

Partial Unilateral Lentiginosis Successfully Treated with a High-fluence 1,064-nm Q-switched Neodymium:Yttrium-aluminum-garnet Laser

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Partial unilateral lentiginosis (PUL) is an unusual pigmentary disorder characterized by numerous lentigines on the skin, with onset usually during early childhood. It is characterized by unilateral segmental distribution with sharp margins in one or more dermatomes. Conventional laser treatments result in several adverse effects, such as mottled pigmentary changes (hyper or hypopigmentation), especially in people of Asian descent. A 57-year-old man with PUL on the neck was treated with a high-fluence 1,064-nm Q-switched (QS) neodymium-doped yttrium-aluminum-garnet (Nd:YAG) laser. After 20 treatment sessions, the lesions markedly improved without adverse effects or recurrence. We suggest that high-fluence 1,064-nm QS Nd:YAG laser treatment is an effective and safe modality for PUL.

Key words

Partial unilateral lentiginosis; Neodymium:yttrium-aluminum-garnet laser

Received March 15, 2021
Accepted April 19, 2021

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INTRODUCTION

Partial unilateral lentiginosis (PUL) is a rare pigmentary disorder characterized by multiple lentigines on the skin and unilateral segmental distribution with sharp margins in the midline in one or more dermatomes.¹ The lesions almost always first appear during early childhood. PUL can occur anywhere on the body, including the face, neck, trunk, and upper and lower extremities. For cosmetic reasons, various conventional lasers have been utilized to remove PUL; however, the treatment outcomes are often unsatisfactory and adverse effects such as mottled pigmentary changes (hyper or hypopigmentation) may occur.^{2,3} Herein, we report a case of PUL on the neck that was successfully treated with a high-fluence 1,064-nm Q-switched (QS) neodymium-doped yttrium-aluminum-garnet (Nd:YAG) laser without recurrence. We suggest that this treatment could be applicable to patients with other lentiginous disorders as well because their clinical and histological findings are similar to those of PUL.

CASE REPORT

A 57-year-old man presented to our clinic with unilaterally distributed brownish patches greater than 10 × 15 cm in diameter, with sharply demarcated borders, on the left posterior neck. The patches were shown in Fig. 1A. He reported that the lesions had first appeared during early childhood. Prior to his visit, he had been treated with various laser devices at other clinics. However, the outcomes were unsatisfactory because the lesions recurred a few months after the treatments, following partial resolution. Skin biopsy revealed increased melanin pigmentation in the basal layer, which is the typical histological finding of lentigo simplex. The pigmented lesions were clinically

and histo-pathologically diagnosed as PUL, and high-fluence 1,064-nm QS Nd:YAG laser treatments were performed. Before the laser treatment, a topical anesthetic (EMLA cream 5%; AstraZeneca AB, Sodertalje, Sweden) was applied for 30 minutes under occlusion. The patient underwent 20 sessions of 1,064-nm QS Nd:YAG laser (SPECTRA; Lutronic Corp., Goyang, Korea) treatment at 2-week intervals, using 2–3 sliding-stacking passes with appropriate overlap and a spot size of 7 mm, fluence of 2.4 J/cm², and pulse rate of 10 Hz, to achieve mild erythema. The treated area was cooled with gauze, which had been soaked in normal saline for 10 minutes, immediately after each laser treatment session. Most of the pigmented lesions disappeared after 20 sessions of treatment (Fig. 1C). No mottled pigmentary changes (hyper or hypopigmentation) were observed until the 6-month follow-up (Fig. 1D).

DISCUSSION

Various types of laser devices, including the 532-nm Nd:YAG laser, ruby laser, 755-nm alexandrite laser, and intense pulsed light, have been used to treat pigmentary disorders.^{4–6} However, no standard treatment has been established for PUL because treatment outcomes are variable, and adverse effects such as mottled pigmentary changes (hyper or hypopigmentation) are common. Hyperpigmentation may occur when cytokines and inflammatory mediators, secreted by damaged keratinocytes, activate melanocytes and increase melanin synthesis.^{7,8} Other damaged perilesional melanocyte cells also induce unwanted hypopigmentation.⁴

To achieve successful outcomes, it is necessary to optimize the delivery of laser energy to the pigmentary lesions, while sparing the perilesional cells as much as possible. In this study, the delivery of laser energy to the

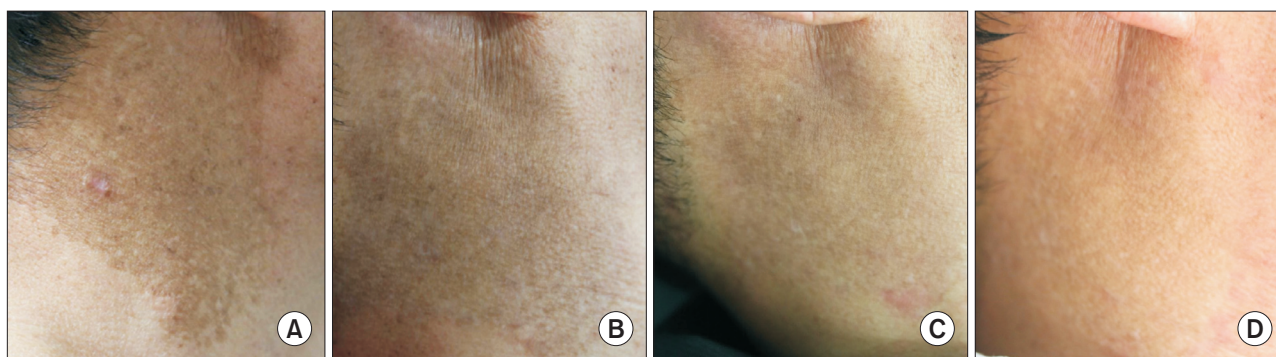


Fig. 1. Clinical manifestations and treatment response of a 57-year-old Korean man with partial unilateral lentiginosis on the right posterior neck. (A) At baseline, (B) after 10 sessions of treatment (20 weeks after baseline), and (C) after 20 sessions of treatment (40 weeks after baseline). (D) At 6 months after the last treatment session.

PUL was optimized to avoid permanent adverse effects, while preventing recurrence. The 1,064-nm QS Nd:YAG laser has been suggested to cause degradation of melanin granules. A low-fluence 1,064-nm QS Nd:YAG laser has been widely used for treating many pigmentary disorders; however, many Korean patients with pigmentary lesions are reported to be at a high risk of recurrence.⁹ In the present case, the high-fluence 1,064-nm Nd:YAG laser yielded satisfactory and long-lasting therapeutic outcomes by causing sufficient damage to the target cells and preserving the perilesional normal tissue. After each session of treatment, we closely observed the occurrence of side effects to decrease the risk of laser-induced hyper or hypopigmentation. Only mild erythema was observed, so we continued the treatment with this treatment regimen. This approach can prevent laser-induced mottled pigmentary changes (hyper or hypopigmentation) and reduce the risk of recurrence through adjustment of the parameters of the laser device.

In conclusion, we experienced that high-fluence 1064-nm QS Nd:YAG laser treatment, using a spot size of 7 mm, fluence of 2.4 J/cm², and pulse rate of 10 Hz with 2–3 sliding-stacking passes, is effective and safe for PUL. The parameters were effective for preventing complications and recurrences after treatment. As our outcome analysis was limited to only one case, further investigations will be needed for providing optimize the parameters.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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How to cite this article: Hong JK, Han HS, Shin SH, Yoo KH. Partial unilateral lentiginosis successfully treated with a high-fluence 1,064-nm Q-switched neodymium:yttrium aluminum garnet laser. *Med Laser* 2021;10:120-122. <https://doi.org/10.25289/ML.2021.10.2.120>