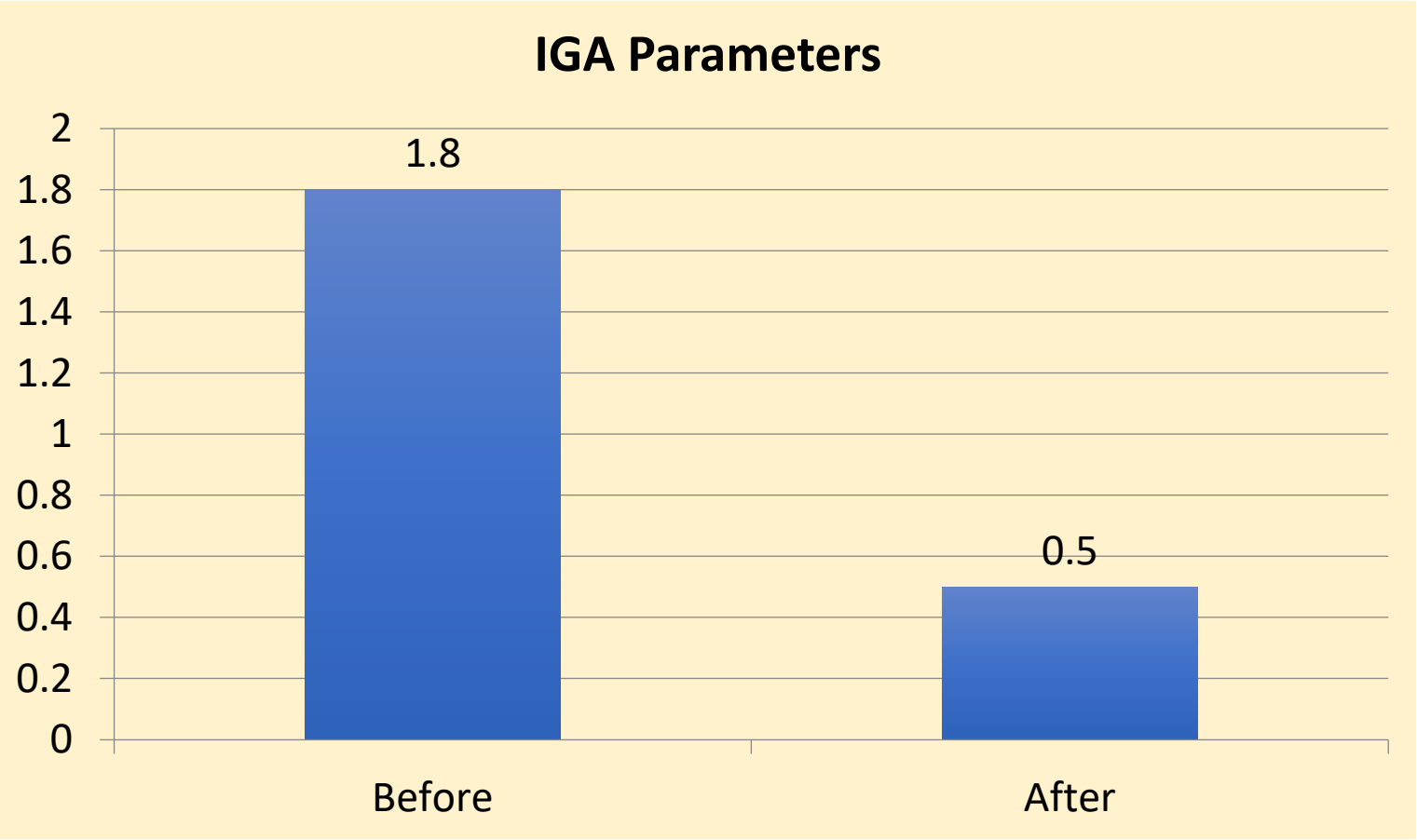
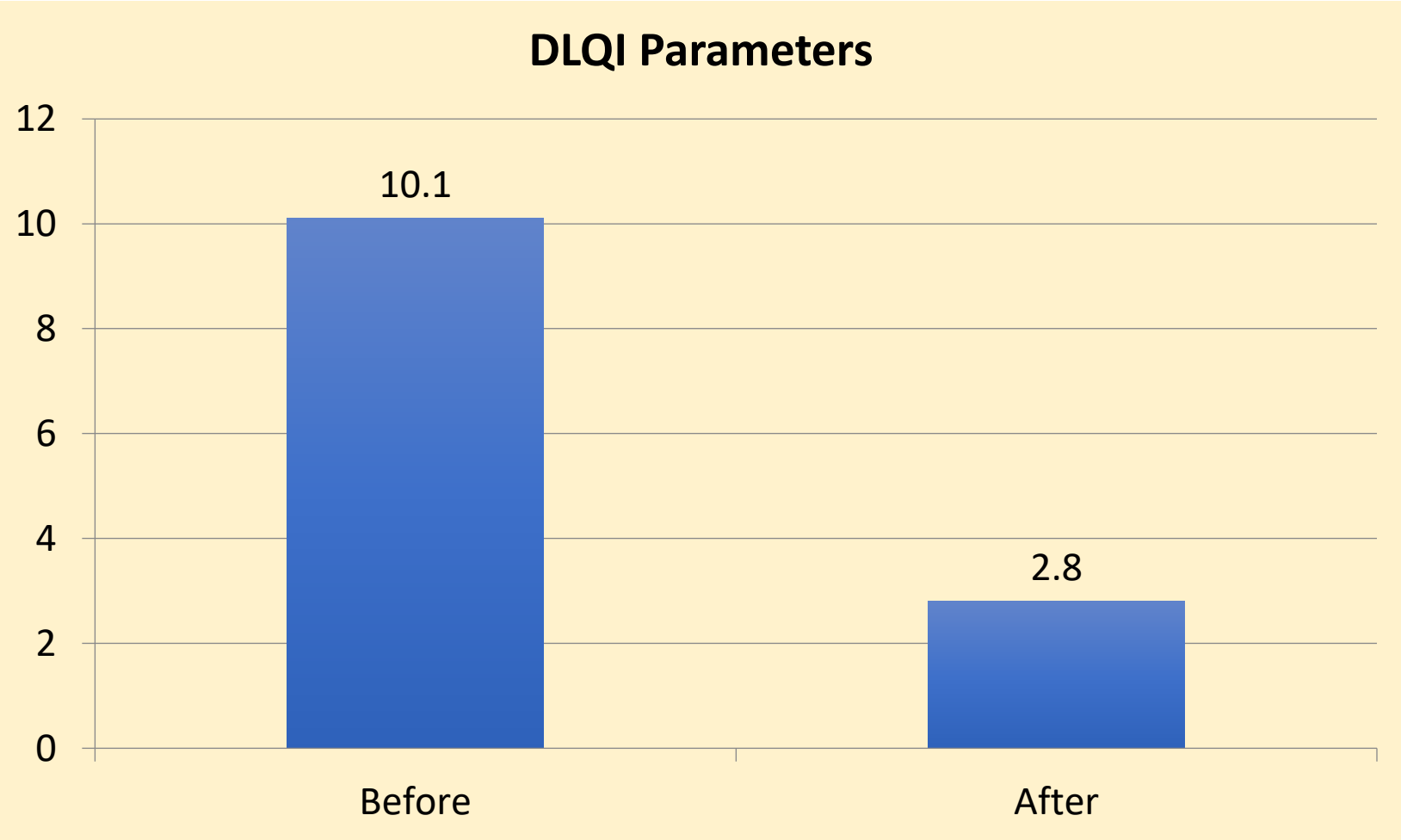
Results: IGA Parameters



Decreased by 72.2% and reached 0.5± 0.4 ($p < 0.01$) points

Results: DLQI Parameters



Decreased to 2.8± 1.2points ($p < 0.01$)

Results

- During the study, it was noted that the resolution of inflammatory elements occurred without scarring
- Increased sensitivity of the skin to laser radiation and the deterioration of the repair process of the skin was not observed
- Tolerability was high

- Acne Devices Targeting Sebaceous Glands

• Acne Devices Targeting Sebaceous Glands

- Two new devices developed for targeted sebaceous gland activity at 1726 nm

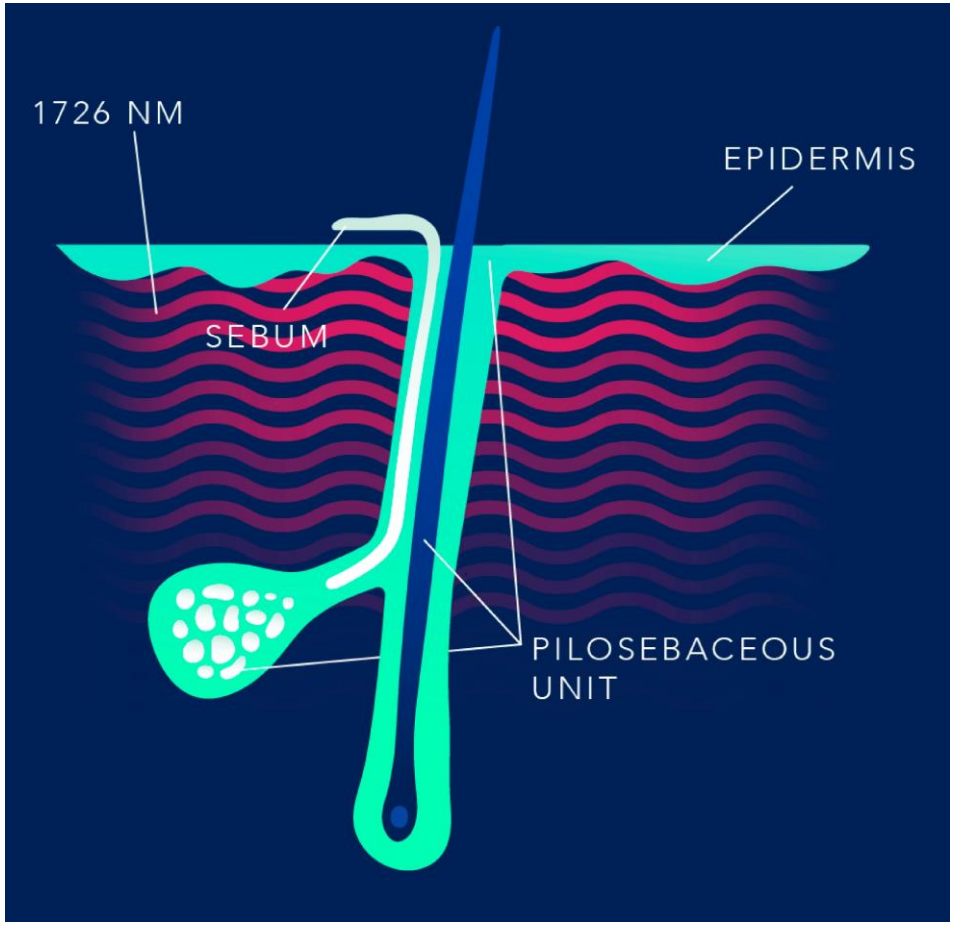
- AvaClear – FDA Approved March, 2022

- Accure – CE Cleared May, 2022

Mechanism of Action

Target acne at the source

- Overproduction of sebum by the sebaceous glands is one of the leading causes of acne[1]
- At 1726 nm sebum absorbs 2x more energy compared to H_2O[2]
- AviClear uses this wavelength to selectively target and damage sebocytes
- Sebaceous glands shrink and sebum production decreases

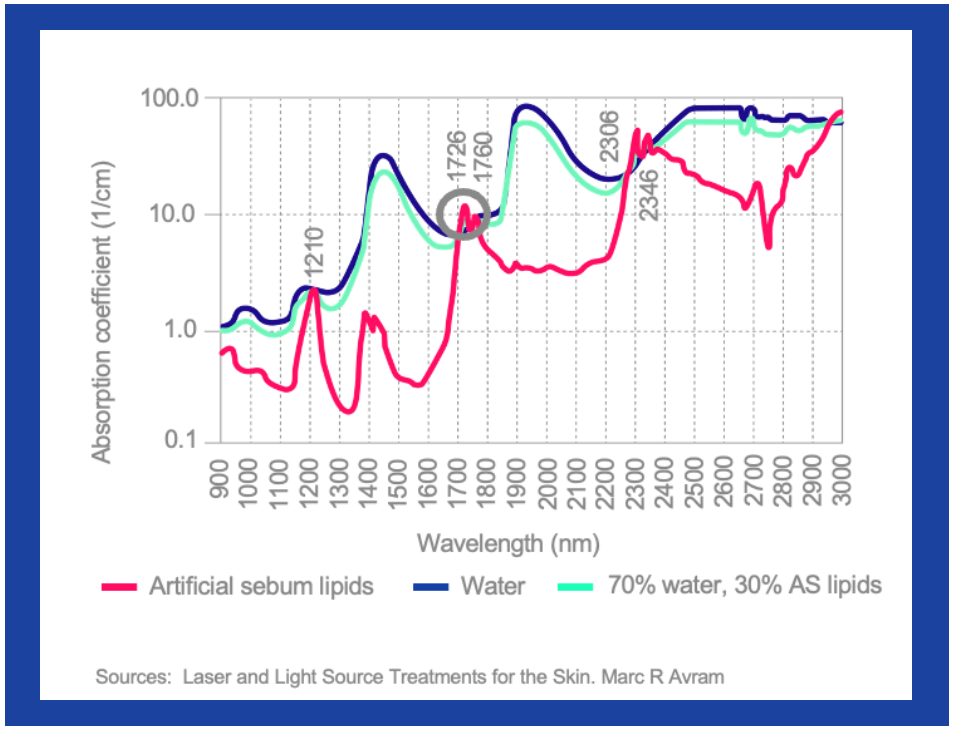


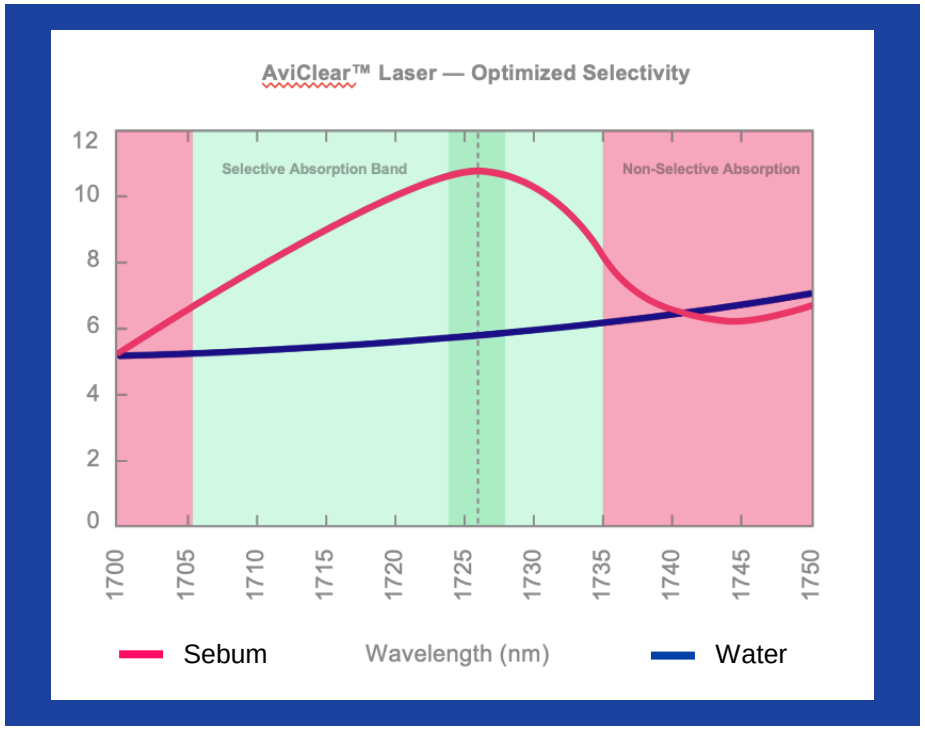
[1]O'Neill AM, Gallo RL. Host-microbiome interactions and recent progress into understanding the biology of acne vulgaris. Microbiome. 2018;6:177
[2] Sakamoto FH, et al. Selective photothermolysis to target sebaceous glands: theoretical estimation of parameters and preliminary results using a free electron laser. Lasers Surg Med. 2012;44(2):175-183

Selectivity of 1726 nm

Parameters Critical for Selectivity:

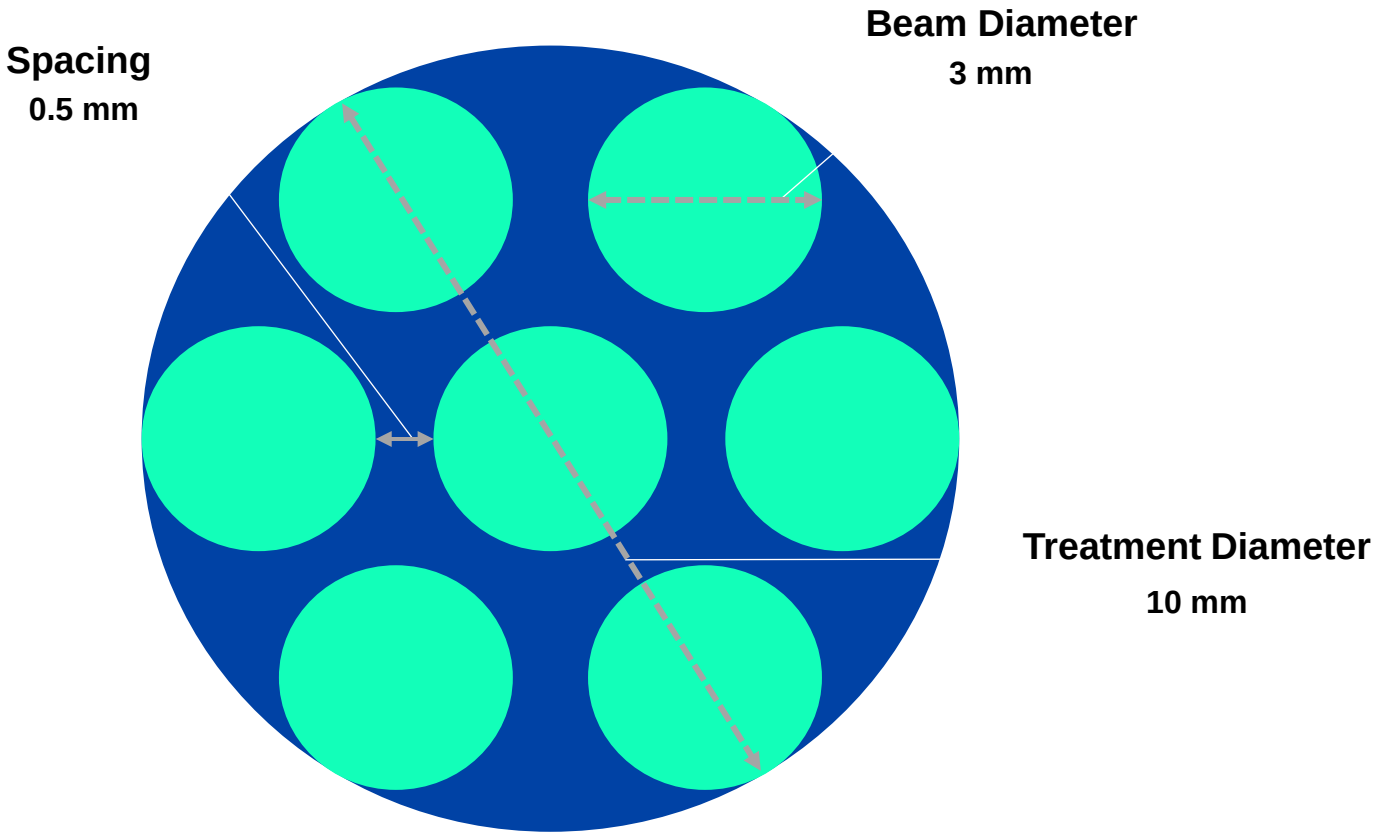
1. Optical – Wavelength
2. Thermal – Pulse Duration
3. Spatial – Spot Size (Depth of Penetration)





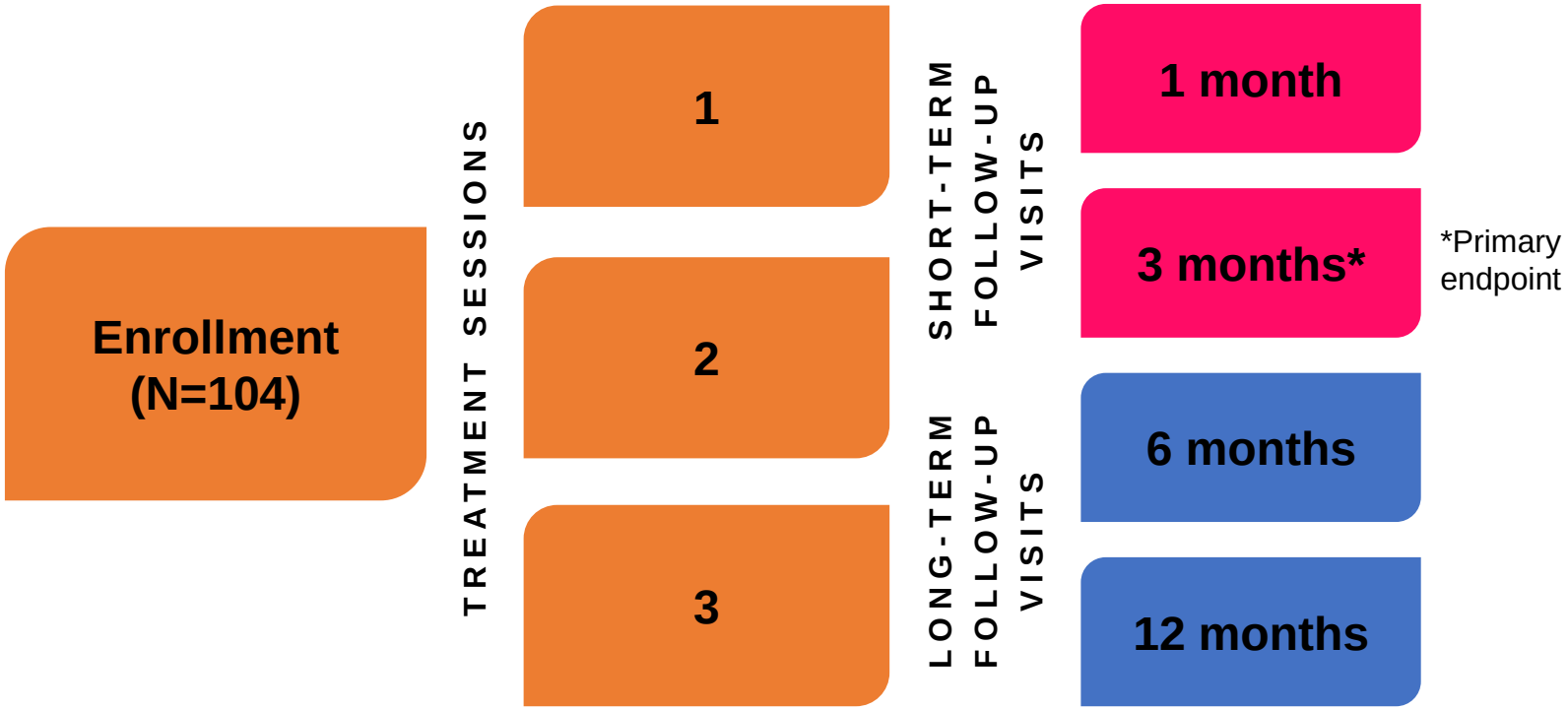
Unique imprint designed for acne

- 7 Individual 3 mm laser spots delivered in a 10 mm treatment area
- Exceptionally fast scanning pattern that takes into account thermal relaxation times of sebaceous glands
- Algorithm delivers a treatment imprint at roughly 0.3 Hz and a 1.5 mm depth of penetration

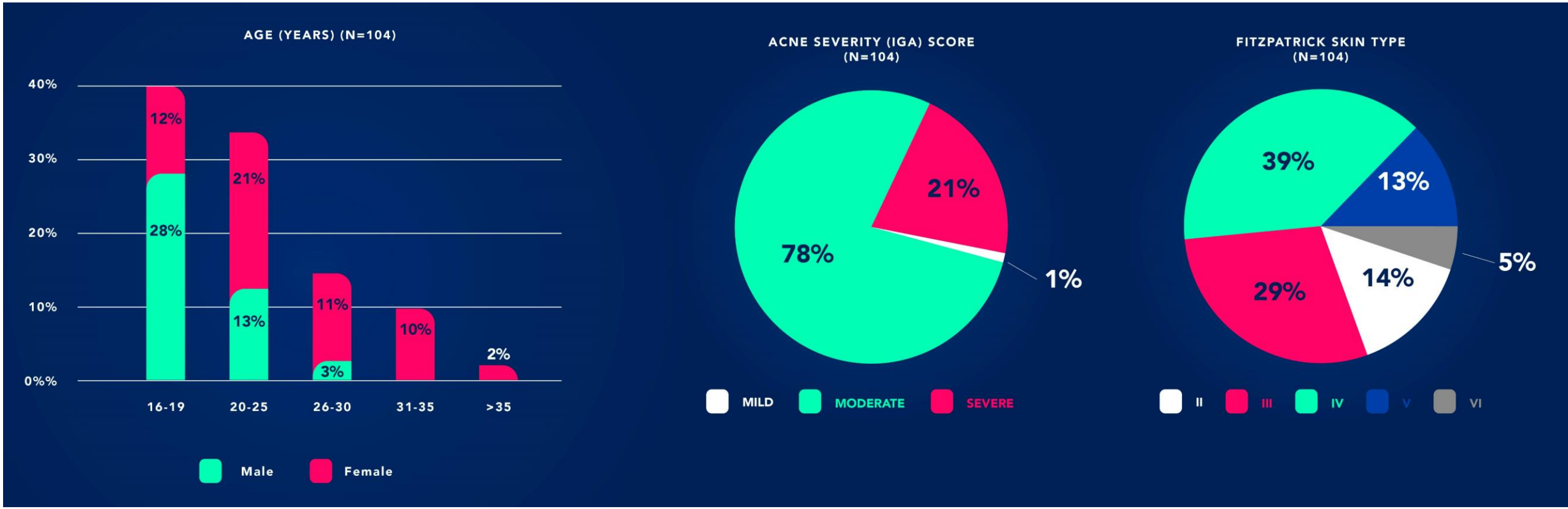


Pivotal study design

- Non-randomized, open-label study
- Primary endpoint was the percentage of patients who achieved a 50% reduction in lesion count by three months after the final treatment



Study patient demographics



Results and Performance
Efficacy Endpoints – 3-Month Follow-Up Data

Primary Endpoint – Responder Rate

- ***80%*** of subjects achieved a **≥ 50% reduction*** in inflammatory acne lesion count (*P*<.001)
  - **60%** over FDA defined success threshold

Secondary Endpoints –

- **Investigator Global Assessment (IGA) Improvement**
  - ***36%*** of subjects were assessed as having **clear or almost clear skin**
  - ***47%*** of subjects achieved **≥ 2-point improvement** in IGA score vs. baseline
  - ***87%*** of subjects achieved **≥ 1-point improvement** in IGA score vs. baseline (meaningful to the patient)
- **Non-Inflammatory Lesion Count Reduction** –
  - Statistically significant reduction achieved (***32%***; *P*= .001)

Results and performance
Nodule count reduction: 3 and 6-Month Follow-Up

Exploratory Endpoint – Nodule Count Reduction

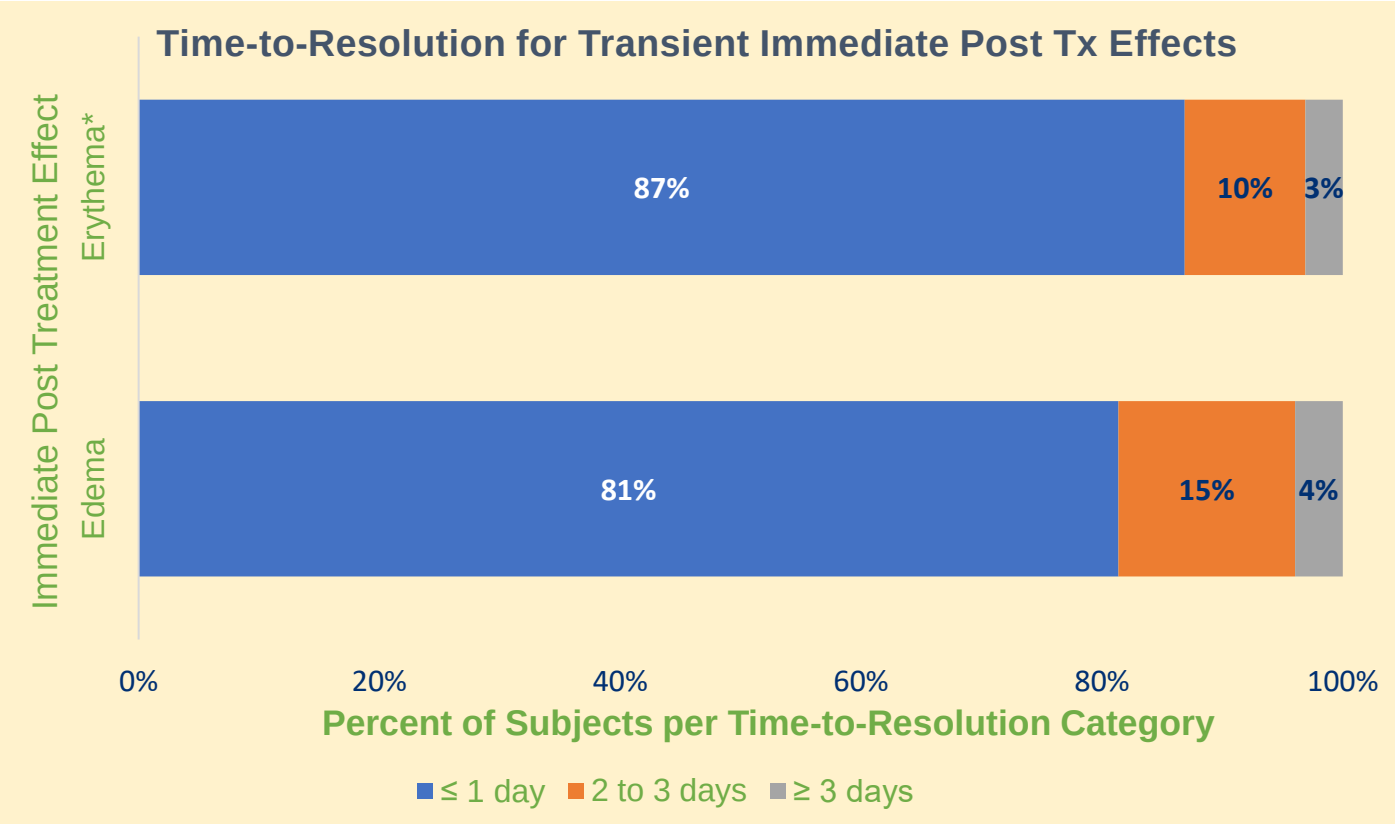
- **71%** mean reduction (P<.001) in nodules at 3 months after final treatment in **moderate and severe acne** patient population.
- **69%** mean reduction (P<.001) in nodules at 1 and 3 months after final treatment in **severe acne** patient population.
- Isotretinoin data* has shown 67-70% nodule reduction in severe acne. With AviClear, we see a **71% nodule count reduction at 3 months** post and **a 97% nodule count reduction at 6 months**

This nodule count reduction data is comparable if not better when compared to isotretinoin.

Downtime, Comfort, Satisfaction

Treatment Related Side Effects*:

- No downtime or medical intervention required
- All post-treatment effects were transient and self-resolving.



Treatment-Related Discomfort:

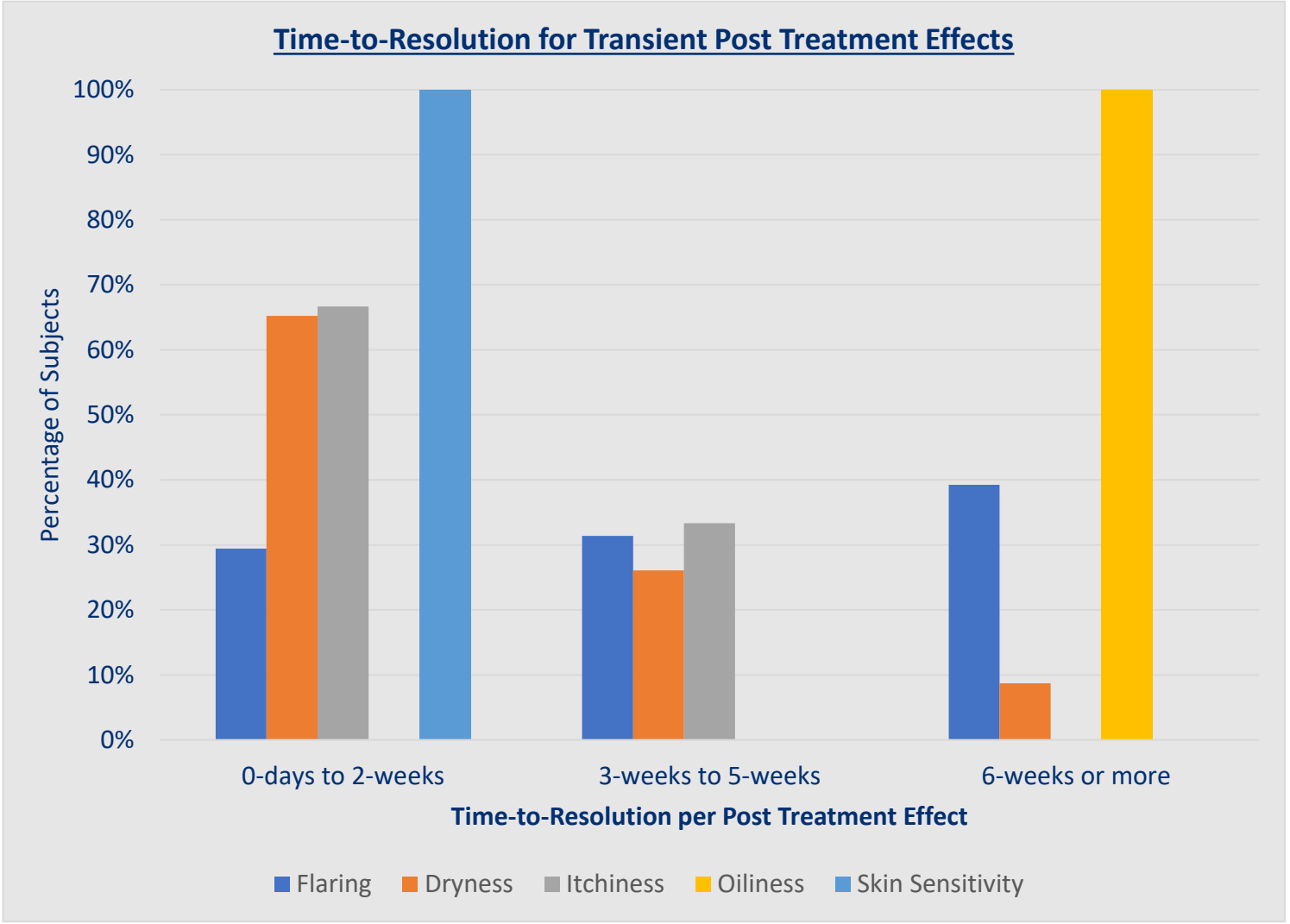
- All subjects tolerated treatment well without the need for topical anesthetic
- No treatment sessions ended prematurely due to discomfort.

Subject Satisfaction:

- **75% of subjects** were **satisfied or extremely satisfied** with improvement after 3 treatments and were **“very likely” or “likely”** to have laser treatment again.

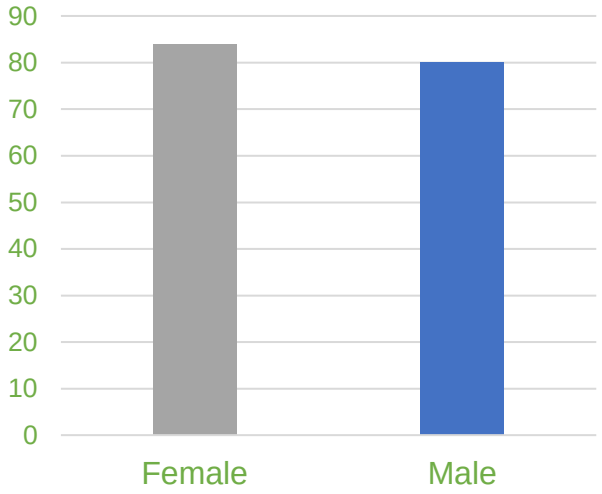
Adverse Event & Resolution Duration

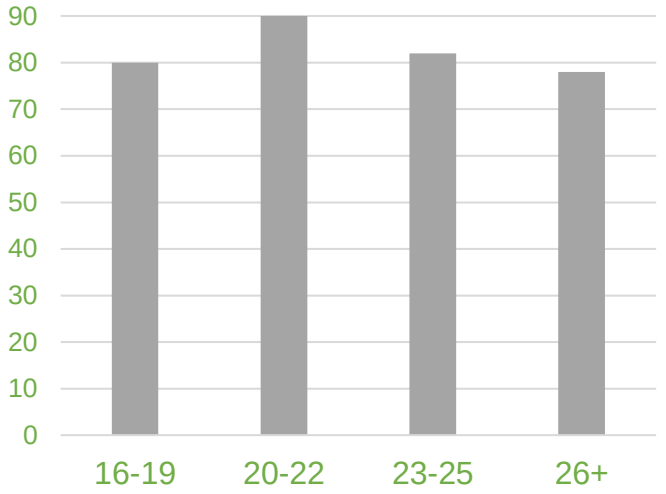
Flaring, dryness and oiliness were the only effects that lasted beyond 6-weeks post treatment

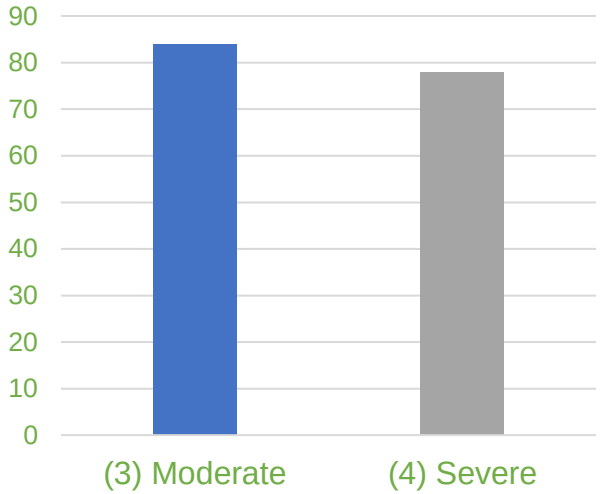


Procedure patient scalability
Gender, Age and Acne Severity

No significant difference seen in treatment efficacy for different age groups or severity types

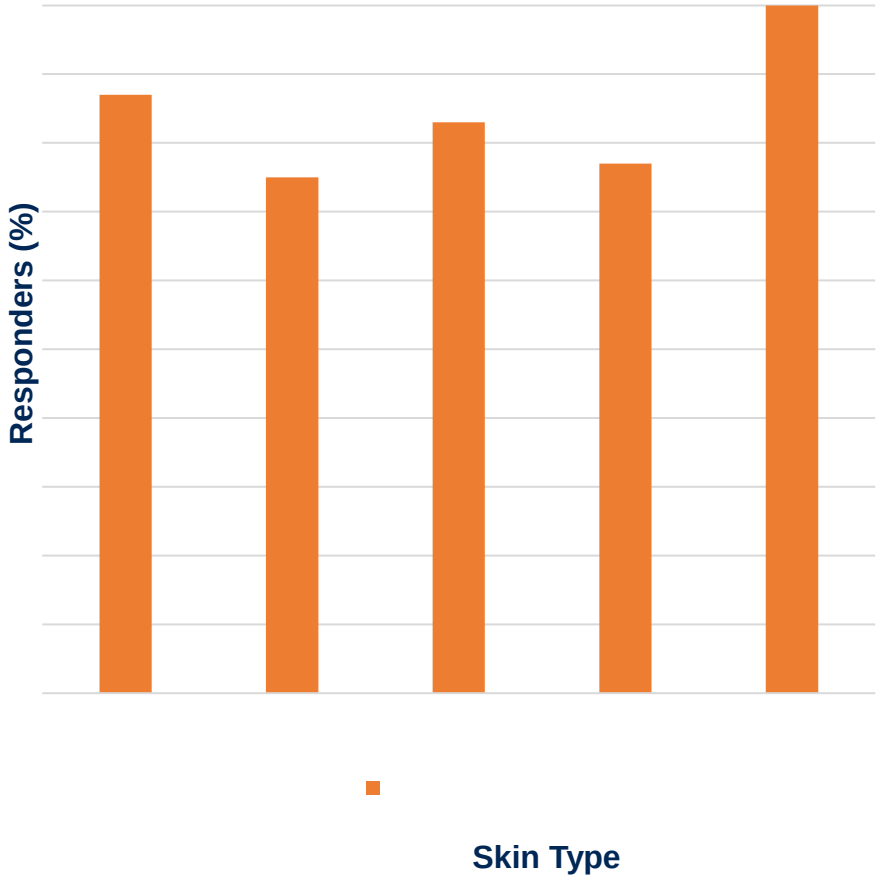






Clinical proof of safety and efficacy Skin Type

Melanin is not a clinically meaningful absorbing chromophore at 1726 nm.



No Skin Type V or VI patients dropped out during the study

No significant difference in the discomfort level between Skin Types

Fitzpatrick Skin Type	Median Discomfort Level (0-10)
II - IV	5.0
V- VI	5.1

Procedure durability
3- and 6-Month Data

Efficacy Improvement (% Patients)	at 3 Months	at 6 Months
IGA Improvement 1+	87	90
IGA Improvement 2+	47	53
IGA Improvement Clear / Almost Clear	36	43
Mean IGA Score Halved at 6 months!!		
ILC Improvement	91	96
ILC Improvement of 50% +	80	88
Nodule Count Reduction	67*	97*
Comedonal Count Reduction	32	44
Patient Experience (% Patients)	**at 3 Months**	**at 6 Months**
Patients feeling their Skin looks Better	87	80
Patients feeling their Skin looks Smoother	85	83

*** - moderate and severe patients**

Acne Treatment with Lasers

- Acne therapy with lasers and EBDs can make your acne patients better – and faster than with conventional therapy

- Use the tools we have to make your patients better each and every day

Laser and Light-Base Therapies in the Management of Rosacea:
An Updated Systematic Review
Lasers in Medical Science (2021):36:1151-1160 in 2021

Laser and light-based therapies in the management of rosacea: an updated systematic review

Husein Husein-ElAhmed[1,2] · Martin Steinhoff[2,3,4,5,6]

Received: 2 September 2020 / Accepted: 13 November 2020 / Published online: 3 January 2021

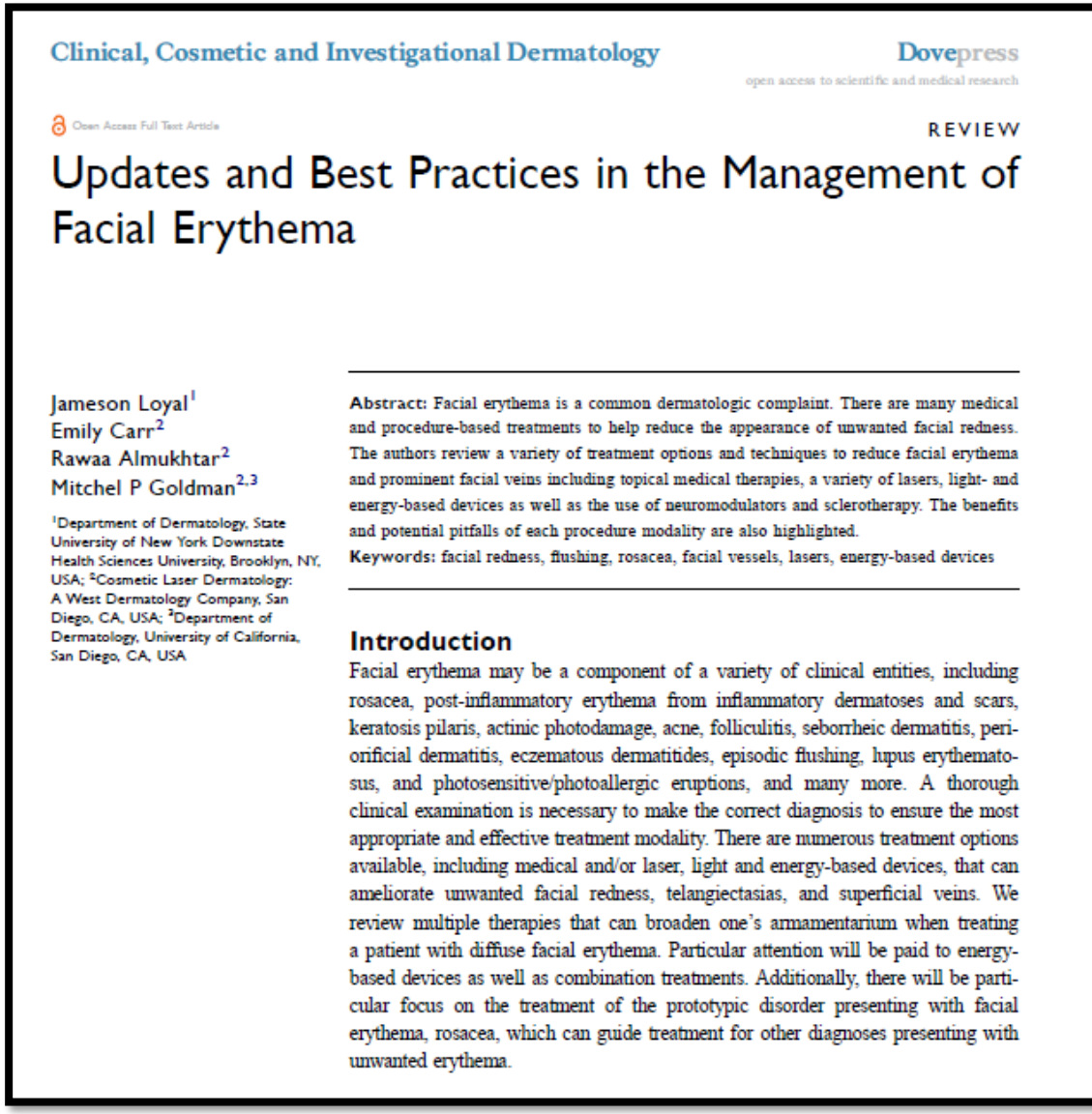
Abstract

Unlike other rosacea therapies which need daily takings or applications over long periods, the edge of lasers and light-based therapies (LLBT) is the limited number of sessions to achieve improvement. The proper selection of the adequate physical device in accordance with the patients' skin features and rosacea-related signs and symptoms should be considered and the management with physical sources should be updated as new data become available. This article reviews and discusses the current use of lasers and light-based therapies in rosacea with reference to all the available literature.

This systematic review demonstrates the quality of evidence to support any recommendation on LLBT in rosacea is low-to-moderate. Among all the available devices, PDL holds the most robust evidence. Treatments options should be tailored for each specific clinical scenario as it is unlike that single modality results in complete resolution. Platforms that include two or more devices and combined therapies with topical agents are suitable and they warrant further investigations.

Keywords Laser · Light-based therapies · Rosacea · Efficacy · Treatment

Updates and Best Practices in the Management of Facial Erythema Clinical, Cosmetic and Investigational Dermatology 2021:14 601–614



Clinical, Cosmetic and Investigational Dermatology

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REVIEW

Updates and Best Practices in the Management of Facial Erythema

Jameson Loyal[1]
Emily Carr[2]
Rawaa Almukhtar[2]
Mitchel P Goldman[2,3]

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Abstract: Facial erythema is a common dermatologic complaint. There are many medical and procedure-based treatments to help reduce the appearance of unwanted facial redness. The authors review a variety of treatment options and techniques to reduce facial erythema and prominent facial veins including topical medical therapies, a variety of lasers, light- and energy-based devices as well as the use of neuromodulators and sclerotherapy. The benefits and potential pitfalls of each procedure modality are also highlighted.

Keywords: facial redness, flushing, rosacea, facial vessels, lasers, energy-based devices

Introduction

Facial erythema may be a component of a variety of clinical entities, including rosacea, post-inflammatory erythema from inflammatory dermatoses and scars, keratosis pilaris, actinic photodamage, acne, folliculitis, seborrheic dermatitis, perioral dermatitis, eczematous dermatitides, episodic flushing, lupus erythematosus, and photosensitive/photoallergic eruptions, and many more. A thorough clinical examination is necessary to make the correct diagnosis to ensure the most appropriate and effective treatment modality. There are numerous treatment options available, including medical and/or laser, light and energy-based devices, that can ameliorate unwanted facial redness, telangiectasias, and superficial veins. We review multiple therapies that can broaden one's armamentarium when treating a patient with diffuse facial erythema. Particular attention will be paid to energy-based devices as well as combination treatments. Additionally, there will be particular focus on the treatment of the prototypic disorder presenting with facial erythema, rosacea, which can guide treatment for other diagnoses presenting with unwanted erythema.

Slide Compliment of Dr. Marco Rocha
Sao Paolo, Brazil

Quality of life

Flushing and papules/pustules were the most uncomfortable aspects, regardless of severity.

The severity of persistent erythema had an increasing impact on self-perception and on RosaQoL's emotional domain scores

1. Harper J, *et al. J Drugs Dermatol* 2018;17:150-8
2. Thomas C, *et al. J Eur Acad Dermatol Venereol* 2017;31:361-6

Covid19's impact on rosacea – Mask

Slide Compliment of Dr. Marco Rocha
Sao Paolo, Brazil

MASK and ROSACEA

Rosacea impact with the use of mask - survey of 220 Canadian and German patients

- 63% worsened from symptoms → flare-ups
- 40% are not leaving to avoid the use of masks
- 30% are spending more time on routine skincare
- 52% used the mask to hide rosacea
- 48% have changed the way they treat rosacea since the use of masks
- 33% had to visit the doctor and 8% made an online consultation

Slide Compliment of Dr. Marco Rocha
Sao Paolo, Brazil

Damianni et al. The impact of personal protective equipment on acne vulgaris and rosácea during the COVID-19 pandemics. Dermatol Ther 2020 in press

Consensus Transition from Subtypes to Phenotypes

Diagnosis of rosacea requires 1 Diagnostic Phenotype alone or at least 2 Major Phenotypes[1,2]

Diagnostic[3]

Fixed centro-facial erythema in a characteristic pattern that may periodically intensify

Phymatous changes

Major[3]

Flushing, Papules and pustules,
Telangiectasia, Ocular manifestations

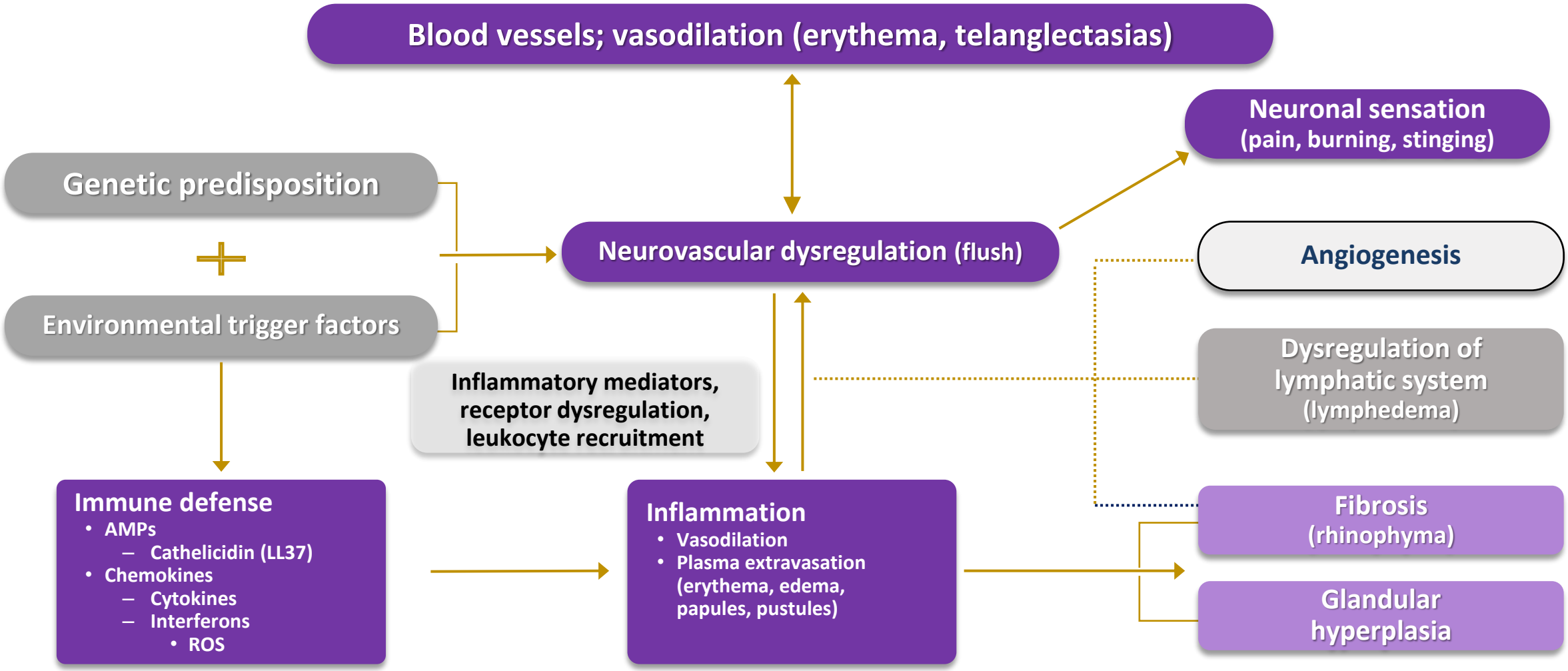
Secondary[4]

Burning Sensation, Stinging Sensation
Edema, Dryness

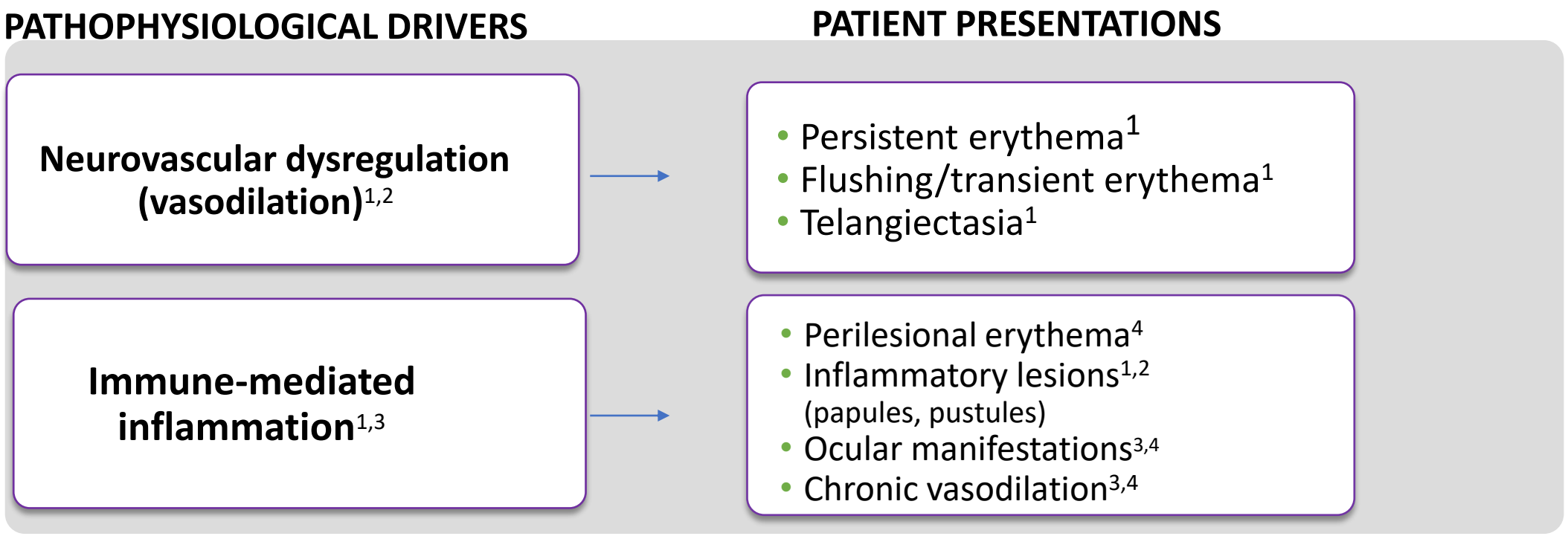
The updated system provides a more flexible set of criteria, “based on phenotypes...to provide the necessary means of assessing and treating rosacea in a manner that is consistent with each individual patient’s experience.”[2]

1. Tan J, et al. *Br J Dermatol*. 2017;176(2):431-438. 2. Gallo JR, et al. *J Am Acad Dermatol*. 2017;78(1): 148-155. 3. Del Rosso JQ, et al. Cutis. 2013;92(5):234-240. 4. Van Zuuren EJ, et al. Br J Dermatol. 2019;181(1):65-79

Rosacea Pathophysiology[1]



Vasodilation is often overlooked in the management of rosacea



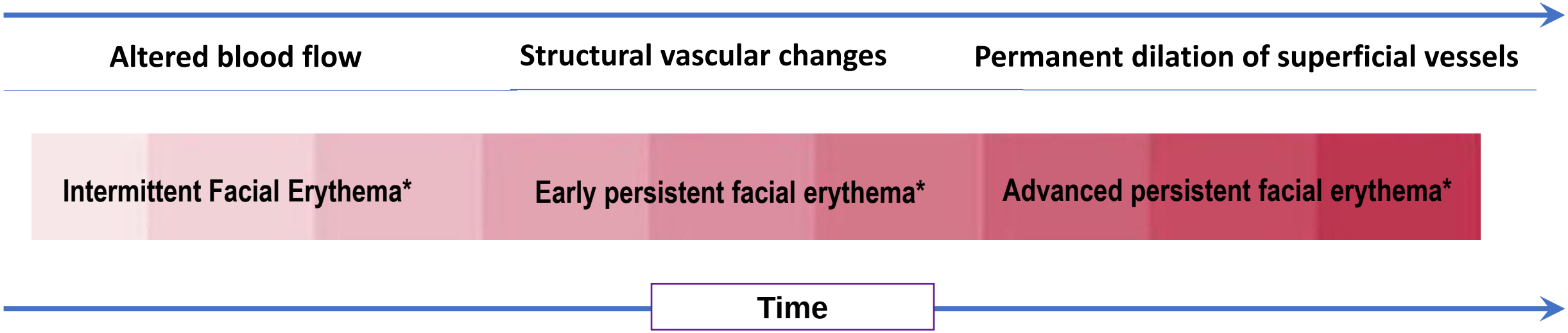
Targeting immune-mediated inflammation alone may leave your patients at risk for persistent erythema that can worsen over time.

- 1. Steinhoff M, et al. *Acta Derm Venereol*. 2016; 95(5):579-586. 2. Steinhoff M, et al. *J Investig Dermatol Symp Proc*. 2011;15(1):2-11. 3. Del Rosso JQ. Part 2. *J Clin Aesthet Dermatol*. 2012;5(3):26-36. 4. Del Rosso JQ. *J Clin Aesthet Dermatol*. 2012;5(3):16-25

Persistent Facial Erythema (PFE) Can Progress Over Time

The pathophysiology of rosacea is complex and multifactorial, but a common pathway to erythema is vasodilation[1-4]

Pathophysiologic Vascular Changes Over Time in Rosacea[1]

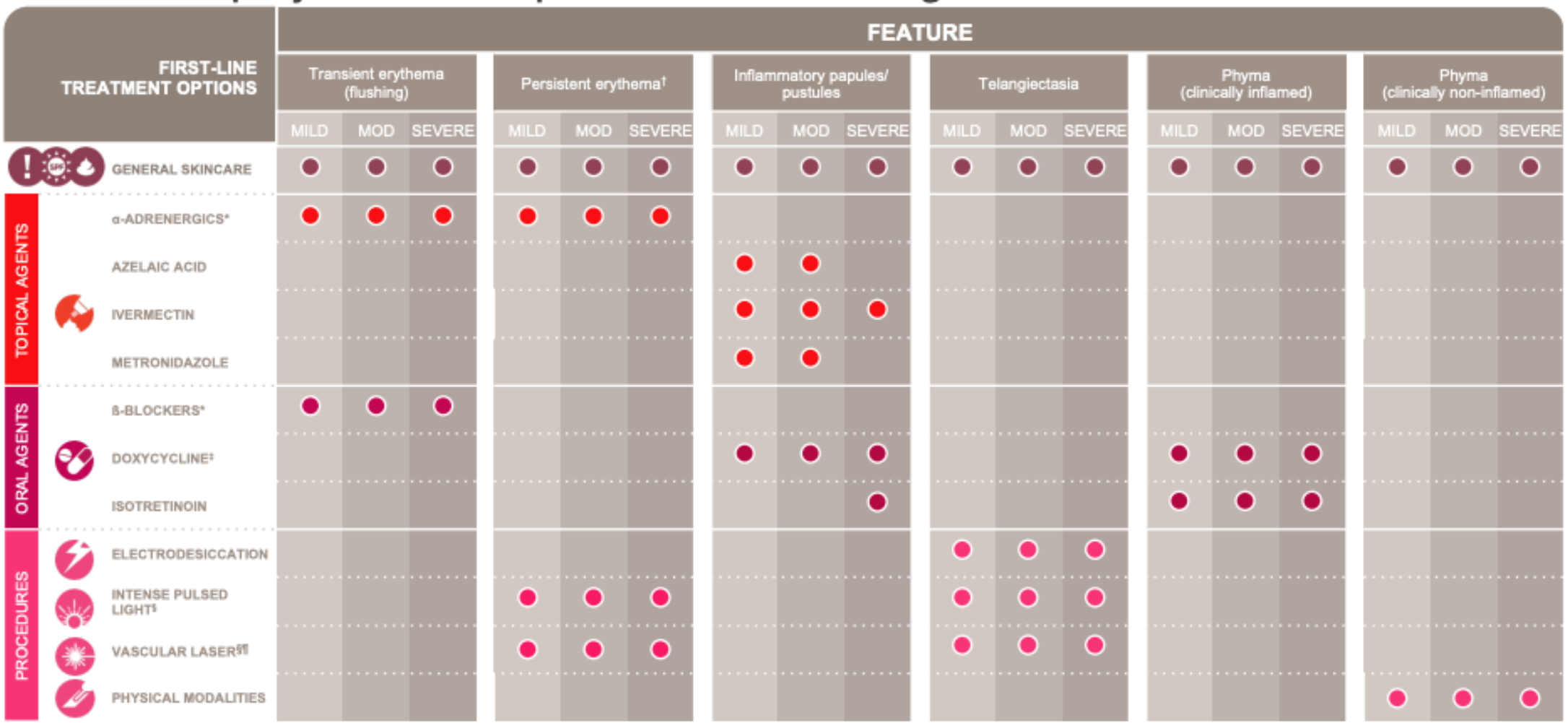


Individual characteristics of rosacea may progress from mild to moderate to severe; thus early diagnosis and treatment are recommended[5]

*Associated with intermittent flare episodes of rosacea.

1. Del Rosso JQ. *J Clin Aesthet Dermatol*. 2012;5(3):26-36. 2. Steinhoff M, et al. *J Am Acad Dermatol*. 2013;69(6 suppl 1):S15-S26. 3. Del Rosso JQ. *J Clin Aesthet Dermatol*. 2012;5(3):16-25.
4. Steinhoff M, et al. *Acta Derm Venereol*. 2016;96(5):579-586. 5. Wilkin J, et al. *J Am Acad Dermatol*. 2002;46(4):584-587.

ROSCO project 2019: Updated treatment algorithm



*There is limited evidence to support the use of topical alpha-adrenergic modulating agents or oral beta blockers for treatment of flushing/transient erythema. However, clinical experience suggests that they could be considered in certain situations. †Persistent centrofacial erythema associated with periodic intensification by potential trigger factors. ‡Doxycycline 40 mg modified release superior to placebo; doxycycline 40 mg modified release non-inferior to doxycycline 100 mg. No inference possible from indirect comparison. §Use of IPL and vascular lasers in darker skin phototypes may require consideration by a healthcare provider with experience in this situation. ¶e.g. pulsed-dye laser and 532-nm KTP laser.

Supporting information to Schaller M, *et al.* Recommendations for rosacea diagnosis, classification and management: Update from the global ROSacea COnsensus (ROSCO) 2019 panel. *Br J Dermatol* 2019.

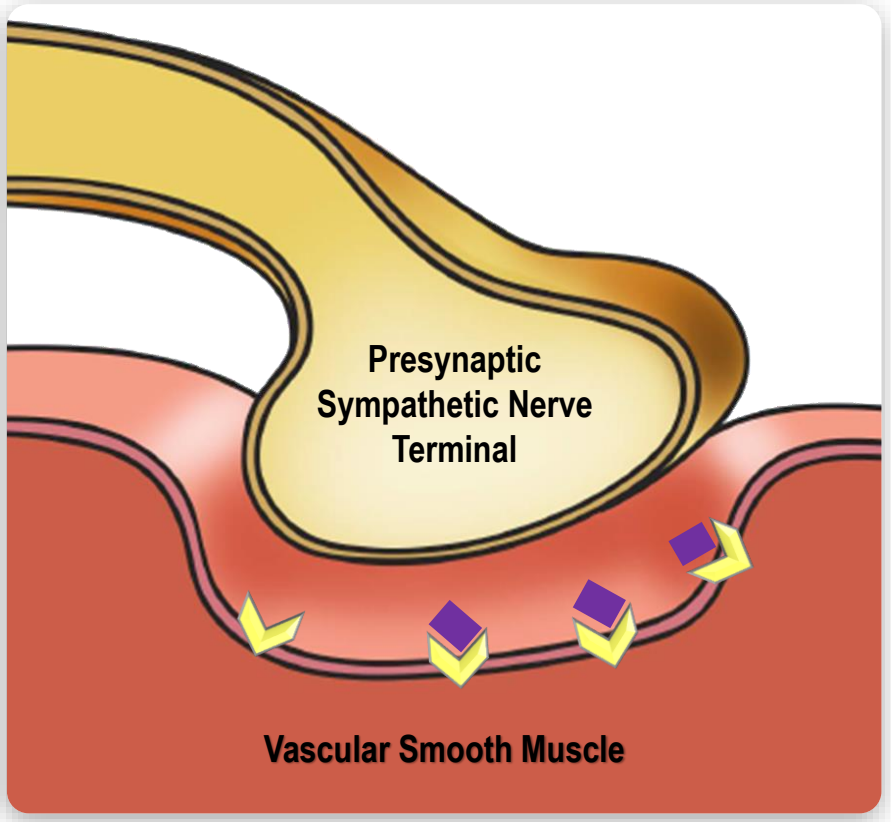
Other Conditions Can Be Mistaken for Rosacea[1,2]

- Chronic photodamage
- Acne vulgaris
- Contact dermatitis
- Early chronic cutaneous and systemic lupus erythematosus
- Seborrheic dermatitis
- Keratosis pilaris rubra faceii

(oxymetazoline HCl) Cream 1% Mechanism of Action

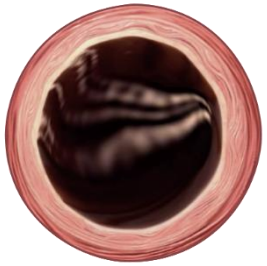
cream is an α_{1A} adrenoceptor agonist[1]

- cream activates α_{1A} adrenoceptors on smooth muscle, causing vasoconstriction[1,2]
- Oxymetazoline acts as a vasoconstrictor



Alpha$_{1A}$ receptors

cream



- 1. cream Prescribing Information, 2020; 2. Docherty et al. *Adv Ther*. 2016.

Pivotal Phase 3 Clinical Evidence

Cream Was Evaluated in Two Pivotal Trials

Structure

- Two identical, randomized, double-blind, vehicle-controlled, parallel-group clinical trials[1]

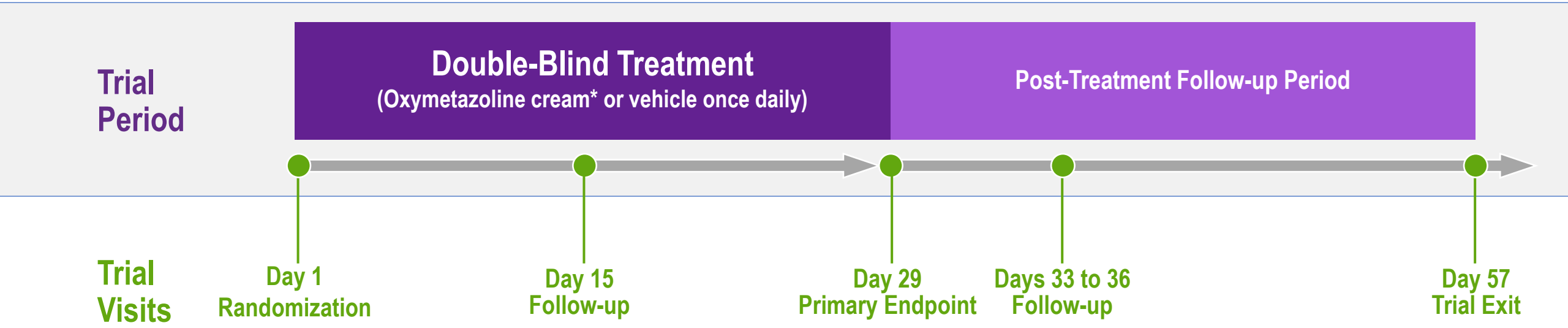
Objective

- To evaluate the efficacy and safety of oxymetazoline cream as compared with vehicle in subjects with moderate to severe persistent facial erythema associated with rosacea[2,3]

Subjects

- Enrolled 885 subjects aged 18 years and older[1]
  - Only subjects with baseline scores of 3 (moderate) or 4 (severe) on both Clinician Erythema Assessment (CEA) and Subject Self-Assessment for Rosacea Facial Redness (SSA) scales were eligible for enrollment[2,3]
  - Subjects with >3 inflammatory lesions on the face were excluded[2,3,*]

Pivotal Trials Included Treatment Period and Post-Treatment Follow-up[1,2]



Subjects were assessed for efficacy measure (primary endpoint) and adverse reactions before dosing and at 3, 6, 9, and 12 hours post dose on Day 29

*All subjects were instructed to apply a pea-sized amount of RHOFADE cream topically to their entire face (forehead, nose, each cheek, and chin) once daily in the morning. No treatments for rosacea other than RHOFADE cream were allowed.

1. Kircik LH, et al. *J Drugs Dermatol.* 2018;17(1):97-105. 2. Baumann L, et al. *J Drugs Dermatol.* 2018;17(3):290-298.

Cream Offers Proven Tolerability

Adverse Reactions Reported by ≥1% of Subjects Through 4 Weeks of Treatment in 3 Controlled Clinical Trials[1]

Adverse Reaction	Oxymetazoline Cream (n=489)	Vehicle (n=483)
	2% (9)	0% (0)
Worsening inflammatory lesions of rosacea	1% (7)	<1% (1)
	1% (5)	1% (4)
Application-site erythema	1% (5)	<1% (2)
	1% (4)	<1% (1)

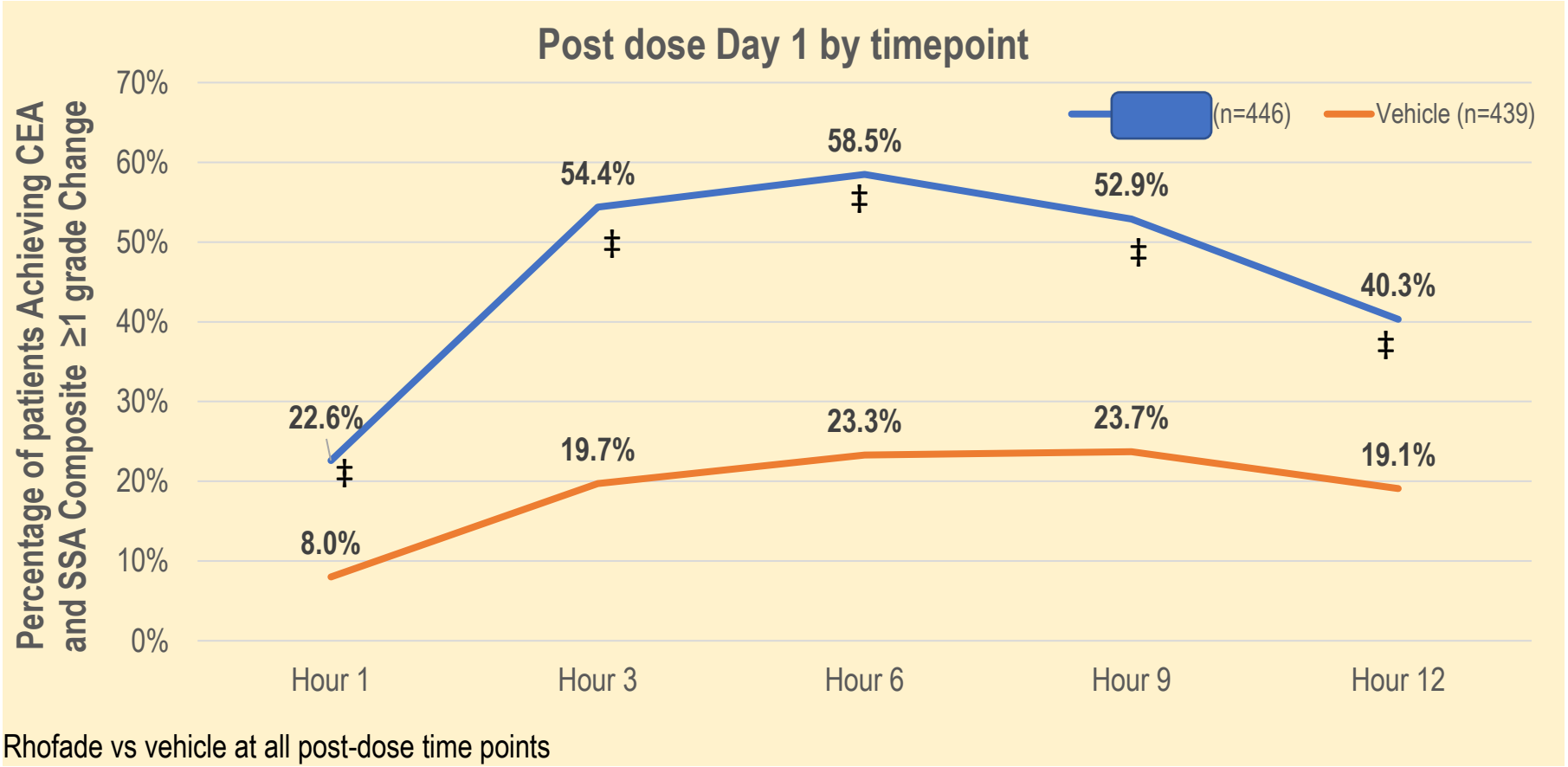
A total of 489 subjects with persistent facial erythema associated with rosacea were treated with oxymetazoline cream once daily for
4 weeks in 3 controlled clinical trials.

In the 2 pooled pivotal trials, few participants discontinued due to treatment-emergent adverse events (2.2% with oxymetazoline cream vs 0.4% with vehicle).[2]

96.3% (852/885) completed their respective trial.

1. RHOFADE cream Prescribing Information, 2018. 2. Data on file, EPI Health .

Significant improvement of erythema (≥ 1-grade composite score*) was seen at hour 1 on first day of treatment

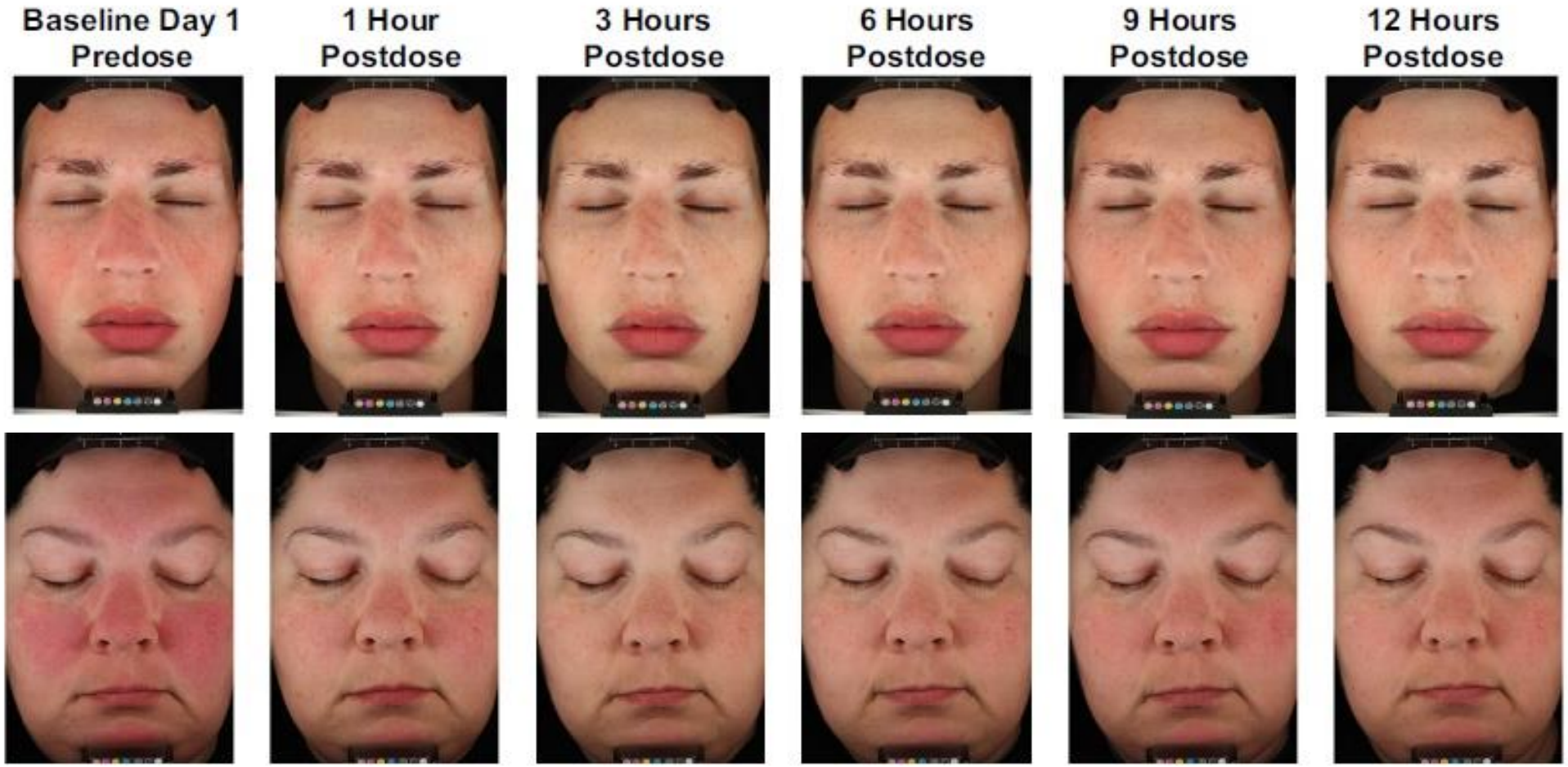


‡ P<0.001 for Rhofade vs vehicle at all post-dose time points

* Composite score of ≥ 1 grade change in both Clinician Erythema Assessment (CEA) and Subject Se lf Assessment (SSA) compared to baseline at specified time point

1.Tanghetti, J.S. et al. *J Drugs Dermatol. 2018:17(6):621-626.*.

Clinically relevant improvement in persistent facial erythema on day 1 demonstrated by ≥ 1-grade composite



1.Tanghetti, J.S. et al. *J Drugs Dermatol. 2018:17(6):621-626.*.

Long-Term, Open-Label Safety Trial

Cream Was Additionally Evaluated in a Long-Term Open-Label Safety Trial[1]

Structure

- Multicenter, open-label, 52-week trial

Objective

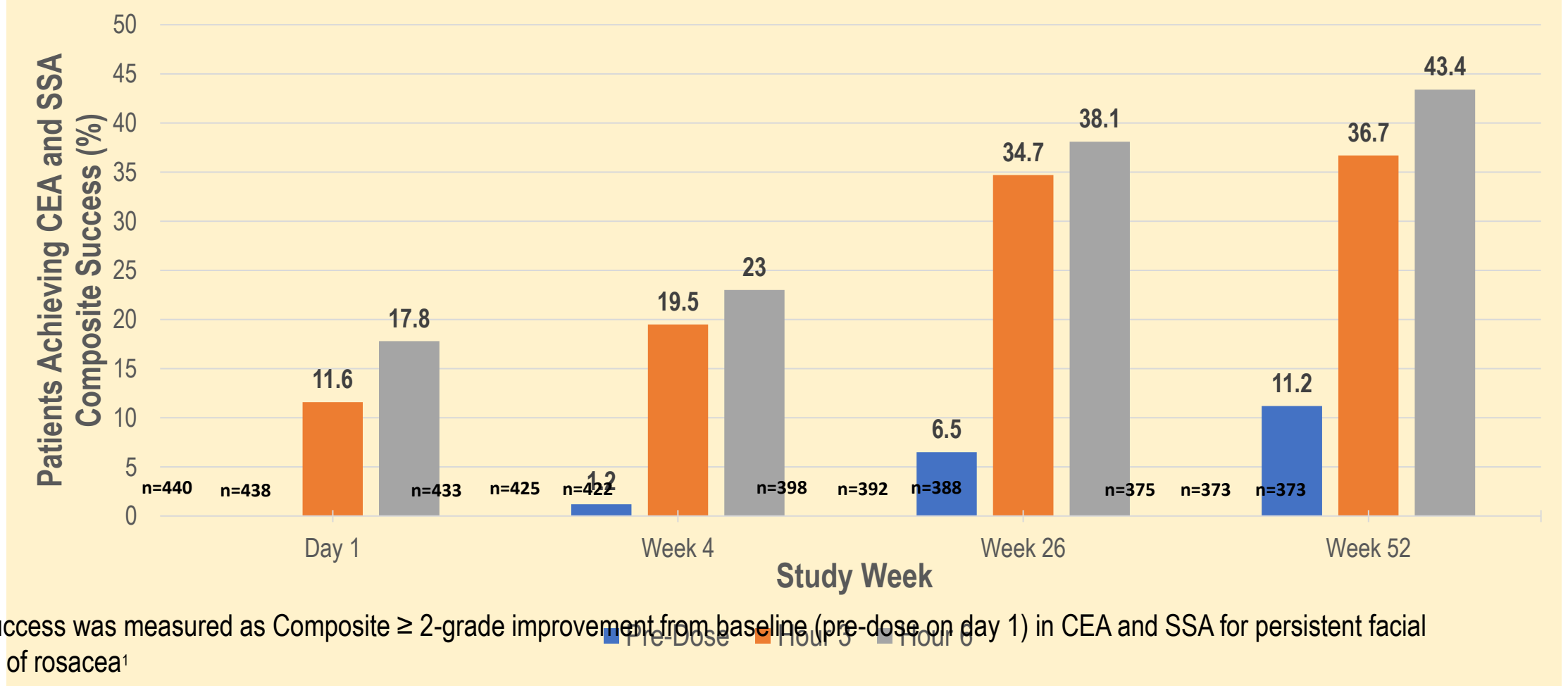
- To evaluate the long-term safety and efficacy of oxymetazoline cream in subjects with moderate to severe persistent facial erythema associated with rosacea

Subjects

- Enrolled 440 subjects aged 18 years and older
  - Only subjects with baseline scores of ≥3 on both clinician and subject assessment scales (moderate to severe) were eligible for enrollment
  - Subjects who had inflammatory lesions of rosacea, in addition to persistent facial erythema, were allowed to use concomitant medication for the inflammatory lesions.

1. Draelos ZD, et al. *J Am Acad Dermatol.* 2018;78(6):1156-1163.

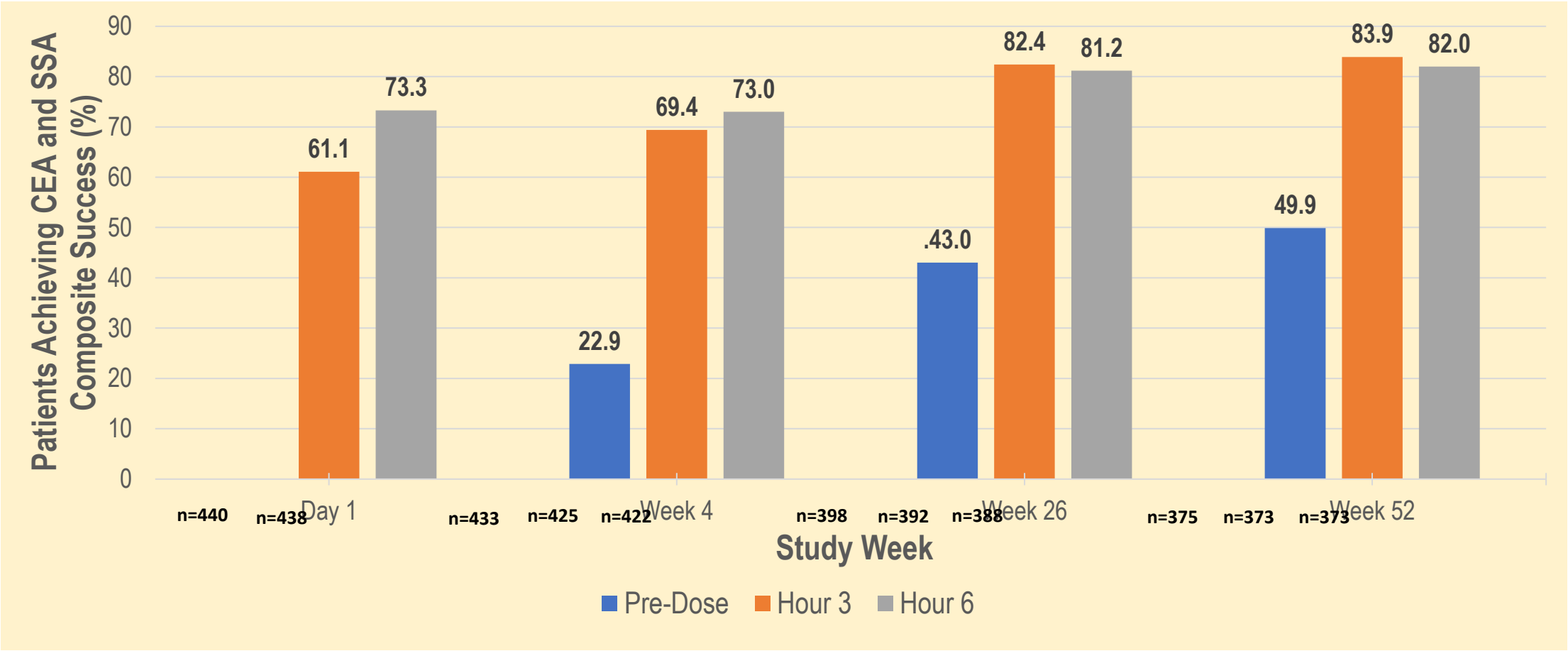
The percentage of patients achieving success* increased throughout duration of study



*Study success was measured as Composite ≥ 2-grade improvement from baseline (pre-dose on day 1) in CEA and SSA for persistent facial erythema of rosacea[1]

. Draelos ZD, et al. *J Am Acad Dermatol.* 2018;78(6):1156-1163.

The percentage of patients with a composite ≥ 1-grade improvement* also improved during the study[1]



*Composite ≥ 1-grade improvement from baseline (pre-dose on day 1) in CEA and SSA for persistent facial erythema of rosacea[1]

Gold et al JAAD 2018;79(3):e57-e59

The Most Common Treatment-Related TEAEs Decreased Over Time

Most Common Treatment-Related TEAEs (≥1% of Subjects) Through 52 Weeks of oxymetazoline cream Treatment (Reported by Quarter)

Treatment-Related TEAE	Quarter 1 (n=440)	Quarter 2 (n=412)	Quarter 3 (n=402)	Quarter 4 (n=390)
Overall	5.9% (26)	1.5% (6)	0.7% (3)	0.3% (1)
Application-site dermatitis	0.9% (4)	0.2% (1)	0.5% (2)	0.3% (1)
Application-site paresthesia	1.6% (7)	0% (0)	0% (0)	0% (0)
Application-site pain	1.1% (5)	0% (0)	0% (0)	0% (0)
Application-site pruritus	1.1% (5)	0% (0)	0% (0)	0% (0)

TEAEs, treatment-emergent adverse events.

Draelos ZD, et al. *J Am Acad Dermatol.* 2018;78(6):1156-1163.

IPL / laser

They are recommended for the treatment of erythema and telangietasias in the updated systematic review of interventions for rosacea.

- Intense pulsed light / Filters +/- 550 nm / Pulse Duration 3-4 ms, Fluency 15-18 J/cm
- Pulsed dye laser (585 or 595 nm),
- Potassium titanyl phosphate (KTP) and Nd:YAG (1064 nm)

- **Recent review on IPL** and number of sessions: **4 to 6 sessions** → ET/PP

Zhang H, Dermatol Ther (Heidelb). 2021 Feb;11(1):13-24. Zhang Y, Jiang S, Lu Y, Yan W, Yan H, Xu Y, Xu T, Li Y, Geng L, Gao X, Chen H.. J Dermatolog Treat. 2020 Feb;31(1):84-90 van Zuuren EJ, st al Br J Dermatol. 2019;181(1): 65–79.

Slide Compliment of Dr. Marco Rocha
Sao Paolo, Brazil

Treatment of Erythematotelangiectatic Rosacea, Facial Erythema, and Facial Telangiectasia with a 577-nm Pro-Yellow Laser: A case Series
Laser Med Sci (2019) 34:93-98

ORIGINAL ARTICLE

Treatment of erythematotelangiectatic rosacea, facial erythema, and facial telangiectasia with a 577-nm pro-yellow laser: a case series

Yelda Kapicioglu[1] · Gulbahar Sarac[1] · Hulya Cenk[2]

Received: 16 April 2018 / Accepted: 31 July 2018 / Published online: 10 August 2018

Abstract
Various lasers have been used for the treatment of erythematotelangiectatic rosacea (ETR), facial erythema (FE), and facial telangiectasias (FT). The assessment of the treatments of all of these conditions with a 577-nm pro-yellow laser has not been reported yet. The aim of this work was to assess the efficacy and safety of the 577-nm pro-yellow laser in ETR, FE, and FT. Forty patients suffering from ETR, FE, and FT (25 female and 15 male) were enrolled in this study. All of the patients were treated with 577-nm pro-yellow laser (QuadroStarPRO YELLOW® Asclepion Laser Technologies, Germany) at 4-week intervals, for one to four sessions. The assessment of the treatment was made based on the digital photographs and the percentage of fading of the erythema and telangiectasias in the lesions. Significant clinical improvement (80–100%) was observed in the first or second sessions of the treatment in FE and ETR patients and in second and fourth sessions of the treatment in FT patients. The treatment was very well tolerated. No side effect was observed except for a few patients who had mild to moderate erythema fading away in 12–24 h. This case series has shown that the pro-yellow laser is a very effective, safe, and well-tolerated treatment for ETR, FE, and FT.

Keywords Treatment of rosacea · Laser treatment · Pro-yellow laser · Facial erythema

Oxymetazoline and Energy-Base Therapy in Patients with Rosacea: Lasers in Surgery and Medicine 53:55–65 (2021)

Oxymetazoline and Energy-Based Therapy in Patients with Rosacea: Evaluation of the Safety and Tolerability in an Open-Label, Interventional Study

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[4]*Laser & Skin Surgery Center of New York, 317 East 34th Street, New York, New York 10016*
[5]*Allergan, Giralda Farms, Dodge Drive, Madison, New Jersey 07940*
[6]*Avanir Pharmaceuticals, Inc., 30 Enterprise, Suite 200, Aliso Viejo, California 92656*
[7]*Aclaris Therapeutics, Inc., 640 Lee Road, Suite 200, Wayne, Pennsylvania 19087*

Background and Objectives: The objectives of this study were to evaluate the safety, tolerability, and efficacy of oxymetazoline hydrochloride cream, 1% (oxymetazoline) when used as an adjunctive treatment with energy-based therapy for patients with moderate to severe facial erythema associated with rosacea.

Study Design/Materials and Methods: In this Phase 4, multicenter, interventional, open-label study, eligible patients received one of four energy-based therapies (potassium titanyl phosphate laser, intense pulsed light therapy, pulsed-laser Vbeam Perfecta, or pulsed-dye laser Cynergy) on 1 and day 29 and once-daily application of oxymetazoline ays 3 through 27 and days 31 through 56. Improvement baseline in Clinician Erythema Assessment (CEA) e, patient satisfaction measures, incidence of treatment-rgent adverse events (TEAEs), and worsening from line on dermal tolerability assessments and the Clinician ngiectasia Assessment (CTA) were assessed. Data were marized using descriptive statistics.

ults: A total of 46 patients (mean age, 51.1 years; 78.3% le) enrolled in this study. Similar numbers of patients ived each of the energy-based therapies in addition to netazoline. All patients demonstrated an improvement baseline in CEA during the study with 39 of 43 uable patients (90.7%) demonstrating an improvement 6 hours posttreatment on day 56. Most patients were satisfied or very satisfied with treatment at the end of the study. All TEAEs were mild or moderate in severity. Some patients experienced worsening in dermal tolerability assessment symptoms (range: 4–21 patients; 8.7–45.7%). Worsening in CEA and CTA were each reported by three patients (6.5%) at any time during the study.

Conclusions: Treatment with oxymetazoline as adjunctive therapy with energy-based therapy was safe, well tolerated, and reduced facial erythema in patients with moderate to severe persistent facial erythema associated with rosacea. Lasers Surg. Med. © 2020 The Authors. *Lasers in Surgery and Medicine* published by Wiley Periodicals LLC

Patient Demographics and Baseline Disease Characteristics
Lasers in Surgery and Medicine 53:55–65 (2021)

TABLE 1. Patient Demographics and Baseline Disease Characteristics

	KTP laser ($n = 12$)	IPL ($n = 12$)	PDL-Vbeam ($n = 11$)	PDL-Cynergy ($n = 11$)	All patients ($N = 46$)
Age, mean, years (SD)	54.8 (11.7)	52.5 (10.6)	48.5 (14.6)	48.1 (12.9)	51.1 (12.4)
Sex, female, *n* (%)	12 (100)	6 (50.0)	9 (81.8)	9 (81.8)	36 (78.3)
Race, white, *n* (%)	12 (100)	12 (100)	11 (100)	11 (100)	46 (100)
Fitzpatrick skin phototype, *n* (%)					
I	0	0	1 (9.1)	0	1 (2.2)
II	11 (91.7)	4 (33.3)	9 (81.8)	2 (18.2)	26 (56.5)
III	1 (8.3)	7 (58.3)	0	9 (81.8)	17 (37.0)
IV	0	0	1 (9.1)	0	1 (2.2)
V	0	1 (8.3)	0	0	1 (2.2)
CEA grade, *n* (%)					
3 (moderate)	9 (75.0)	9 (75.0)	8 (72.7)	11 (100)	37 (80.4)
4 (severe)	3 (25.0)	3 (25.0)	3 (27.3)	0	9 (19.6)

CEA, Clinician Erythema Assessment; IPL, intense pulsed light; KTP, potassium titanyl phosphate; PDL, pulsed-dye laser; SD, standard deviation.

Proportion of patients with one-grade or greater improvement in Clinician Erythema Assessment …
Lasers in Surgery and Medicine 53:55–65 (2021)

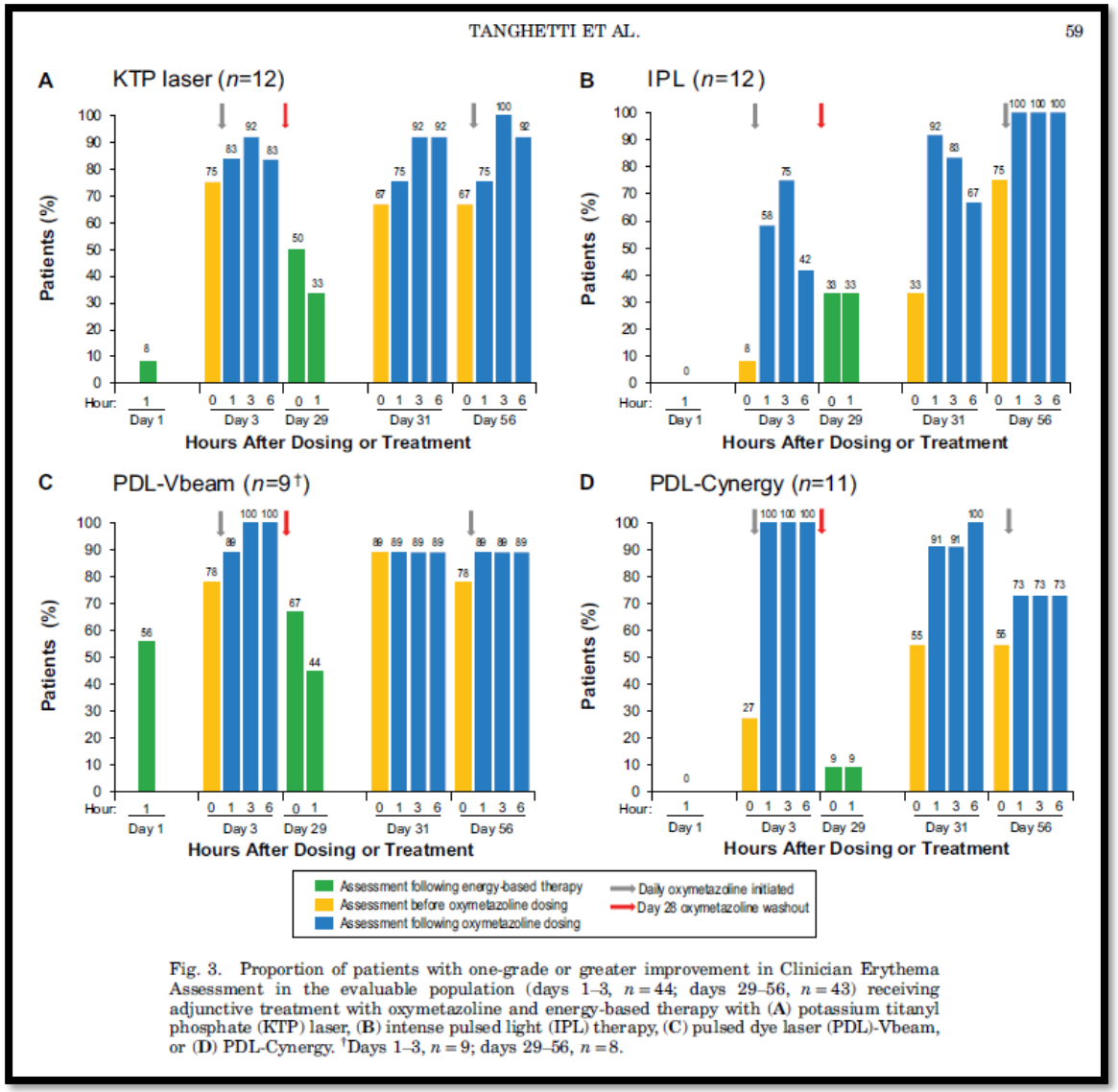

Fig. 3. Proportion of patients with one-grade or greater improvement in Clinician Erythema Assessment in the evaluable population (days 1–3, $n = 44$; days 29–56, $n = 43$) receiving adjunctive treatment with oxymetazoline and energy-based therapy with (**A**) potassium titanyl phosphate (KTP) laser, (**B**) intense pulsed light (IPL) therapy, (**C**) pulsed dye laser (PDL)-Vbeam, or (**D**) PDL-Cynergy. †Days 1–3, $n = 9$; days 29–56, $n = 8$.

Distribution of Clinician Erythema Assessment grades in the evaluable population (baseline [BL] through day 3, n = 44; days 29–56, n = 43). †Hour 0, …
Lasers in Surgery and Medicine 53:55–65 (2021)

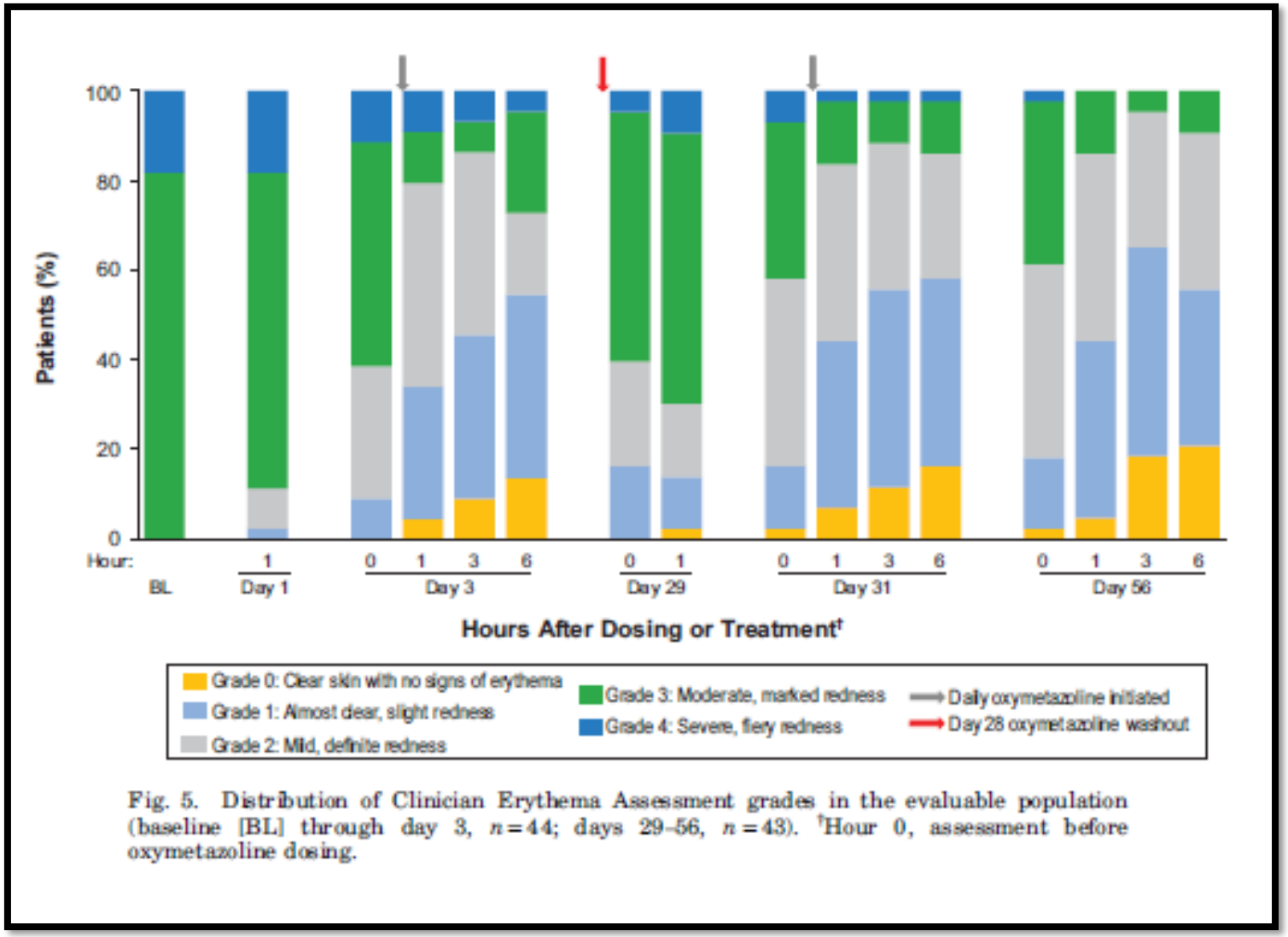

Fig. 5. Distribution of Clinician Erythema Assessment grades in the evaluable population (baseline [BL] through day 3, $n = 44$; days 29–56, $n = 43$). †Hour 0, assessment before oxymetazoline dosing.

Patient-reported outcomes (evaluable population; baseline [BL] through day 3, n = 44; days 29–56, n = 43): Lasers in Surgery and Medicine 53:55–65 (2021)

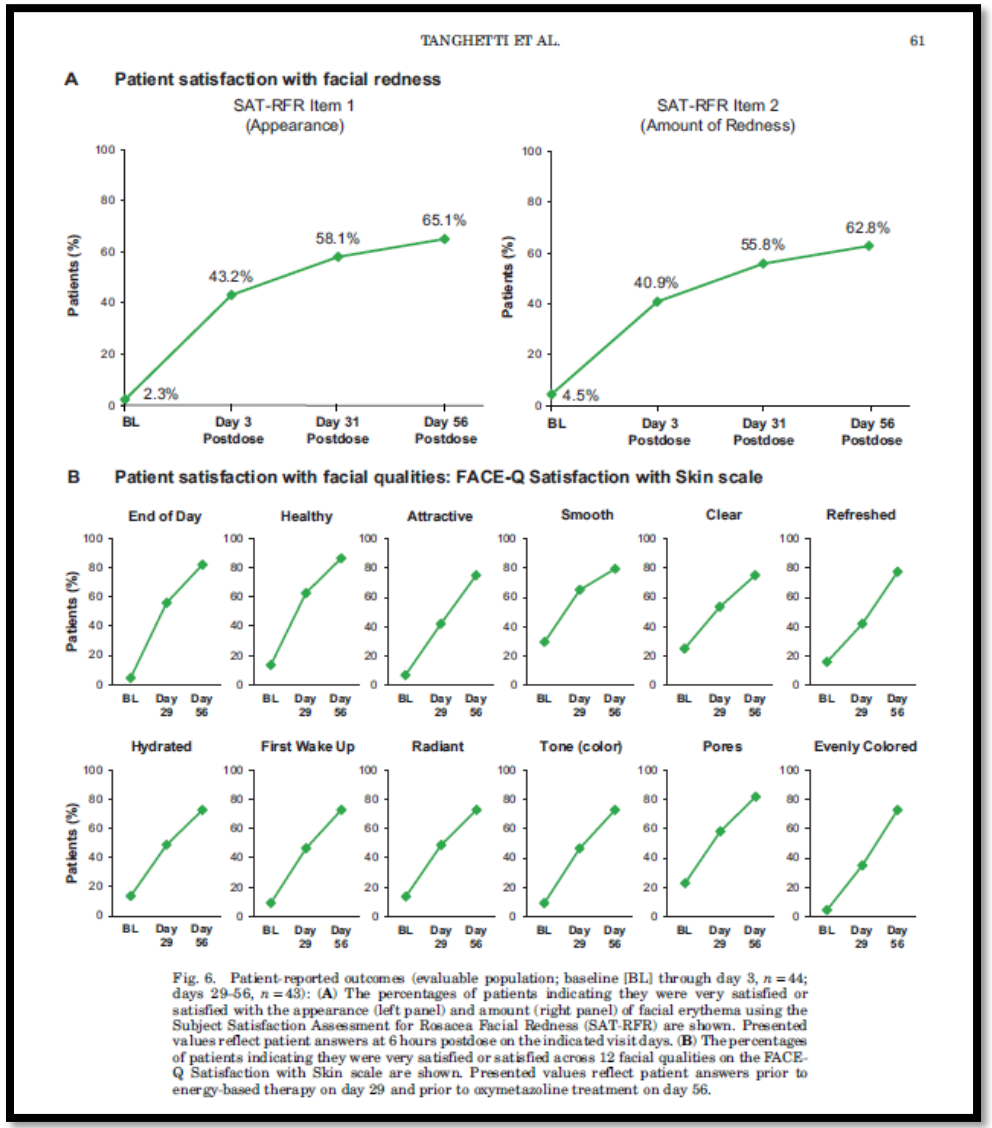

Fig. 6. Patient-reported outcomes (evaluable population; baseline [BL] through day 3, $n = 44$; days 29-56, $n = 43$): (**A**) The percentages of patients indicating they were very satisfied or satisfied with the appearance (left panel) and amount (right panel) of facial erythema using the Subject Satisfaction Assessment for Rosacea Facial Redness (SAT-RFR) are shown. Presented values reflect patient answers at 6 hours postdose on the indicated visit days. (**B**) The percentages of patients indicating they were very satisfied or satisfied across 12 facial qualities on the FACE-Q Satisfaction with Skin scale are shown. Presented values reflect patient answers prior to energy-based therapy on day 29 and prior to oxymetazoline treatment on day 56.

Dermal tolerability assessment grades (safety population n = 46):... Lasers in Surgery and Medicine 53:55–65 (2021)

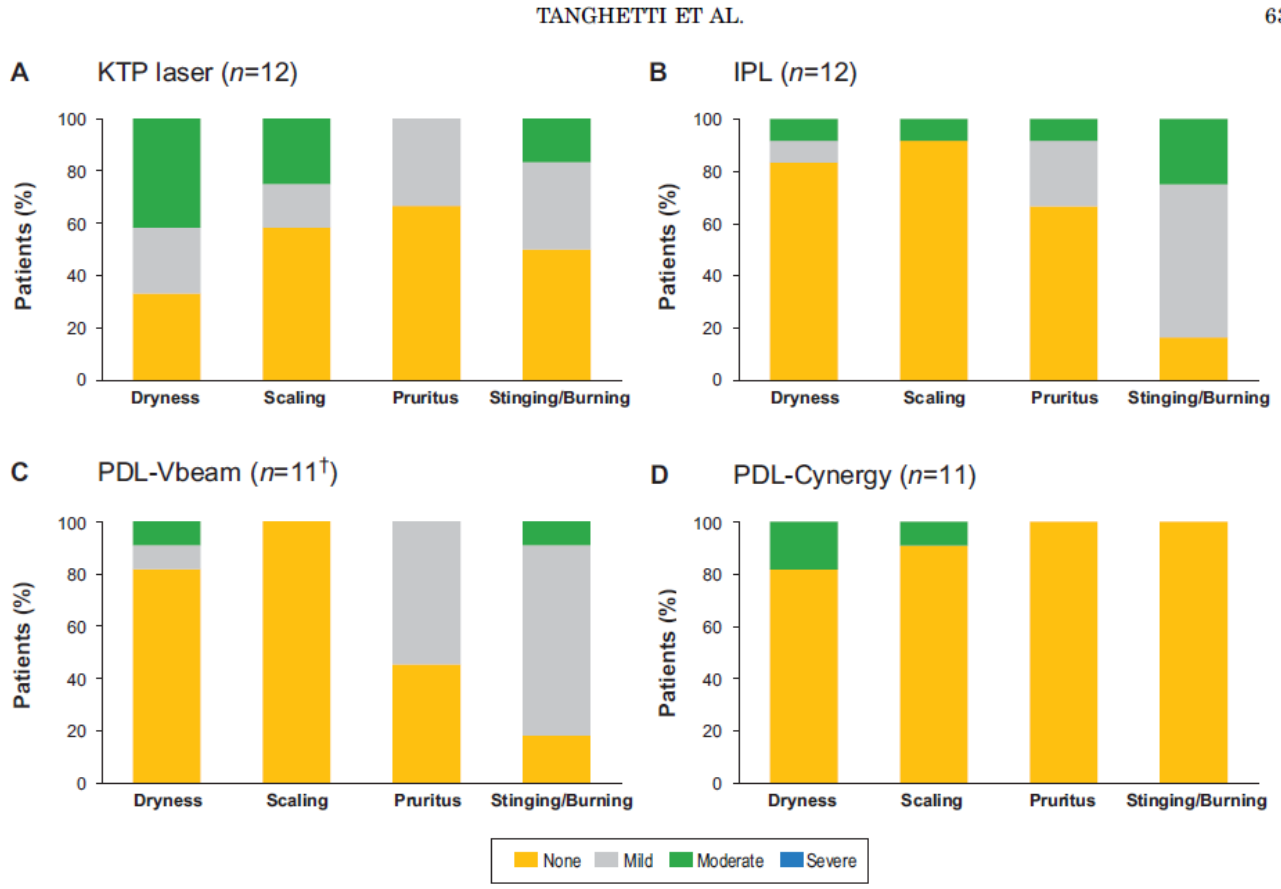

Fig. 7. Dermal tolerability assessment grades (safety population; $n = 46$): The maximum severity of dryness, scaling, pruritus, and stinging/burning at any time during the study is shown for patients who received energy-based treatment with (**A**) potassium titanyl phosphate (KTP) laser, (**B**) intense pulsed light (IPL) therapy, (**C**) pulsed dye laser (PDL)-Vbeam, or (**D**) PDL-Cynergy. †$n = 11$, days 1–3; $n = 9$, day 29; $n = 8$, day 31; $n = 11$, day 56 predose; $n = 8$, day 56 postdose.

Clinician Telangiectasia Assessment (CTA) grades (safety population; n = 46): Lasers in Surgery and Medicine 53:55–65 (2021)

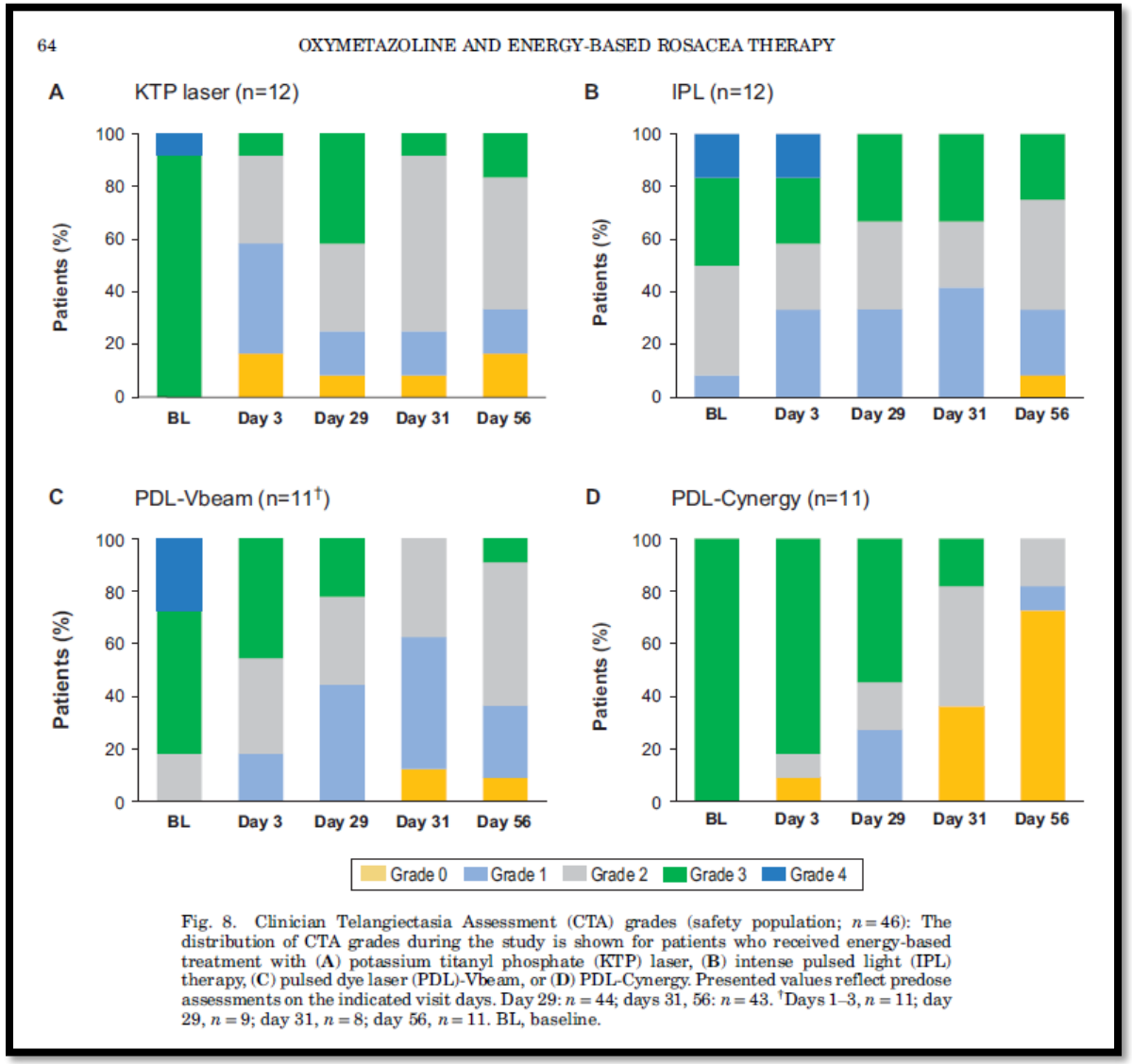

Fig. 8. Clinician Telangiectasia Assessment (CTA) grades (safety population; $n = 46$): The distribution of CTA grades during the study is shown for patients who received energy-based treatment with (**A**) potassium titanyl phosphate (KTP) laser, (**B**) intense pulsed light (IPL) therapy, (**C**) pulsed dye laser (PDL)-Vbeam, or (**D**) PDL-Cynergy. Presented values reflect predose assessments on the indicated visit days. Day 29: $n = 44$; days 31, 56: $n = 43$. †Days 1–3, $n = 11$; day 29, $n = 9$; day 31, $n = 8$; day 56, $n = 11$. BL, baseline.

Microvascular Effects of Pulsed Dye Laser in Combination With Oxymetazoline
Lasers in Surgery and Medicine 52:17–22 (2020)

Background and Objective: Oxymetazoline, an α-1A agonist, is approved by the United States Food and Drug Administration (FDA) for treatment of persistent facial erythema associated with rosacea and induces vasoconstriction by interacting with α receptors. The objective of our study was to study the microvascular effects of oxymetazoline and pulsed dye laser
Materials and Methods: A dorsal
surgically installed on 20 mice. Each
to one of four experimental groups
metazoline alone (10 µl applied o
saline + PDL (saline applied 5 minu
diation [10 mm spot, 1.5 ms pulse
livered to epidermis]), or oxymet
oxymetazoline applied 5 minutes b
once daily × 7 days). Brightfield and
were performed for 7 days to monit
tural and functional changes.
Results: We observed persistent blo
saline-only and oxymetazoline-only e
rate of vascular shutdown was
metazoline + PDL (66.7%) compared with saline + PDL alone (16.7%). Oxymetazoline application increased venule diameter at 5 minutes post-application and decreased both arteriole and venule diameters at 60 minutes post-application.
Conclusion: The combination protocol of oxymetazoline + PDL induces persistent vascular shutdown observed 7 days after irradiation. This result may be associated with the acute vascular effects of oxymetazoline. Oxymetazoline + PDL should be evaluated as a treatment for cutaneous vascular disease, including rosacea and port wine birthmarks. Lasers Surg. Med. © 2019 Wiley Periodicals, Inc.

Microvascular Effects of Pulsed Dye Laser in Combination With Oxymetazoline

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[3]Edwards Life Sciences Center for Advanced Cardiovascular Technology, University of California, 2400 Engineering Hall, Irvine, California, 92697-2730
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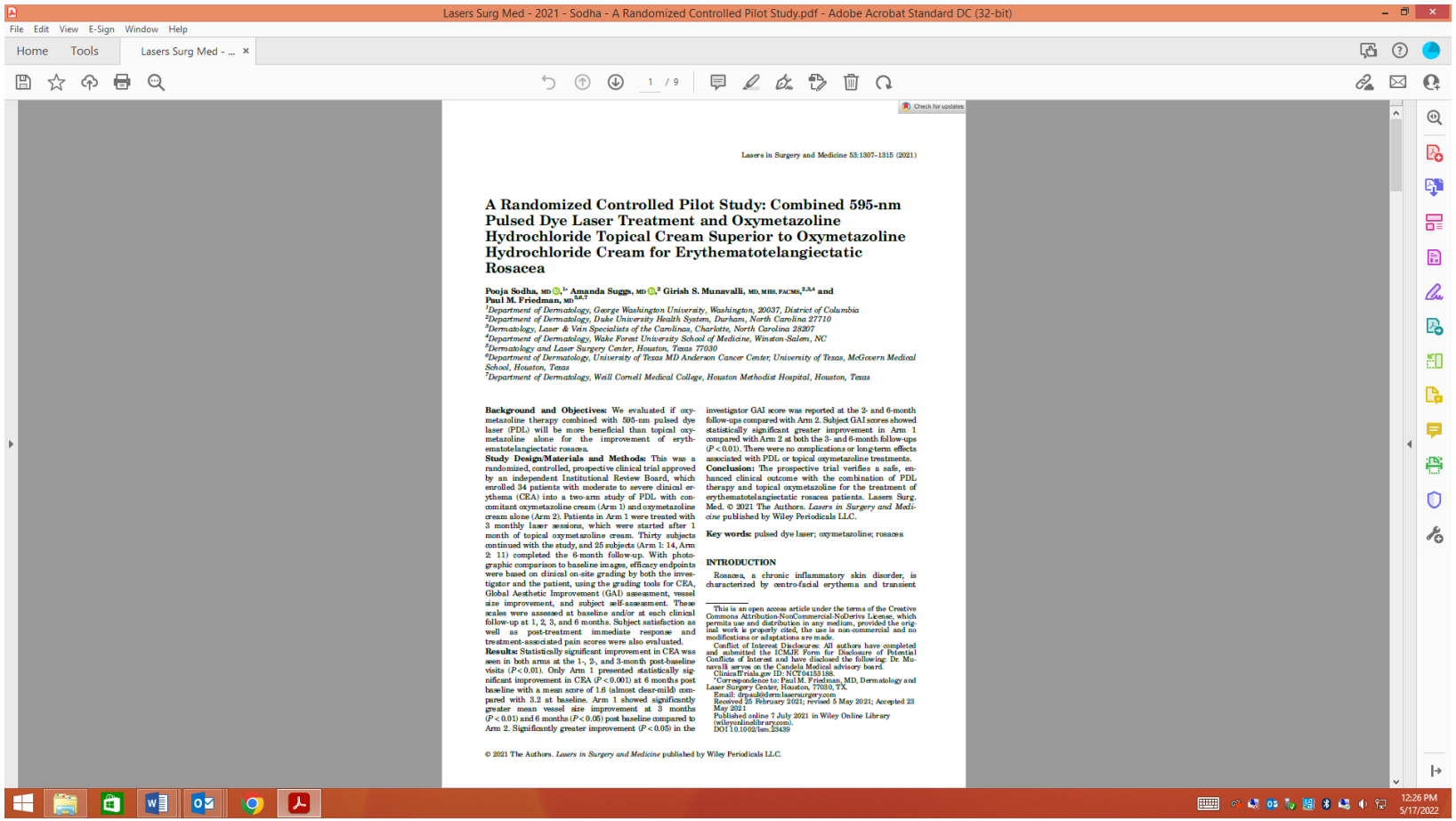
A Randomized Controlled Pilot Study: Combined 595-nm Pulsed Dye Laser Treatment and Oxymetazoline Hydrochloride Topical Cream….
Lasers in Surgery and Medicine 53:1307–1315 (2021)



Oxymetazoline 1% cream

- Oxymetazoline 1% cream works to reduce the erythema associated with rosacea
- Oxymetazoline 1% cream with vascular lasers or light sources works to enhance the effect of erythema reduction and may show prolonged success
- More research is needed, but preliminary data encouraging