CLINICAL PAPER

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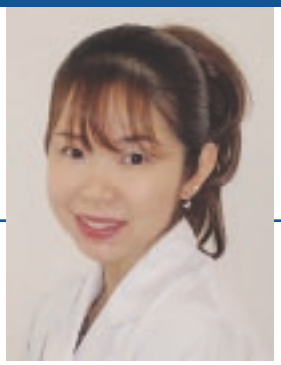

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Treatment of Epidermal Pigmented Lesions with a Long-Pulsed Alexandrite Laser

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Introduction

Study on long-pulsed GentleLASE® alexandrite laser treatment of epidermal pigmented lesions, such as senile lentigines, solar keratosis, freckles, and lichen planopilaris, was performed. Approximately 50-90% improvement (lesion clearance) was observed after a single treatment. Prior to the treatment to targeted lesions, laser shots were given to the entire face with the cooling system, and it led to improvement of skin texture, translucency, and reduction of pore size as well as lesion clearance. Patients' contentment was significant. Advantageous effect was also obtained when combined treatment with iontophoresis and tranexamic acid was applied to melasma, to which laser is commonly a contraindication.Lately, rejuvenation treatment by Intense Pulsed Light (IPL) source has won popularity in the cosmetic industry which owes some thanks to the mass communication publicity. Its claim of being able to give treatment generally to unfavorable conditions, such as pigmented lesions, wrinkles, and telangiectasia without post-operative down time, is supposedly the main reason of winning the popularity. Having been asked by patients for equivalent treatment, I started some trial treatments of the entire face with the long-pulsed alexandrite laser, and good results were obtained. In this report, I have presented these results.

Material and Methods

GentleLASE LE™ long-pulsed alexandrite laser, which had been originally developed for hair removal purpose, was used in this study. [1,2]

The specification: Wavelength, 755 nm; Pulsewidth, 3msec; Spot size, 12 mm (in diameter); Repetition rate, 1 Hz. Equipped with Candela's Dynamic Cooling Device™ (DCD™), it provides proper protection to the epidermis and reduces the patients' pain during treatment by spurring cryogen to the skin just before laser irradiation. With this cooling system, safe treatment with high-energy fluence has become possible. (When using GentleLASE, for which spot sizes are variable up to 18 mm, it is important to carefully determine the fluence according to the spot size.)

Procedure

1. Shave the area before treatment.
2. Apply 12% Lidocaine cream 30 minutes prior to a laser procedure for topical anesthesia.
3. Treat the entire face with the fluence 16-18 J/cm^2 with DCD 20 ms.
4. After treating the entire face, set the fluence to 22-26 J/cm^2 depending on the color of the lesion and treat the lesion with no DCD. After cooling the treated area for five minutes, apply corticosteroid cream. No occlusive dressing is required.
5. Instruct the patient to apply sunscreen from the following day. Make-up is allowed also from the following day.

GentleLASE® with DCD

Targets and Results

Senile Lentigines and Solar Keratosis (10 subjects)

After one single treatment, 50-90% improvement (clearance rate of lesion) was observed of all the patients. Hyperpigmentation was observed at 50% of the lesions, which, however, cleared after 2-4 months of application of sunscreen and bleaching agent. A sample case follows.

Case 1

Female 72 years old. (Figure 1) Condition: Senile lentigines and solar keratosis on the sides of her face from the temples to cheeks. After a single application of the entire face laser treatment, 90% improvement was observed at the lesion area. Skin texture and tone were also improved. At the same time, we treated wrinkles in dermis with the Vbeam pulsed-dye laser and the results were good.

Freckles (Five Subjects)

At all the lesions, 80-90% (clearance rate of lesion) improvement was shown. No hyperpigmentation was observed subsequently. A sample case follows.

Case 2

Female 23 years old. (Figure 2) She had had freckles on the cheeks since her infancy. After a single entire face laser treatment, 80% improvement was observed at the lesion area. Skin texture and tone were also improved, and she happily expressed increase of make-up spread smoothness.

Melasma (10 Subjects)

Five out of 10 cases had color improvement after single treatment. Improvement degree varies with the respective cases. Out of five remainders, three cases remained unchanged and two cases had worsened. The patients with improved cases underwent laser treatment because preceding treatment with iontophoresis of ascorbic acid and human placental extract (Laennec), oral administration of tranexamic acid had ceased to improve. The patients with no improvement who worsened had not received any treatment prior to laser treatment. A sample case follows.

Case 3

Female 36 years old. (Figure 3) The patient noticed that melasma on her cheeks had darkened over several years. She received the treatment of iontophoresis of L-Ascorbyl Acid-2-Phosphate Mg (APMg), human placental extract (Laennec), (1-2/weeks) and oral administration of tranexamic acid for six months. After improvement to a certain

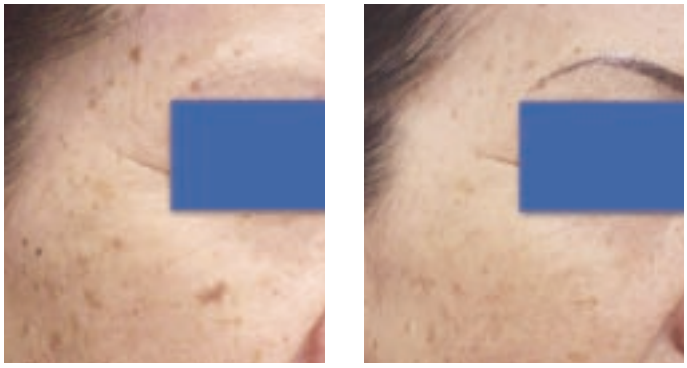

Figure 1–Case 1

Figure 2–Case 2

Figure 3–Case 3

extent was obtained, the lesion did not respond to further treatment. Entire face treatment was then performed. For laser treatment of melasma, we limited the method to the entire treatment with the cooling system. After a single treatment, considerable improvement was obtained. Three months after the first treatment, the second treatment was performed and improvement was again observed.

Enlarged Pores (Five Subjects)

With one single treatment, three out of five cases showed improvement such as: pores becoming less evident, and less blackness in pores. Although no improvement at pores was observed with two cases, the patients were delighted because they noticed the skin complexion improvement and/or make-up smoothness gained.

Case 4

Female 25 years old. (Figure 4) Entire face treatment was applied to the cheeks to treat enlarged pores and pore blackness. The treatment was performed with the cooling system. Following several days after the treatment, it was observed that the pores were less evident and skin texture improved so that make-up spread smoothly.

Lichen Planopilaris at Upper Arms (Two Subjects)

With both treated cases, pores were reduced in size, became less distinct, and skin roughness and tone were improved. The following is a sample case.

Case 5

Female 27 years old (Figure 5). The patient had had lichen planopilaris at her upper arms since adolescence, which gradually had grown distinct. Laser treatment with cooling system was applied entirely to the upper arms twice with one-month interval. Brownish papule was smoothed and skin tone was improved.

Discussion

The long-pulsed alexandrite laser showed significant efficiency on the treatment of benign epidermal pigmented lesions such as senile lentigines and solar keratosis. Furthermore, entire face treatment with the cooling system prior to the regional treatment resulted in cosmetically preferable effect such as

Figure 4–Case 4

Figure 5–Case 5

improvement of skin texture and tone, reduction of pore size, and smoother make-up spread to all the cases. This effect is achieved presumably because fine hair was removed, epidermis containing excess melanin was slightly peeled, and blackened sebum in pores was also removed. In order to verify this mechanism, we treated lichen planopilaris, which is characterized by corresponding eruption of brownish papula at the pores, infundibulum enlargement, and sebum plug. Obtained results were as expected: the pore size reduced, papula lesion was smoothed and color of the lesion became lighter.

In comparison with Q-switched lasers, which are customarily used for epidermal pigmented lesions, long-pulsed alexandrite laser enables:

1. Thinner crust forming. No occlusive dressing needed so that patients' quality of life fairly retained.
2. Improvement of skin texture and tone of the entire face as well as improvement of the lesions. Patients' contentment gained.

3. Faster treatment with larger spot size. Reduction of practitioner's labor and therefore more economical (approximately five minutes for treatment of the entire face).

On the other hand, post-operation whitening of the treated area with long-pulsed alexandrite laser is less distinguishable than treatment with Q-switch laser, so it is rather difficult to determine the endpoint. According to my experience, it is considered to be ideal to treat with the fluence, which results in slight grayish whitening to the treated site. Occurrence of hyperpigmentation seems to be equivalent with both Q-switched and long-pulsed lasers. It should be counted as a great advantage of the long-pulsed alexandrite laser that it can provide sufficient improvement with a single treatment, while the IPL entire face treatment needs to be repeated before certain effect is gained. However, treatment effect on redness (telangiectasia) and wrinkles cannot be expected much. (Study on effect on wrinkles is yet to be done.)

Melasma, is generally considered a contraindication of laser treatment, therefore common techniques such as iontophoresis of bleaching agent, oral administration of tranexamic acid or vitamins C and E, and topical use of bleaching cream are generally used for treating the condition. In some cases, however, these techniques rarely work and its efficacy is very limited. The laser treatment on melasma following these treatments showed improvement, but with the preceding treatment, it didn't show any improvement and, in some cases, even worsened. Even though the mechanism of melasma is still unclear, I believe that the difference of the treatment result is caused by the difference of the pathological structure of melasma. Melasma is considered to be functional lentigines which show some improvement to the conventional melasma treatments.

The melasma resistant to the conventional treatment has a tendency of being organic lentigines and, therefore, responds to laser treatment well. At any rate, for treating melasma, initial treatment should be the conventional method, which should continue for three-six months. And when there is no further improvement seen, laser treatment should take the place of the preceding treatment. It is preferable to avoid laser treatment to a patient who is not in good shape or who is menstruating. In order to maintain the effect of laser treatment, iontophoresis and oral administration should be continued.

When performing rejuvenation treatment, the single method is not sufficient to treat all cases but the combination treatment with other technologies such as other types of lasers, chemical peeling, retinoic acid application, Botox injection, iontophoresis of collagen and hyaluronic acid, and surgical operation, should be tailored accordingly to lesion types.

Conclusion

Entire face treatment of long-pulsed alexandrite laser provides advantageous effects, such as:

1. Very effective in treating epidermal pigmented lesions, especially widespread small lesions.
2. Improvement of skin texture, translucency, and pores can be achieved with the entire face treatment prior to the regional treatment. Patients' contentment is significant.
3. Effective treatment result is often achieved on melasma.
4. No occlusive dressing is required so that patients' quality of life can be retained.
5. Combined with the other treatment methods it enhances effectiveness of treatment.

The abstract of this study has been presented at the 25th Congress of Japan Society of Aesthetic Plastic Surgery (Kyoto, Japan, October 12-14, 2002).

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Printed in the USA. 06/03 0920-23-0195 Rev. 02

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