

## White Paper

# Comparison of Treatment Regimens and Outcomes Between the RevLite Electro-Optic Q-Switched Nd:YAG Laser System and the Fraxel® 1550 Fractionated Laser System: Two Case Studies

**Neil Sadick, MD,**

Medical Director, Sadick Dermatology,  
Sadick Research Group

### INTRODUCTION

Non-ablative lasers are widely used for the gentle, safe and effective treatment of mild facial photodamage. However, patients and aesthetic medicine practitioners have a variety of wavelength and technology options to choose from, and must carefully weigh the benefits and disadvantages of each treatment protocol and its suitability for individual needs. The Q-Switched Nd:YAG laser is a popular choice for skin rejuvenation. An electro-optic (EO) Q-Switched laser utilizes an extremely high-speed shutter that stores energy between pulses, producing a deep and even beam with a photoacoustic effect in its delivery of energy to the target chromophore. Photoacoustic nanosecond technology forces energy into the chromophores at such a high rate that they vibrate and shatter. The nanosecond pulse duration is shorter than the thermal relaxation time of the skin and its microvasculature, thus limiting the healthy tissue's exposure to heat build-up and minimizing damage to the epidermis while stimulating collagen production and targeting chromophores in the dermal layers. Treatment involves minimal patient discomfort and there is usually no downtime after the procedure. In addition, the Nd:YAG wavelength spectrum is particularly suited for the treatment of darker skin types, as it is only weakly absorbed in epidermal melanin.

In recent years, the introduction of fractionated technology has further expanded the options available for safe and effective photorejuvenation. The laser energy in a fractionated system is split in order to create thousands of microcolumns of injury amid tiny "bridges" of untouched skin. Therefore, only a small portion of the skin's surface is treated at any one time. Undamaged tissue surrounding the microcolumns accelerates the healing process in the epidermal layers, while new dermal collagen bundles are formed in response to the injury. Theoretically, recovery time is therefore reduced, and results are enhanced by the skin's own natural regeneration capabilities.

The objective of this comparison was to examine the treatment protocols and effects of two types of laser systems in the treatment of fine wrinkles: RevLite Q-Switched Nd:YAG Laser (ConBio, a Cynosure Company, Fremont, CA) operating at 532nm and 1064nm, and the Fraxel 1550 Fractionated Laser (SOLTA Medical, Hayward, CA).

### METHODS

Two female subjects provided informed consent in order to participate in this ongoing IRB-approved comparative protocol. Each subject was classified as Fitzpatrick Wrinkle Class I (fine wrinkles), with evidence of bilateral dyschromia. Subjects were randomly assigned to receive RevLite treatment on the left or right side of the face. The other side of the face received treatment with the fractionated system. Subjects underwent eight RevLite treatments and five fractionated treatments, according to standard clinical practice and established treatment guidelines for each laser system. Topical anesthetic (containing lidocaine, benzocaine and tetracaine) was applied to the entire face, generally one hour prior to treatment. The majority of treatment visits were scheduled 8-12 days apart. Subjects were asked to rate the tolerability of each treatment (stinging/burning sensations during and after treatment on each side of the face) according to the following scale: 0 for none; 1 for mild; 2 for moderate; and 3 for severe.

Improvement assessments were completed at three months and again at six months after the final fractionated treatment. Subjects and a blinded investigator rated the amount of irregular facial pigment (0 for none; 1 for minimal; 2 for mild; 3 for moderate; and 4 for severe), as well as the percentage of improvement (0 for no improvement; 1-24% for slight

improvement; 25-49% for fair improvement, 50-75% for good improvement; and 76-100% for excellent improvement) in the categories of: wrinkle appearance, skin tone/texture and dyschromia. Subjects also described the amount of redness and swelling that they experienced on each side of the face after treatment.

## CASE STUDY RESULTS

### Subject 1

#### 37-year-old Caucasian female with Fitzpatrick Skin Type III.

At baseline, Subject #1 was assessed with severe irregular facial pigmentation. Three months post-treatment, the blinded evaluator rated her dyschromia as minimal on the RevLite side and moderate on the fractionated side. At six months, the irregular pigment on the RevLite side remained minimal, while the dyspigment on the fractionated side was reduced to a mild level. The subject's own ratings of her pigmentation issues matched the blinded investigator scores at three months; at six months, the subject rated the dyschromia on the RevLite side as mild and on the fractionated side as moderate. At all time points, improvement in uneven pigment was greater on the RevLite treated side. When asked to rate the percentage of improvement in pigmentation, the blinded evaluator noted 50-75% improvement on the RevLite side at three months vs. 1-24% on the fractionated side; and 76-100% improvement (RevLite) compared to 50-75% improvement on the fractionated side at six months. The subject scored her improvement in pigmentation as 50-75% on the RevLite side at both three and six months, compared to 1-24% improvement at both three and six months on the fractionated side.

When asked to rate the percentage of improvement in the appearance of her facial wrinkles, the subject noted an improvement of 1-24% on both sides of the face at three months, with no change at six months on either side. The blinded evaluator noted no improvement on the RevLite side at three months, but a 1-24% change at six months. On the fractionated side, the blinded evaluator rated a 1-24% improvement at three months and a no-improvement rating at six months.

Blinded evaluator percentage of improvement ratings for skin tone/texture were scored at 25-49% on the RevLite side at both three and six months, and at 1-24% at 3 months and 25-49% at 6 months for the side of the face that received fractionated treatment. The subject rated her improvement in this category as 1-24% on the RevLite side at three months, increasing to 50-75% at six months, while the fractionated side received a rating of 1-24% improvement at both three and six months.

During most treatment sessions where both modalities were employed, this subject rated the RevLite treated side with

**Table 1:** Subject #1 Treatment Regimen

RevLite	Fractionated
<b>TREATMENT VISIT 1</b>	
532nm; 6mm spot size; 10Hz; 1.4J/cm <sup>2</sup> ; 3-5 passes allowed; 5 minutes	15mJ; Level 7; 8 passes; 15 minutes
<b>TREATMENT VISIT 2</b>	
1064nm (PTP* mode); 6mm spot size; 10Hz; 5.4J/cm <sup>2</sup> ; 4 passes; 3 minutes	
<b>TREATMENT VISIT 3</b>	
1064nm (PTP mode); 6mm spot size; 10Hz; 5.4J/cm <sup>2</sup> ; 3 passes; 3 minutes	15mJ; Level 7; 8 passes; 10 minutes
<b>TREATMENT VISIT 4</b>	
1064nm (PTP mode); 6mm spot size; 10Hz; 5.4J/cm <sup>2</sup> ; 3 passes; 3 minutes	
<b>TREATMENT VISIT 5</b>	
1064nm (PTP mode); 6mm spot size; 10Hz; 5.4J/cm <sup>2</sup> ; 4 passes; 4 minutes	20mJ; Level 8; 8 passes; 15 minutes
<b>TREATMENT VISIT 6</b>	
1064nm (PTP mode); 6mm spot size; 10Hz; 5.4J/cm <sup>2</sup> ; 3 passes; 3 minutes	
<b>TREATMENT VISIT 7</b>	
532nm; 6mm spot size; 1.4J/cm <sup>2</sup> ; 5Hz; 3-5 passes; 5 Minutes; also 1064nm; 6mm spot size; 10Hz; 5.4 J/cm <sup>2</sup> ; 3 passes; 4 minutes	25mJ; Level 8; 8 passes; 13 minutes
<b>TREATMENT VISIT 8</b>	
1064nm (PTP mode); 6mm spot size; 10Hz; 5.4J/cm <sup>2</sup> ; 5 passes; 3 minutes	
<b>TREATMENT VISIT 9</b>	
(No RevLite treatment)	25mJ; Level 8; 8 passes; 8 minutes
<b>TOTAL TREATMENT TIME</b>	
<b>32 Minutes</b>	<b>61 minutes</b>

\*Photoacoustic Technology Pulse

Fractionated

RevLife

Baseline



3 Months Post Treatment



6 Months Post Treatment



less discomfort intra-operatively and immediately after the treatment (mild or none vs. moderate stinging/burning on the fractionated side of the face). After earlier treatments, the subject's narratives also reported less downtime or redness and/or swelling on the RevLite treated side.

## Subject 2

### 56-year-old Asian female with Fitzpatrick Skin Type IV.

At baseline, Subject #2 was assessed with a moderate level of dyspigmentation. Three months after the final fractionated treatment, the blinded evaluator rated her irregular pigment as mild on the RevLite side and moderate on the fractionated side of the face. Unfortunately, this subject did not comply with sun avoidance instructions during the time period between her three-month and six-month follow-up visits, and the resulting sun damage and facial hyperpigmentation rendered her six-month assessments invalid. The subject's ratings of her irregular pigmentation did not match the investigator's in this instance: she scored the dyschromia on the RevLite side as mild and on the fractionated side as minimal. In the percentage of improvement assessment, the blinded evaluator rated the RevLite side with 50-75% improvement in pigmentation at three months, versus 1-24% improvement on the fractionated side. The subject saw only 1-24% improvement in this area on both sides of the face at three months.

In the categories of wrinkle appearance and skin tone/texture, the blinded evaluator rated the percentage of improvement in both categories as 50-75% on the RevLite side, and 1-24% on the fractionated side at three months. The subject did not see any improvement in these areas on either side of her face at this time.

During and immediately after the majority of her treatment sessions, the subject rated her sensations of discomfort as mild on the RevLite side, and moderate on the side treated with the fractionated laser. When asked to describe her downtime and experiences of redness and swelling post-treatment, the subject generally reported instances of lesser severity and of shorter duration on the side treated with the RevLite.

## DISCUSSION

Aesthetic customers have many choices when it comes to the treatment of superficial photodamage and fine wrinkles. Laser technology offers a stunning array of wavelengths and delivery options to the discerning patient in search of healthy, youthful and radiant skin. Selection of a treatment method in laser dermatology is often a careful balancing of pros and cons weighted differently by each patient's individual needs and expectations. Patients who are willing to take on the intense prolonged downtime and increased risk of a traditional CO<sub>2</sub> or Er:YAG laser procedure may enjoy the dramatic benefits of a dermal ablative treatment. However,

**Table 2:** Subject #2 Treatment Regimen

RevLite	Fractionated
<b>TREATMENT VISIT 1</b>	
1064nm (PTP* mode); 6mm spot size; 10Hz; 5.7J/cm <sup>2</sup> ; 5 passes; 3 minutes	10mJ; Level 5; 8 passes; 10 minutes
<b>TREATMENT VISIT 2</b>	
1064nm (PTP mode); 6mm spot size; 10Hz; 5.7J/cm <sup>2</sup> ; 3 passes; 3 minutes	
<b>TREATMENT VISIT 3</b>	
1064nm (PTP mode); 6mm spot size; 10Hz; 5.7J/cm <sup>2</sup> ; 3 passes; 3 minutes	12mJ; Level 6; 8 passes; 12 minutes
<b>TREATMENT VISIT 4</b>	
1064nm (PTP mode); 6mm spot size; 10Hz; 5.7J/cm <sup>2</sup> ; 3-5 passes allowed; 7 minutes	
<b>TREATMENT VISIT 5</b>	
1064nm (PTP mode); 6mm spot size; 10Hz; 5.7J/cm <sup>2</sup> ; 3-5 passes allowed; 4 minutes	12mJ; Level 6; 8 passes; 9 minutes
<b>TREATMENT VISIT 6</b>	
1064nm (PTP mode); 6mm spot size; 10Hz; 5.7J/cm <sup>2</sup> ; 3-5 passes allowed; 6 minutes	
<b>TREATMENT VISIT 7</b>	
1064nm (PTP mode); 6mm spot size; 10Hz; 5.7 J/cm <sup>2</sup> ; 3-5 passes allowed; 4 minutes	25mJ; Level 8; 8 passes; 8 minutes
<b>TREATMENT VISIT 8</b>	
1064-nm (PTP mode); 6mm spot size; 10Hz; 5.7J/cm <sup>2</sup> ; 3-5 passes allowed; 4 minutes	25mJ; Level 8; 8 passes; 8 minutes
<b>TREATMENT VISIT 9</b>	
(No RevLite treatment)	12mJ; Level 6; 6 passes; 11 minutes
<b>TOTAL TREATMENT TIME</b>	
<b>34 Minutes</b>	<b>58 minutes</b>

\*Photoacoustic Technology Pulse



there is a definite need for treatment methodologies that provide a safer and more moderate (gradual) spectrum of improvement. The split-face design of this study offered a rare opportunity to compare the effects of two popular non-ablative laser treatment regimens in the same patient. Treatment settings for the fractionated system were those recommended by the manufacturer for a mild-moderate level of therapy. Every effort was made to facilitate a straightforward and scientific comparison of results between these different methods of laser energy delivery.

For both subjects, blinded evaluator scores of photographs revealed a clear advantage for the RevLite in the treatment of irregular pigmentation. Treatment times were also significantly lower for the RevLite device, which translates to less patient and practitioner fatigue, as well as less time booked for a treatment room in a busy practice. In this study we

used topical anesthesia on both sides of the face to equalize the treatment conditions: while anesthesia is a normal (and standard) part of the treatment regimen for the performance of a 1550nm fractionated treatment; in clinical practice, most physicians do not find it necessary to use topical anesthesia with the RevLite. Eliminating anesthesia would reduce the cost of treatment for a RevLite regimen, as well shorten the time in the treatment room (waiting for the numbing action to occur). Only two of the four available RevLite wavelengths (1064nm and 532nm) were utilized in this study. Optional RevLite MultiLite™ dye handpieces provide 650nm and 585nm wavelengths. The standard handpiece alone allows the practitioner to customize therapy according to skin type and pigment density; 532nm wavelength is highly absorbed by melanin and is uniquely suited to address stubborn pigmented lesions.

## CONCLUSION

RevLite's Photoacoustic Technology Pulse mode offers notable improvement in the signs of facial photoaging in a manner that involves significantly less patient discomfort, a shorter amount of time in the treatment room, reduced risk of side effects and a decrease in cost of approximately \$350 per treatment package when compared to the gold standard in fractionated treatment.

[www.cynosure.com](http://www.cynosure.com)

© 2012 Cynosure, Inc. Cynosure, MultiLite and RevLite are registered trademarks of Cynosure, Inc. Be Transformed is a trademark of Cynosure, Inc. Fraxel is a registered trademark of Solta Medical, Inc.  
921-0399-000 Rev. 1 07/12

**CYNOSURE**<sup>®</sup>  
Be transformed