White Paper

A Study of the RevLite® Electro-Optic Q-Switched Nd:YAG Laser in the Treatment of Acne Scars in Asian Skin: Results for Two Subjects

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INTRODUCTION

Acne is a common dermatological problem that has the potential to leave lasting scars. Injury from acne lesions initiates a cascade of wound healing events that are among the most complex of biological processes. Eighty to ninety percent of people with acne scars have those associated with a loss of collagen (atrophic scars), compared to a minority who show hypertrophic scars and keloids.[1] In patients with Asian skin types, even mild cases of acne can cause scarring and hyperpigmentation. Lasers in particular have assumed a central role in the management of acne scarring, as atrophic scars from inflammatory lesions tend to be unaffected by other medical therapies.[2]

In 2006, Lipper and Perez[3] reported a small study of acne scar patients treated with a short-pulsed 1064nm Nd:YAG laser in which scar improvement was noted in all treated subjects with minimal discomfort and no downtime or adverse effects. Friedman and colleagues[4] noted that treatment with a non-ablative 1064nm Q-Switched Nd:YAG laser resulted in significant quantitative improvements in skin topography in patients with mild to moderate atrophic acne scarring and continual, incremental improvements through six months post-treatment, indicating ongoing dermal collagen remodeling. In addition, practitioners utilizing this Q-Switched device for skin rejuvenation and acne scars in clinical practice indicated some contemporary reduction in active acne lesions, suggesting that further quantification of this effect was warranted. The objective of this study was therefore to evaluate the use of the RevLite Electro-Optic Q-Switched Nd:YAG laser in the treatment of acne scars and acne lesions in hard-to-treat darker Asian skin types. Two case reports from preliminary results of this study are presented.

METHODS

Subjects provided informed consent to participate in this trial, which is ongoing under the general supervision of the Ethics Committee at Kasemrad Prachacheun Hospital. The study was open to subjects with Fitzpatrick Skin Types III-VI, with evidence of atrophic scarring and mild to severe facial acne. In order to replicate standard clinical conditions, and with the exception of isotretinoin use within 6 months prior to study enrollment, subjects were allowed to continue any topical or oral acne medications during the course of the trial. Study patients received a total of 10 bi-weekly treatments with the RevLite system at the following settings: 1064nm in the Photoacoustic Technology Pulse® (PTP) Mode, 6mm spot size, 10 Hz, 5.7 J/cm^2 and either 10 or 20 passes per session. Pulses were overlapped until the immediate treatment endpoint of mild to moderate erythema was achieved.

Subjects were scheduled to return for follow-up at three months after the final treatment visit. Improvement in acne scarring was assessed using the Global Acne Scarring Classification[5] as follows:

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Grade 1	**Macular scarring** [postinflammatory macular (flat) dyspigmentation]
Grade 2	**Mild atrophy or hypertrophic scarring** that may not be evident at 50 cm or greater and may be adequately masked by makeup or hair patterns
Grade 3	**Moderate atrophic or hypertrophic scarring** obvious at social distances and not easily masked
Grade 4	Severe atrophic or hypertrophic scarring

Improvement in acne vulgaris was judged using the Investigators' Global Assessment[6] [IGA] scale:

Grade 0	**Clear skin** with no inflammatory or noninflammatory lesions
Grade 1	**Almost clear;** rare noninflammatory lesions with no more than one small inflammatory lesion
Grade 2	**Mild severity;** greater than Grade 1; some noninflammatory lesions with no more than a few inflammatory lesions (papules/pustules only, no nodular lesions)
Grade 3	**Moderate severity**; greater than Grade 2; up to many noninflammatory lesions and may have some inflammatory lesions, but no more than one small nodular lesion
Grade 4	**Severe**; greater than Grade 3; up to many noninflammatory and inflammatory lesions, but no more than a few nodular lesions

At the three month follow-up visit, subjects rated their satisfaction with the outcome of treatment according to the following Likert scale: **1** = Very Dissatisfied; **2** = Dissatisfied; **3** = Neither Satisfied or Dissatisfied; **4** = Satisfied; **5** = Very Satisfied.

CASE REPORT 1

Subject 1

30-year-old Asian female with Fitzpatrick Skin Type IV.

At baseline her acne scarring was rated at Grade 3 (moderate) and her acne severity was Grade 3 (moderate). She underwent 10 treatments with the RevLite laser. Assessments taken at three months post-treatment revealed an acne scar score at the lowest, Grade 1 (macular [flat] scarring), and an acne severity at Grade 1 (almost clear). The subject rated her satisfaction at 4 (Satisfied).

Subject 2

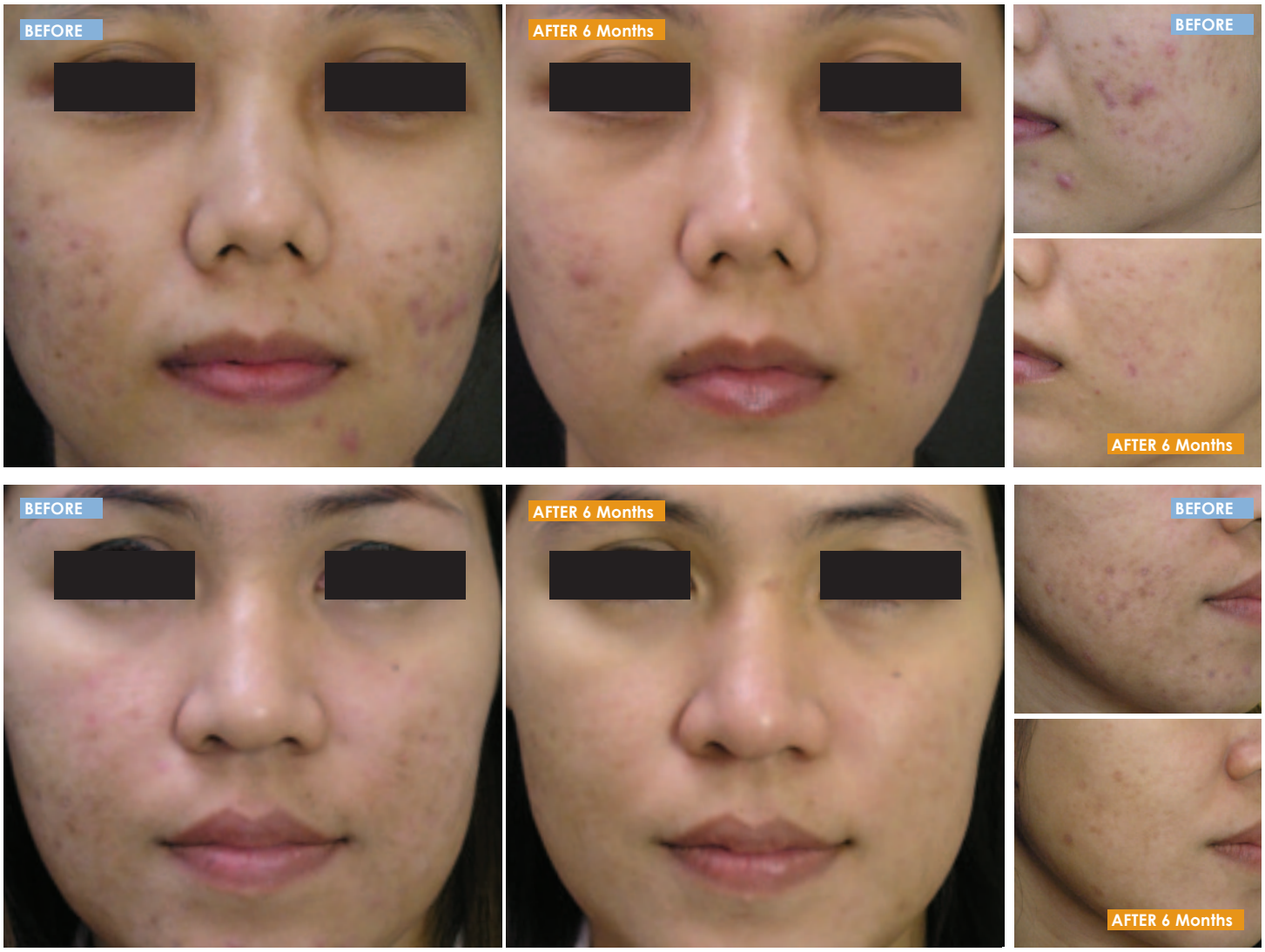
30-year-old Asian female with Fitzpatrick Skin Type IV.

At baseline she was rated as a Grade 2 (mild scarring) for atrophic acne scars, and a Grade 2 (mild) for acne severity. This subject also underwent 10 treatments with the RevLite laser system. At study end, her acne scarring score was at the lowest, Grade 1 (macular [flat] scarring), and her acne rating had also dropped to Grade 1 (almost clear). This subject reported that she was very satisfied (score of 5) with the results of her treatment regimen.

DISCUSSION

Acne scars can be improved by injecting hyaluronic acid or collagen fillers, but these solutions are only temporary, usually lasting three to six months.[7] Attempts at facial resurfacing through (micro) dermabrasion can cause permanent skin discoloration or blotchiness in patients with darker skin types. Chemical peeling, glycolic acid and salicylic acid are other alternatives for acne scarring that can be used with caution in skin of color; however, patients should be made aware that topical treatments containing salicylic acid can cause transient mild erythema and dryness.[1] Patients who are sensitive to these topical agents are often well served by nonablative laser treatment, which provides the well-known benefits of collagen stimulation, a smoothing of skin texture and an evening of irregular skin tone and pigment. Nonablative skin remodeling systems have become increasingly popular for the treatment of acne scars because they decrease the risk of side effects and the need for postoperative care.[1] In this study we used the PhotoAcoustic Technology Pulse® (PTP) mode of the RevLite: the PTP option is a unique dispersion of maximum energy that delivers very narrow pulse widths at more power than other Q-Switched devices. The RevLite in PTP mode is able to apply more energy over a larger spot size at the same fluence level as the standard mode, enabling the physician to treat a larger area more rapidly.

Early results from the current study indicate that the RevLite can provide safe and effective treatment for acne scarring in Asian skin. Both of the cases presented here had a significant improvement in their atrophic acne scarring; in 3 months, the pitted scars had improved to the point where they could be described as macular scarring or simple flat dyspigmentation. These scar remnants can now be



Top: Subject 1, Front and left side view
Bottom: Subject 2, Front and right side view

further treated with the Q-Switched laser, perhaps in combination with topical lightening agents.

Acne vulgaris is a widespread and multi-factorial dermatologic complaint, and blue light therapy has been the traditional treatment avenue for patients seeking light-based therapy for this condition. Blue light targets the fast-growing P.acnes bacteria; wavelengths in the blue light spectrum are thought to trigger endogenic porphyrins (components that are produced as part of normal bacteria metabolism), which naturally destroy the bacterial culprit in acne. The addition of the light-absorbing chemical Levulan (topical ALA), which concentrates in the sebaceous glands, increases the effectiveness of blue light treatment. Laser treatments utilize an entirely different mechanism of action: several wavelengths have proven effective for sebaceous hyperplasia; they are thought to treat the condition by shrinking the oil-producing glands that are overactive in patients with acne.[8] Results from laser treatment are theoretically longer-lasting than those from blue light, and laser treatment provides other well-known benefits: collagen stimulation, a smoothing of skin texture and an evening of skin tone and color: all of which are not within the scope of a blue-light regimen.

The subjects also showed significant improvement in the severity of their acne condition; from baseline to study end as rated by both the physician and patient. One subject had mild acne and one had moderate acne when they entered the trial, and both showed marked improvement. Neither of these

subjects had an adverse event during their participation in this trial, and both expressed satisfaction with the results from their treatments.

CONCLUSION

Preliminary results of two case reports from this on-going study demonstrate successful treatment using the RevLite® with Photoacoustic Technology Pulse® (PTP) to resurface the skin and to noticeably raise and even out common atrophic acne scarring. These promising results also appear to warrant further investigation for acne vulgaris*. Patients with darker skin types can expect a smoothing effect on their existing acne scars over time, without the concerns for post-inflammatory pigmentation issues that can occur with other laser or topical treatments, and with the possibility of concurrent improvement in their active acne lesions.

REFERENCES

1. Fabbrocini G, Annunziata MC, D'Arco V, De Vita V, Lodi G, Mauriello MC, et al., "Acne scars: pathogenesis, classification and treatment," *Dermatology Research and Practice* 2010 2010:893080.
2. Jih MH, Kimyai-Asadi A, "Laser treatment of acne vulgaris," *Seminars in Plastic Surgery*, 2007 Aug 21(3):167-174.
3. Lipper GM, Perez M, "Nonablative acne scar reduction after a series of treatments with a short-pulsed 1,064-nm Neodymium:YAG laser" *Dermatologic Surgery* 2006 32:998-1006.
4. Friedman PM, Jih MH, Skover GR, Payonik GS, Kimyai-Asadi A, Geronemus RG, "Treatment of atrophic facial acne scars with the 1064-nm Q-switched Nd:YAG laser," *Archives of Dermatology* 2004 140:1337-1341.
5. Global Acne Scarring Classification from Goodman GJ, Baron JA., "Postacne scarring: a qualitative global scarring grading system," *Dermatological Surgery* 2006 Dec 32(12):1458-1466.
6. Investigators' Global Assessment: Taken from the September 2005 United States Food and Drug Administration Center for Drug Evaluation and Research Guidance Document "Acne Vulgaris: Developing Drugs for Treatment."
7. Chrastil B, Friedman PM, "Treatment of atrophic acne scars," Available at www.touchbriefings.com/pdf/2707/chrastil.pdf, accessed 12/19/11.
8. Jih MH, Friedman PM, Goldberg LH, Robles M, Glaich AS, Kimyai-Asadi A. The 1450-nm diode laser for facial inflammatory acne vulgaris: dose-response and 12-month follow-up study. *J Am Acad Dermatol.* 2006 Jul;55(1):80-87.

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* RevLite is FDA-cleared for the treatment of acne scarring but not for the treatment of active acne.

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