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Treatment of Epidermal Pigmented Lesions with 578 nm Yellow Laser

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As melanin has a wide absorption spectrum, various lasers have been used effectively for treatment of pigmented lesions including Nd:YAG laser, ruby laser, alexandrite laser, KTP laser, pulsed dye laser, and copper bromide laser. Pigmented lesions in the skin can be classified according to the depth and location of the pigments and are generally divided into three groups: epidermal, mixed, and dermal pigmented lesions. In the current report, we treated two patients with epidermal pigmented lesions on the face with 578 nm yellow laser and achieved satisfactory results without complications or post-laser hyperpigmentations.

Key words
Copper bromide laser; Yellow laser; Pigmented lesions

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INTRODUCTION

Pigmented lesions of the skin can be classified into epidermal, dermal and mixed pigmented lesions by the depth and location of the existing pigments. Epidermal pigmented lesions include lentigines, freckles, seborrheic keratoses, dermal lesions include nevus of ota and ito, blue nevus, melanocytic nevus, and mixed lesions include melasma, post-inflammatory hyperpigmentation, becker's nevus with both epidermal and dermal pigment components.[1,2] As melanin has a wide absorption spectrum (500-1,000 nm), various laser modalities have been effectively used to treat pigmented lesions including various Q-switched or long pulsed lasers such as Nd:YAG laser, ruby laser, alexandrite laser, KTP laser, pulsed dye laser, and copper bromide laser.[1-5] Although these lasers are generally well tolerated with good results, the possibility of post-inflammatory hyperpigmentation (PIH) exists when used in Asians with dark skin types.

Lentigines, freckles, and seborrheic keratoses are common epidermal pigmented lesions which can cause cosmetic concerns in patients. These lesions are mostly treated with various melanin-targeting lasers, but the use of vascular lasers have also been increasing.[3] Representative vascular lasers such as 595 nm long pulsed dye laser or 532 nm frequency doubled Nd:YAG laser, for example, has been safely used for the treatment of such superficial pigmented lesions of the skin.[3,4] Laser with the wavelength of 578 nm is known to be preferentially absorbed by hemoglobin but is also absorbed by melanin. In this report, we present two patients with epidermal pigmented lesions on the face, which was effectively treated by a 578 nm yellow laser.

CASE REPORTS

Case 1

A 44-year-old Korean male patient visited our clinic presenting with several discrete and various sized brownish lentiginous macules and plaques on the right periorbital area and cheeks. He did not have any pertinent family history or medical history. The patient had been intermittently treated with 1,064 nm and 532 nm Q-switched Nd:YAG laser treatment in another clinic, but satisfactory improvement was not obtained with easy recurrence. After obtaining a written informed consent, a chilled, colorless, ultrasonic gel was applied on the right side of face and the patient was treated with 578/511 nm copper bromide laser (Dual Yellow D10B: Norseld, Adelaide, SA, Australia) with the settings of 578 nm, Fast Edge Micropulse (FEM) mode, 3 kW peak power, 100 cm^2 area, 2-3 passes with continuous movement with a 1 mm hand piece in contact with the gel. Then, the gel was gently wiped out and the second step was performed by the settings of 578 nm, 30 J/cm^2, off time 250 ms, 1 pass, using a 0.6 mm hand piece. Two treatment sessions were performed with a 1 month interval. Immediately after the treatment, slight erythema was seen on the treated face with fine crust on the lentigines and seborrheic keratoses. Crust was peeled off within 7 days after treatment, and the pigmented lesions were remarkably improved without any noticeable side effects (Fig. 1).

Case 2

A 62-year-old Korean female patient visited our clinic presenting with various sized brown-colored lentiginous lesions on the right temple and cheeks. She did not have any pertinent family history or medical history. The patient had been using topical bleaching agents, but satisfactory clinical improvement was not seen. After obtaining a written informed consent, a chilled, colorless, ultrasonic gel was applied on the right face and the patient was treated with 578/511 nm copper bromide laser (Dual Yellow D10B: Norseld, Adelaide, SA, Australia) with the settings of 578 nm, FEM mode, 3 kW peak power, 100 cm^2 area, 2-3 passes with continuous movement using a 1 mm hand piece in contact with the gel. Then, the gel was gently wiped out and the second step was performed by

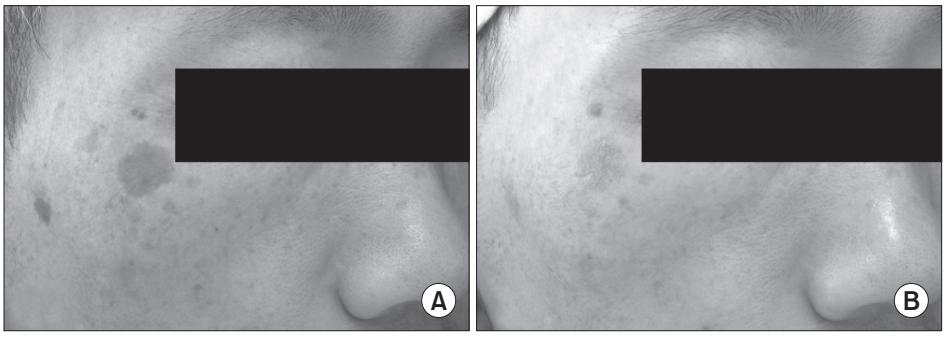

Fig. 1. Clinical photographs showing lentigines and seborrheic keratoses on the face of a 44-year-old Korean male, (A) before and (B) one month after two sessions of 578 nm yellow laser treatment.

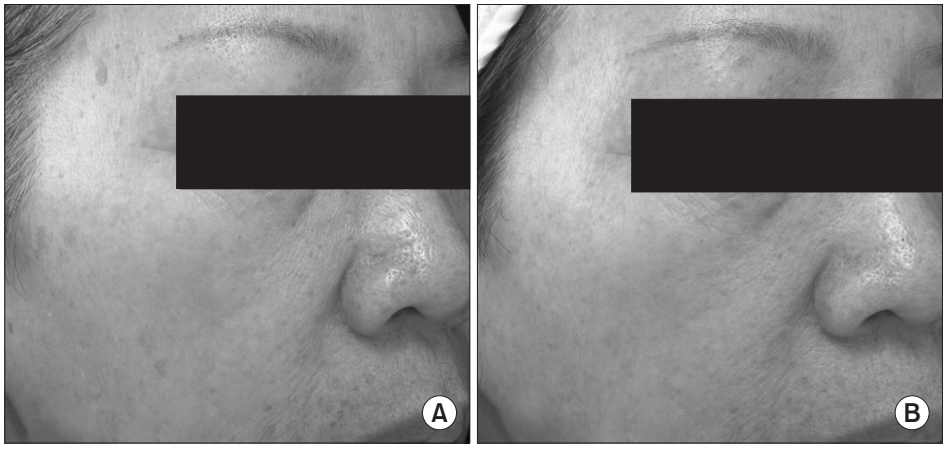

Fig. 2. Clinical photographs showing lentigines on the face of a 62-year-old Korean female, (A) before and (B) one month after two sessions of 578 nm yellow laser treatment.

the settings of 578 nm, 30 J/cm^2, off time 250 ms, 1 pass, using a 0.6 mm hand piece. Two treatment sessions were performed with a 1 month interval. Immediately after the treatment, slight erythema was seen on the treated face with fine epidermal change on the lentigines. Crust was peeled off within 7 days after treatment, and the pigmented lesions were remarkably improved without bruising or any other noticeable side effects (Fig. 2).

DISCUSSION

578/511 nm copper bromide laser emits dual wavelength lasers of which 578 nm yellow beam targets vascular lesions and 511 nm green beam targets pigmented lesions.[5,6] In general, physicians use 511 nm green laser for the treatment of superficial pigmented lesions of the skin. However, 578 nm yellow laser can target not only hemoglobin but also melanin,[1,2] and can also be effectively used in the treatment of epidermal pigmented lesions. There are previous studies reporting experiences of 578/511 nm copper bromide laser in the treatment of melasma and PIH, but these studies used both 578 nm and 511 nm dual wavelength lasers emitted separately or together.[5-8] To our knowledge this is the first report using 578 nm yellow laser only for the treatment of lentigines and seborrheic keratoses.

As melanocytes express functional vascular endothelial growth factor receptors, melanocytes can respond to angiogenic factors,[9] and recently, it is being suggested with growing evidence that interactions between cutaneous vasculature and melanocytes can effect the development of pigmented lesions.[5] Therefore, the direct/indirect effects of 578/511 nm copper bromide laser to the dermal vasculature and epidermal pigmentation can make clinical improvements in melasma or PIH lesions.[5,7,8] In case of epidermal pigmented lesions such as lentigines, freckles, and seborrheic keratoses, however, altered dermal vasculature is not included in its histologic characteristics, thus it is suggested that the effect of yellow laser to epidermal melanin itself may have resulted in pigment removal.

In this report, we demonstrated two patients with lentigines and seborrheic keratoses which were treated with a 578/511 nm copper bromide laser but using only a 578 nm yellow beam. Remarkable improvements of epidermal pigmented lesions were noticed with two sessions of treatment without purpura or any other side effects and discomfort. Although further studies are required to suggest a clear mechanism of the effect of 578 nm yellow laser on epidermal pigmented lesions and comparative studies with other pigment targeting lasers are needed, 578 nm yellow laser can be a considerable option for superficial pigmented lesions with a relatively lower risk of PIH. Therefore, 578 nm yellow laser can be used with acceptable clinical outcomes in the treatment of epidermal pigmented lesions.

REFERENCES

1. Stratigos AJ, Dover JS, Arndt KA. Laser treatment of pigmented lesions--2000: how far have we gone? Arch Dermatol 2000;136:915-21.
2. Bukvić Mokos Z, Lipozenčić J, Ceović R, Stulhofer Buzina D, Kostović K. Laser therapy of pigmented lesions: pro and contra. Acta Dermatovenerol Croat 2010;18:185-9.
3. Ho SG, Chan NP, Yeung CK, Shek SY, Kono T, Chan HH. A retrospective analysis of the management of freckles and lentigines using four different pigment lasers on Asian skin. J Cosmet Laser Ther 2012;14:74-80.
4. Kono T, Chan HH, Groff WF, Sakurai H, Takeuchi M, Yamaki T,

et al. Long-pulse pulsed dye laser delivered with compression for treatment of facial lentigines. Dermatol Surg 2007;33:945-50.
5. Lee HI, Lim YY, Kim BJ, Kim MN, Min HJ, Hwang JH, et al. Clinicopathologic efficacy of copper bromide plus/yellow laser (578 nm with 511 nm) for treatment of melasma in Asian patients. Dermatol Surg 2010;36:885-93.
6. Dinehart SM, Waner M, Flock S. The copper vapor laser for treatment of cutaneous vascular and pigmented lesions. J Dermatol Surg Oncol 1993;19:370-5.
7. Eimpunth S, Wanitphakdeedecha R, Triwongwaranat D, Varothai S, Manuskiatti W. Therapeutic outcome of melasma treatment by dual-wavelength (511 and 578 nm) laser in patients with skin phototypes III-V. Clin Exp Dermatol 2014;39: 292-7.
8. Park KY, Choi SY, Mun SK, Kim BJ, Kim MN. Combined treatment with 578-/511-nm copper bromide laser and light-emitting diodes for post-laser pigmentation: a report of two cases. Dermatol Ther 2014;27:121-5.
9. Kim EJ, Park HY, Yaar M, Gilchrest BA. Modulation of vascular endothelial growth factor receptors in melanocytes. Exp Dermatol 2005;14:625-33.