A Pilot Split-face Comparison of Revital Treatment versus Laser Genesis Using Quasi Long-Pulsed 1,064-nm Nd:YAG Lasers in a Patient with Enlarged Facial Pores

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ABSTRACT

Background: Therapeutic modalities utilizing topical or oral retinoic acid, iontophoresis, chemical peels, and treatments with various lights or lasers have achieved reduction of enlarged pores by the repair and remodeling of photodamaged skin and the modulation of sebum secretion, but with variable clinical outcomes.

Objectives: Our split-face pilot study was designed to compare the clinical efficacy and safety of the ‘Revital Treatment’ versus ‘Laser Genesis’ treatment in a female patient with enlarged facial pores and seborrhea using two different quasi long-pulsed 1,064 nm Nd:YAG laser devices.

Methods: A 39-year-old Korean female patient with enlarged facial pores and seborrhea participated in this study. On the left side of her face, 1200 shots of Revital Treatment were delivered with the settings of 16 J/cm², a pulse duration of 300 μs, and a 5 mm spot size, at a repetition rate of 10 Hz. On the right side of the face, 1200 shots of Laser Genesis treatment were delivered with the settings of 16 J/cm², a pulse duration of 300 μs, and a 5 mm spot size, at a repetition rate of 9 Hz.

Results: Facial skin texture and tone on both sides of the face were noticeably improved after two sessions of Revital Treatment and Laser Genesis using each of the respective 1,064 nm 300 μs quasi long-pulsed Nd:YAG laser devices. One month after the final treatment, many of the keratin plugs in the patient’s facial pores were removed and symptoms of seborrhea had improved on both sides of the face. The patient reported being satisfied with the therapeutic effects of both laser treatments. No remarkable major side effects, including transient or persistent post-treatment erythema, were recorded on either side of the face.

Conclusions: By safely delivering quasi long-pulsed high laser energy to target tissues, we suggest that Revital Treatment can be effectively used for the treatment of enlarged pores.

Key words: Nd:YAG laser, quasi-long pulsed, revital treatment, laser genesis, split-face, enlarged facial pore

Introduction

Enlarged skin pores clinically appear as empty funnel-shaped structures or cornified cylindrical plugs with or without obtrusive vellus hair (1-3). The major pathogenic factors of enlarged openings of pilosebaceous follicles include genetic predisposition, age and sex, chronic exposure to ultraviolet radiation, a medical history of acne, and sebum secretion (2). By improving photodamaged skin and modulating sebum secretion, the use of topical or oral retinoic acid, iontophoresis, chemical peels, and irradiation with a variety of light or laser sources has proved effective in treating enlarged pores to varying degrees (2-5). Previous reports demonstrated that administration of either Q-switched or quasi long-pulsed (pulse width of 300 μs) 1,064 nm Nd:YAG laser treatment effectively reduced the size of facial pores and sebum levels (3,6). Additionally, an experimental study on mice reported significant increases in epidermal and dermal thickness after treatment with a quasi long-pulsed 1,064 nm Nd:YAG laser, in which pretreatment with a carbon photoenhancer seemed to enhance the efficacy of the laser treatment (7).

In the present pilot split-face, evaluator-blinded study, we attempted to compare the clinical efficacy and safety of ‘Revital Treatment’ versus ‘Laser Genesis’ treatment, delivered by two different quasi long-pulsed 1,064 nm Nd:YAG laser devices, in a female patient with enlarged facial pores and seborrhea.

Methods

A 39-year-old Korean female patient with Fitzpatrick skin phototype IV participated in this study. The patient was clinically diagnosed as having enlarged facial pores with seborrhea and had no remarkable treatment history for this skin condition. She also had no pertinent medical or family history. She denied having been treated with oral retinoic acids, any laser or light treatment, or topical bleaching agents or retinoic acids within the previous six months. This study was reviewed and approved by the ethics board of Clinique L Dermatology (Goyang, Korea) and Lutronic Corporation (Goyang, Korea). After written informed consent was obtained from the patient, she was treated on the left side of her face with five sessions of Revital Treatment using the 1,064 nm Nd:YAG SPECTRA XT™ laser (Lutronic Corporation) and Laser Genesis treatment on the right side using the 1,064 nm Nd:YAG Xeo™ laser (Cutera Corporation, CA, USA) at two-week intervals. On the left side of her face, 1200 shots of Revital Treatment were delivered with the settings of 16 J/cm², a pulse duration of 300 μs, and a 5 mm spot size, at a repetition rate of 10 Hz. On the right side of her face, 1200 shots of Laser Genesis treatment were delivered with the settings of 16 J/cm², a pulse duration of 300 μs, and a 5 mm spot size, at a repetition rate of 9 Hz. Additionally, we recommended the patient to apply a broad-spectrum sunscreen and to refrain from the use of bleaching agents or topical retinoids during and after treatment.
Objective clinical assessment was performed by analyzing photographs taken before and one month after the final treatment session with an imaging tool (Janus®, PSI Corporation, Ltd., Seoul, Korea) under normal and ultraviolet light exposures. First, three separate blinded dermatologists were asked to evaluate overall clinical improvement on photographs taken under normal light exposure. Second, they were to analyze additional photographs taken under ultraviolet light exposure, assessing the effects of the two quasi long-pulsed 1,064-nm Nd:YAG lasers on facial pigments. Thereafter, objective improvement scores were recorded for each treatment using a global aesthetic improvement scale (GAIS) of ‘worse than before’ (score: -1), ‘clinically unchanged’ (score: 0), ‘slightly improved’ (score: 1), ‘moderately improved’ (score: 2), and ‘markedly improved’ (score: 3). The sizes of facial pores on the nose were calculated using ImageJ 1.43u (National Institutes of Health, Bethesda, MD) by analyzing inversed and background-subtracted images. The patient was additionally asked to report any experiences of pain during the treatment using a visual analogue scale (VAS), in addition to any side effects.

Results

Baseline photos, which were taken under normal light exposure, revealed enlarged facial pores along the forehead, nose, and cheeks (Figures 1A and 2A). Additionally, baseline photos taken under ultraviolet light exposure revealed epidermal and dermal hyperpigmented skin lesions along the patient’s forehead and both cheeks (Figure 3A). After the second treatment session, facial skin texture and tone on both sides of the patient’s face were noticeably improved, each of which were respectively treated with Revital Treatment or Laser Genesis treatment, which utilize different 1,064 nm 300 μs quasi long-pulsed Nd:YAG laser devices. One month after the final treatment, many of the keratin plugs in the facial pores were removed and symptoms of seborrhea had improved on both sides of the face (Figures 1B and 2B). Photos taken under ultraviolet light exposure presented improved skin tone (Figure 3B). However, neither remarkable improvement nor worsening of the epidermal and dermal pigmentary lesions was noted on either side of the face.

Objective clinical assessment revealed mean GAIS scores of 2.7 for the Revital Treatment and 2.0 for the Laser Genesis treatment. Computer-based size estimation of nasal skin pores, which was calculated by analyzing inversed/background-subtracted images, revealed an improvement of 12.5% in pore size on the left side of the nose treated with Revital Treatment and 8.0% improvement on the right side treated with Laser Genesis treatment (Figures 4 and 5). The patient was satisfied with the therapeutic effects of both lasers. The patient reported no difference in VAS scores for laser treatment-associated pain (Revital Treatment [VAS score 2] versus Laser Genesis [VAS score 2]). No remarkable major side effects, including transient or persistent post-treatment erythema, were recorded for either side of the face.
SPECTRA XT 300 μs Revital Treatment versus Laser Genesis Technique: a Split-face Study

Figure 4: Close-up photos of nasal pores (A, C) before and at one month after five sessions of (B) Laser Genesis and (D) Revital Treatment using quasi long-pulsed 1,064 nm Nd:YAG lasers.

Figure 5: Inversed and background-subtracted images of nasal pores (A, C) before and at one month after five sessions of (B) Laser Genesis and (D) ‘Revital Treatment’ using quasi long-pulsed 1,064 nm Nd:YAG lasers.

Discussion

Quasi long-pulsed 1,064 nm Nd:YAG lasers have been shown to be therapeutically effective in treating enlarged facial pores and seborrhea (3). The authors of a previous study found that all experimental settings, including the use of a quasi long-pulsed 1,064 nm Nd:YAG laser, a Q-switched 1,064 nm Nd:YAG, or combined quasi long-pulsed and Q-switched laser, with or without a carbon photoenhancer lotion, significantly reduced facial pore sizes and sebum secretion, compared to the controls (3). Additionally, the authors reported no statistically significant differences among the four experimental laser settings. Quasi long-pulsed 1,064 nm Nd:YAG laser treatment was administered over five sessions using the laser settings of a fluence of 3.0 J/cm², a pulse duration of 300 μs, and a 7 mm spot size, at a repetition rate of 10 Hz at 3-week intervals (3). However, neither the clinical endpoint nor total shot count delivered was mentioned.

In addition, a previous comparison study reported that enlarged facial pores were effectively treated with five sessions of either quasi long-pulsed Nd:YAG laser treatment alone or carbon photoenhancer-assisted Q-switched Nd:YAG laser treatment, followed by quasi long-pulsed laser treatment, at two-week intervals (6). The laser settings of a fluence of 10-14 J/cm², a pulse duration of 300 μs, and a 4 mm spot size at a repetition rate of 7-8 Hz were used for quasi long-pulsed Nd:YAG laser treatment with total shot counts of 1,500 to 2,000 or upon the appearance of slight erythema (7). The authors suggested that carbon photoenhancer pretreatment did not provide any adjunctive clinical effect to the 1,064 nm Q-switched Nd:YAG laser treatment (6).

Our study group previously investigated histometric changes in epidermal and dermal thickness using seven-week-old hairless mice treated with a quasi long-pulsed or a Q-switched 1,064 nm Nd:YAG laser with or without a carbon photoenhancer (7). In our study, epidermal and dermal thickness significantly increased in the mouse skin after treatment with the quasi long-pulsed or Q-switched laser, which was associated the expression of fibroblast growth factor-9 (7). Additionally, carbon photoenhancer pretreatment significantly enhanced the efficacy of the quasi long-pulsed laser treatment on epidermal and dermal thickness (7).

In the present study, we chose the laser settings of 16 J/cm², a pulse duration of 300 μs, a 5 mm spot size, and 1200 shots with a repetition rate of 9-10 Hz to compare the two different laser devices utilized in administering Revital Treatment and Laser Genesis treatment. When each side of the face was treated with 1200 shots of quasi long-pulsed treatment, the irradiated skin became mildly to moderately hot without excessive burning or pain sensations. We found that facial skin texture and tone were noticeably improved after two sessions of both Revital Treatment and Laser Genesis. In addition, one month after five sessions of laser treatment, many of the keratin plugs in the facial pores had spontaneously disappeared without the need for an additional plug extraction procedure. Nevertheless, although the Revital Treatment demonstrated a higher GAIS score as well as a calculated reduction in pore size, than the Laser Genesis treatment, we were unable to conclusively compare the two different devices because of the single-subject study sample.

In the present pilot study, we demonstrated that Revital Treatment is at least equally effective compared with Laser Genesis treatment for treating enlarged facial pores with seborrhea. Additionally, repetitive treatment with a 1,064 nm quasi long-pulsed Nd:YAG laser with a high fluence did not worsen pre-existing epidermal and dermal pigmented lesions in an Asian patient. Accordingly, the results of the study showed that, by safely delivering quasi long-pulsed high laser energy to target tissues, Revital Treatment could be effectively be used for the treatment of enlarged pores. Despite the single patient sample, this result merits further split-face comparative studies with larger patient populations.
References


