

Café-au-lait macule in type V skin: Successful treatment with a 510 nm pulsed dye laser

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Café-au-lait macules are benign pigmented lesions that can be found in isolation or in association with neurocutaneous syndromes. Persons affected by them frequently come for treatment as a result of their disfigurement. The 510 nm pulsed dye laser has recently been shown to selectively destroy melanosomes comprising such epidermal pigmented lesions as café-au-lait macules without adverse sequelae. Previous reports of the use of laser therapy have been limited to persons with light skin tones (skin phototypes I or II).

CASE REPORT

A 3-year-old boy with type V skin had an 8 × 10 cm brown birthmark on his left cheek and temple that had become progressively darker (Fig. 1). Two 1.5 cm brown macules were also present on the extremities. Because of the disfigurement, the child's parents desired its eradication. A biopsy specimen showed basal melanosis without dermal involvement, consistent with diagnosis of a café-au-lait macule.

The entire lesion was treated with a 510 nm, 300 nsec pulsed dye laser (Candela Laser Corp., Wayland, Mass.) at a fluence of 2.5 J/cm² with single, nonoverlapping laser pulses. Anesthesia was achieved with topical 30% lidocaine occluded for 30 minutes.¹ The irradiated area immediately became pale gray. Postoperatively, the area was washed with mild soap twice daily and antibiotic ointment and a nonstick bandage applied until healing occurred (1 to 2 weeks). Sun avoidance and/or protection was strongly encouraged between treatments.

Three months later clearing was marked (Fig. 2, A). During the next year, five additional laser treatments at 2-month intervals were delivered at the same energy density. Total disappearance of the lesion was apparent within 8 weeks after the sixth laser treatment (Fig. 2, B).

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Fig. 1. Three-year-old boy with large, unilateral café-au-lait macule.

No hypopigmentation or textural changes were noted and no lesional recurrence was evident at a 2-year follow-up examination.

DISCUSSION

Previous treatments for café-au-lait macules have included cryotherapy, dermabrasion, and excision with or without grafting. These treatments often resulted in permanent hypopigmentation and scarring, as well as a high rate of recurrence.

In recent years, laser surgery has been used to remove café-au-lait macules; a variety of systems, including the argon (488, 514 nm),²⁻⁴ Q-switched Nd:YAG (532/1064 nm),⁵ Q-switched ruby (694 nm),⁶⁻⁸ and 510 nm pulsed dye⁹⁻¹³ lasers, have been employed. The lack of specificity of injury induced by the argon laser led to the destruction of nonpigmented and pigmented structures, with resultant side effects similar to those after traditional treatments. With the Q-switched Nd:YAG or ruby lasers, 50% to 100% clearing has been reported. Hypopigmentation has been observed particularly in lesions treated with the ruby laser. Recurrences have been common (25% to 50%) after treatment with each of these laser systems.

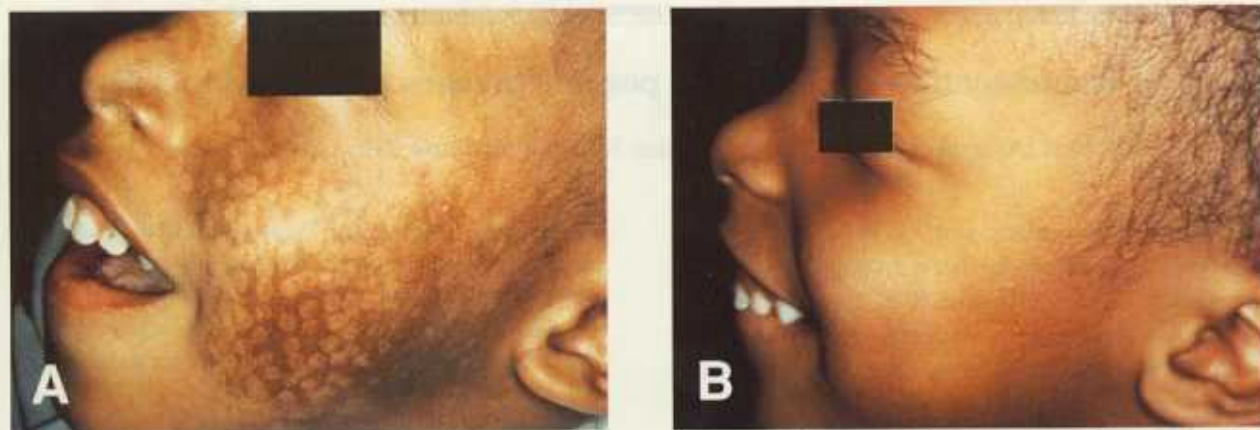


Fig. 2. A, Three months after one 510 nm pulsed dye laser treatment at 2.5 J/cm². B, Eight weeks after sixth laser treatment.

The 510 nm pulsed dye laser has been shown to remove a variety of benign pigmented epidermal lesions without scarring or hypopigmentation.¹³ The apparent selectivity of this system may be because more specific injury to pigment-containing cells in the epidermis occur at 504 nm.^{14, 15} In addition, a 300 nsec pulse duration does not exceed the thermal relaxation time of the targeted melanosome (1 μ sec).^{16, 17} This further enhances the specificity of this laser.

The exact mechanism whereby this pigment-specific laser destroys lesional pigment without damaging normal skin pigment is unknown. The injury induced by the 510 nm pulsed dye laser may be limited primarily to the melanosomes at the dermoepidermal junction, which are the factor that causes the color of the lesion, and does not destroy the melanocytes responsible for producing normal skin color.

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