

CLINICAL APPLICATION OF INTENSE PULSED LIGHT IN ASIAN PATIENTS

Yuan-Hong Li, Hong-Duo Chen

Department of Dermatology, No.1 Hospital of China Medical University, Shenyang - China

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Summary

Chinese skin is relatively darker than Caucasian skin, more apt to develop post-inflammatory pigmented changes, and to develop scar following the procedures that induces inflammation. In order to avoid the over damage of intense pulsed light to Asian skin, lower energy and mild treatment parameters are proposed.

A new IPL modality (Lumenis One, Santa Clara, USA), delivering more even distribution of the energy within each individual pulse and between sub-pulses, can result in safer and more effective treatments.

Patients with freckles got over 50% improvements after 2 sessions of IPL. With the succession of 4 treatments, 35%, 63%, 75% and 87% patients with café-au-lait spots obtained over 50% improvement. After 4 sessions of treatment, 69 of 89 melasma patients (77.5%) obtained 51-100% improvements, according to the over-all evaluation by dermatologists. IPL could also be tried in treating macules of port wine stain, which were resistant to pulsed dye laser. Half of them got over 50% of clearance in our clinical study. For rosacea patients, 81.18% had more than 60% improvement after 4 sessions. In 152 patients with photoaging, 91.44% got a score decrease of 3 to 2 after 4 sessions of treatment.

In conclusion, IPL has widely been used in treating a variety of skin disorders in Chinese population, with excellent improvements and limited side-effects.

Riassunto

La cute degli asiatici, a differenza della cute caucasica, è caratterizzata da melanosomi più grandi e maggiormente melanizzati. Per questi ed altri motivi sviluppa più facilmente iperpigmentazioni post-infiammatorie. In questo studio vengono riportati alcuni risultati ottenuti trattando con luce pulsata a bassa intensità (IPL) la cute di soggetti asiatici con lo scopo di attenuare i fenomeni iperpigmentari e infiammatori provocati da alcune comuni disfunzioni patologiche come, ad esempio, il melasma, l'acne, la rosacea ed il fotoinvecchiamento. I risultati che si incontrano con la IPL sulla popolazione cinese sono da considerarsi eccellenti.

INTRODUCTION

Asian skin is totally different from Caucasian skin in a variety of aspects. Asian skin is relatively darker than Caucasian skin. They are prone to get sun tanning, instead of sun burning, which are very common in Caucasian skin with Fitzpatrick phototype I to III. Most Asian skin belongs to Fitzpatrick phototype III or more. Asian skin is more apt to develop post-inflammatory hyperpigmentation and hypopigmentation following any procedure that induces inflammation.

Asians are far more likely than Caucasians to develop keloid. Thus more cautions should be given to Asian skin to avoid any damage to the integrity of the epidermis.

Furthermore, photoaging in Asians tends to occur at a later age and has more pigmentary problems but less wrinkling than in Caucasians [1]. This difference is partially due to the higher epidermal melanin content.

As has already been well documented, there are larger and more melanized melanosomes in Asian skin than in Caucasian skin. In order to avoid the over-damage to the epidermal melanin, lower energy and mild treatment parameters are proposed for Asian skin.

PIGMENTED DISORDERS

Ephelides

Ephelides, or freckles, are small, usually less than 0.5 cm in diameter, discrete brown macules that appear on sun-exposed skin. Histologically they demonstrate as melanocyte proliferation without nest formation along the basement membrane. Intense pulsed light (IPL) sources that emit a broad band of visible light and infrared light (400–1,200nm) from a noncoherent filtered flashlamp, affects pigmentation via photo-

thermal effects. IPL has been studied for the treatment of lentigines and ephelides with cutoff filters ranging from 550–590nm, a fluence of 25–35J/cm², and a pulse width of 4.0ms. These studies have been performed on Asian skin with surprisingly no PIH. This lower risk of PIH and the limited postoperative downtime have made IPL a popular choice. The patient should understand, however, that multiple treatments may be necessary. In our practice, for those who do not wish to have any downtime, or for those who wish to improve not only their pigmentation, but also pore size and skin texture, we offer IPL treatment combined with other laser modalities in the same treatment session to obtain a better outcome. The recommended parameter (Lumenis One, Lumenis) is single pulse (pulse width: 3–4 ms) at 12–14 J/cm² for fair skin, and double pulse (pulse width: 3ms, pulse delay: 20–30ms) at 15–17 J/cm² for dark skin. After 2 sessions, all the 69 freckle patients obtained over 50% clearance [2].

Café-au-lait macules (CALMs)

The use of Q-switched lasers (ruby 694nm, frequency-doubled Nd-YAG 532nm) [3] and pulsed dye laser (510nm) [4] in the treatment of CALMs has yielded variable results with a high risk of recurrence if pigment is left behind. Populations demonstrated a similar variable degree of repigmentation following a long-time follow-up period of up to 50%.

Yoshida et al performed the treatment of pigmented lesions with eurofibromatosis 1 by intense pulsed-radio frequency (IPL-RF) in combination with topical application of vitamin D3 ointment. Eight patients were treated in this study and the improvement was moderate to good in six cases (75%) [5].

We treated 58 Chinese patients of CALMs with Lumenis One IPL (560nm filter, single pulse, 3–4ms pulse width, 14 J/cm² for fair skin; 560nm

filter, double pulse, 3ms pulse width, 30ms pulse delay, 15-17 J/cm² for dark skin). With the succession of 4 treatments, 35%, 63%, 75% and 87% patient obtained over 50% improvement [2].

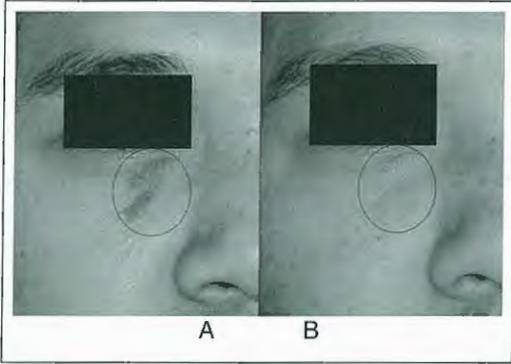


Fig. 2 A patient with CALMs. **A:** prior the treatment; **B:** after 3 sessions of treatment (560nm filter, double pulse, 3ms pulse width, 35ms pulse delay, 14J/cm²).

Melasma

Melasma is commonly seen in Asian population. Traditional therapies are less effective and may cause adverse effects. We tried IPL (Lumenis One, Lumenis) in 89 women with melasma. Subjects received a total of four IPL treatments at a 3-week interval (560/590/615/640nm filter, pulse width of 3-4ms, pulse delay of 25-40ms, fluence of 13 to 17 J/cm²). Changes in facial hyperpigmentation and telangiectasis were evaluated using a Mexameter, the melasma area and severity index (MASI), and a global evaluation by the patients and blind investigators. Sixty-nine of 89 patients (77.5%) obtained 51-100% improvements, according to the over-all evaluation by dermatologists. Self-assessment by the patients indicates that 63 out of 89 patients (70.8) considered over 50% or more improvements. Mean MASI scores decreased substantially from 15.2 to 4.5. Mexameter results

demonstrated a significant decrease in the degree of pigmentation and erythema beneath the melasma lesions. Patients with the epidermal-type melasma responded better to treatment than the mixed-type. Adverse effects were minimal [6].

Postburn hyperpigmentation

Ho et al has tried IPL in the treatment of postburn hyperpigmentation to assess its efficacy and side effects. Multilight™ (ESC Medical Systems Ltd., Yokneam, Israel) of the IPL family was used to treat these patients at intervals of 3-4 weeks for three to seven treatments. Patients were treated with an energy fluence of 28-46 J/cm², pulse width of 1.7-4 ms, double pulse mode, and a delay of 15-40 ms. Among the nineteen Chinese patients, over 78% showed more than 50% clinical clearance and nearly 32% of the patients were able to achieve more than 75% clearing. Although two patients had no clinical response, one patient had 100% clearing. Three patients developed blisters and one patient had erythema that all resolved within 1 week without leaving permanent marks. They have been followed-up from 11-32 months and there was no recurrence of the hyperpigmentation [7].

Port wine stain

Asian patients with more melanin in the epidermis are at a higher risk of adverse effects after laser treatment of vascular diseases. Although the pulsed dye laser is the gold standard in treating port wine stain, at times patients find the results disappointing and the various side effects, such as pronounced purpura and pigmented changes, to be disturbing.

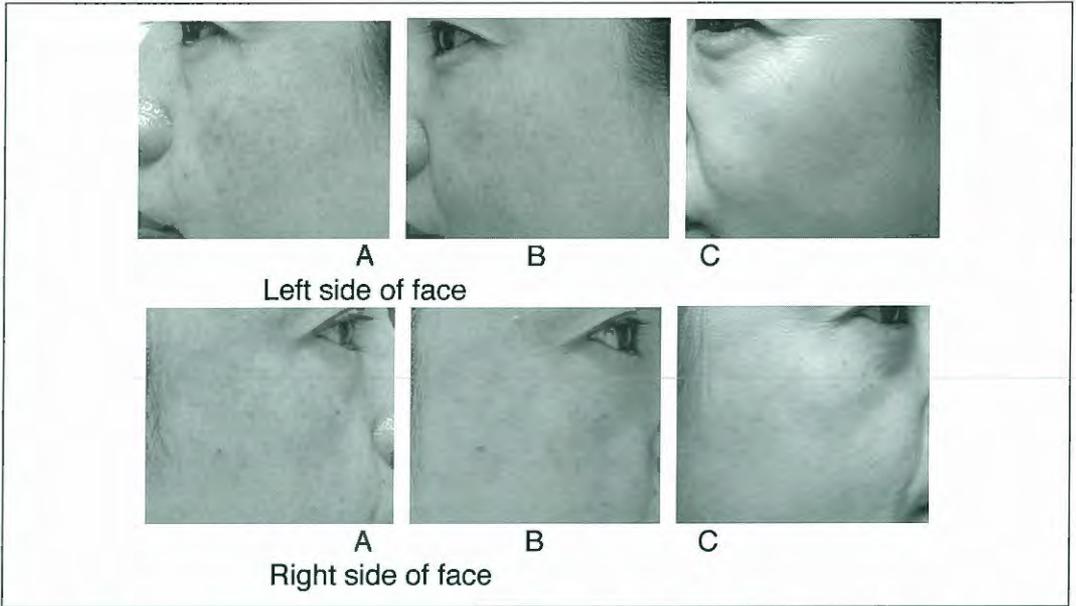


Fig. 3 A patient with melasma. **A:** pretreatment; **B:** after 4 sessions; **C:** at 3 month follow-up visit (590nm filter, triple pulse, 3ms pulse width, 30ms pulse delay, 15-17 J/cm²). **Upper trace:** left side of face. **Lower trace:** right side of face.

Bjerring et al used IPL system for the treatment of port-wine stains (PWS) resistant to multiple pulsed dye laser (PDL) treatments. Fifteen PWS patients, who were previously found to be resistant to multiple PDL treatments, were treated four times with a second generation IPL system. Patients with dye laser resistant PWS could be divided into two groups: responders to IPL treatments (46.7%) and non-responders (53.3%). All responders obtained more than 50% reduction, and 85.7% of the responders obtained between 75% and 100% reduction of their lesions. The IPL treatment modality was found to be safe and efficient for the treatment of PWS, except for those located in the V2 area [8].

We tried also IPL (Lumenis One) in treating port wine stain and got very good results. See Fig. 4 for details.

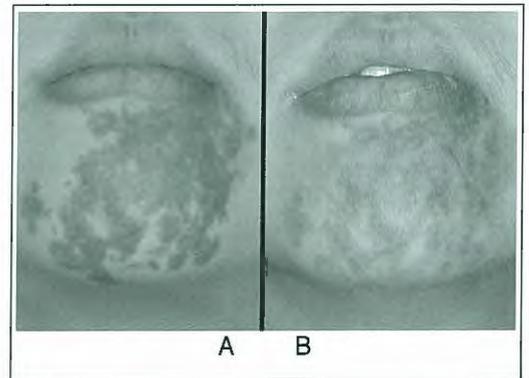


Fig. 4 A patient with port wine stain. **A:** prior the treatment; **B:** after 4 sessions of treatment (560nm filter, triple pulse, 3ms pulse width, 50ms pulse delay, 20-24 J/cm², 2 passes).

ACNE AND ROSACEA

A rising number of laser- or light-based therapies are addressing the need for effective acne treatments with minimal downtime. In order to evaluate the efficacy of IPL in the treatment of acne, Chang et al performed IPL equipped with a 530- to 750-nm filter on 30 female Korean patients (mean age, 25.7 years) with mild-to-moderate acne. All patients experienced the reduction of inflammatory lesion counts in both sides of face. There was no significant difference between IPL-treated and untreated sides of the face for mean papule plus pustule counts, 3 weeks after three sessions. As to red macules, 63% obtained good or excellent results on the laser-treated side compared to 33% on the untreated side. Improvement of irregular pigmentation and skin tone was detected on the laser-treated side than the untreated side [9].

We have used IPL in treating acne patients and rosacea patients at a 3-week interval. It could significantly reduce the inflammatory papules, pustules, acne scars, and red macules.

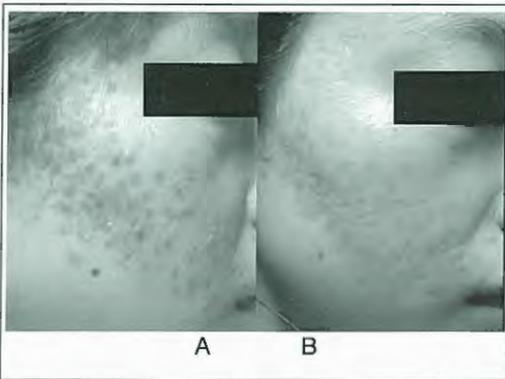


Fig. 5 A patient with inflammatory acne. **A:** prior to treatment; **B:** after 3 sessions of treatment (590nm filter, triple pulse, 3ms pulse width, 30ms pulse delay, 17-19 J/cm²).

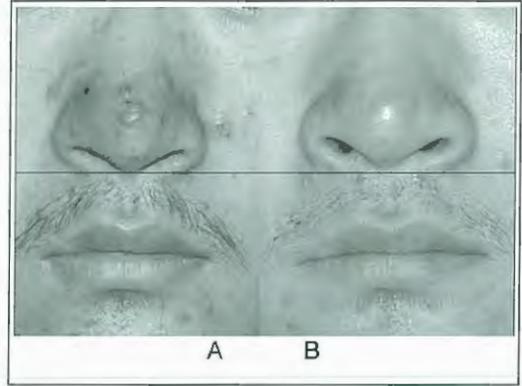


Fig. 5 A rosacea patient received 3 sessions of treatment on the nose (the perioral region was spared). **A:** prior the treatment; **B:** after 3 sessions of treatment (590nm filter, triple pulse, pulse width 3ms, pulse delay 35ms, 17-20J/cm², 2 passes).

PHOTOAGING

Cumulative exposure to sun is the main reason for skin aging. Photoaging skin is characterized by fine and coarse wrinkles, dyspigmentations, telangiectasia, sallow color, dry and rough texture, laxity, increased pore size, and a leathery appearance in habitually sun-exposed skin. Bitter et al has reported that the noncoherent IPL device could efficiently solve all the above problems at the same time [10].

One hundred and fifty-two Chinese women with photoaging skin were treated with IPL (Lumenis one) in our open-labeled study. Subjects received a total of four IPL treatments at a 3- to 4-week interval. One hundred and thirty-nine of 152 patients (91.44%) experienced a score decrease of 3 or 2 grade, according to the dermatologist. One hundred and thirty-six of 152 patients (89.47%) rated their overall improvement as excellent or good. The mean MI and EI values decreased with each session. MI on forehead and EI on cheilion decreased most significantly. Adverse effects were limited as mild pain and transient erythema. IPL treatment is a safe

and effective method for photoaging skin in Asian patients. Adverse effects were minimal and acceptable [11].

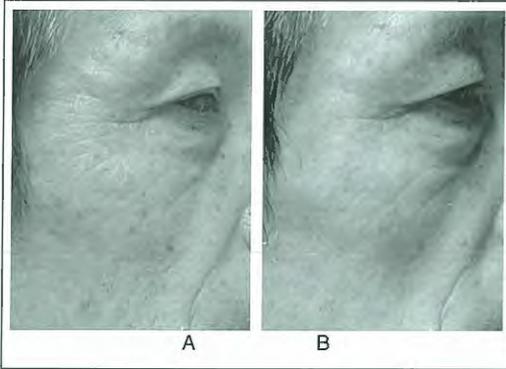


Fig. 7 A patient of photoaging. A: prior to treatment; B: after treatment (640nm filter, triple pulse, 3ms pulse width, 30ms pulse delay, 17-19J/cm²).

CONCLUSION

In conclusion, IPL has widely been used in treating a variety of skin disorders in Chinese population, with excellent improvements and limited side-effects.

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Author Address:

Yuanhong Li
 Department of Dermatology
 No.1 Hospital of China Medical University
 155N. Nanjing Street
 Shenyang 110001 - P.R. China
 Fax: +86-24-83282633
 Email: liyuanhong@vip.sina.com