Successful Treatment of Ota Nevus With the 532-nm Solid-State Picosecond Laser

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The Q-switched 532-nm picosecond laser delivers energy in short pulses, creating fragmentation of melanosomes into melanin particles that eventually become phagocytosed. This process may be safer for patients with Fitzpatrick skin types IV to VI, as it decreases the risk for dyschromia and scarring.

Laser treatment of Ota nevi can be complicated, particularly in darker skin types, as there is a higher risk for adverse effects if the laser is not carefully employed. We report a case of successful treatment of an Ota nevus in a patient with Fitzpatrick skin type IV with the novel 532-nm solid-state picosecond laser after 2 treatments.

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Ota nevus is a dermal melanocytosis that is typically characterized by blue, gray, or brown pigmented patches in the periorbital region.[1] The condition has a prevalence of 0.04% in a Philadelphia study of 6915 patients and is most notable in patients with skin of color, affecting up to 0.6% of Asians,[2] 0.038% of white individuals, and 0.014% of black individuals.[3,4] The appearance of an Ota nevus often imparts a negative psychosocial impact on the patient, prompting requests for treatment and/or removal.[5] Laser treatment of Ota nevi must be carefully implemented, especially in Fitzpatrick skin types IV through VI. Although 532- and 755-nm Q-switched nanosecond lasers have been used to treat Ota nevi,[5,6] typically only moderate improvement is seen; further treatment at higher fluences will only increase the risk for dyspigmentation and scarring.[6]

We report a case of successful treatment of an Ota nevus following 2 treatment sessions with the 532-nm solid-state picosecond laser, which is a novel application in patients with skin of color (Fitzpatrick skin types IV–VI). The Q-switched nanosecond laser has been shown to be moderately effective at treating Ota nevi.[6]

Case Report

An 18-year-old woman with Fitzpatrick skin type IV presented for cosmetic removal of an 8×5-cm

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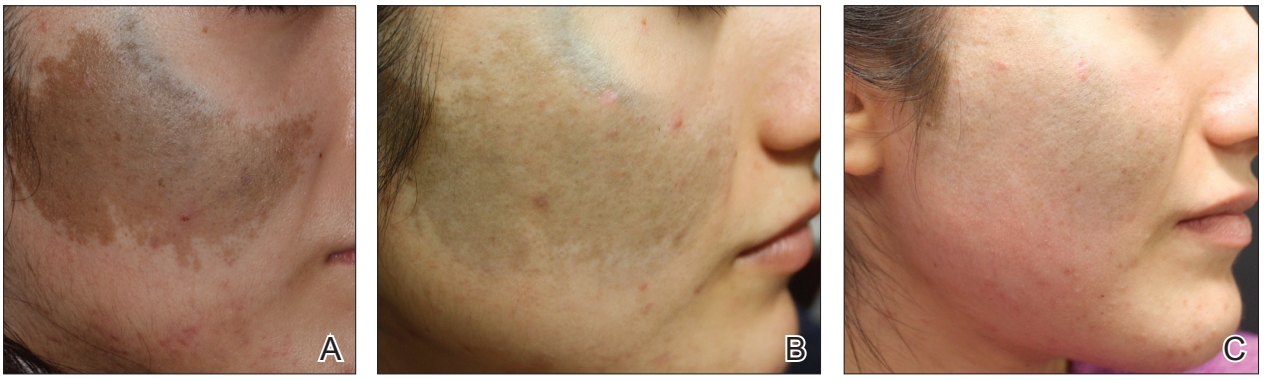

Ota nevus before (A), 6 weeks after the first treatment with the 532-nm solid-state picosecond laser (B), and 2 months after the second treatment with the same laser (C). A small patch of the nevus was left untreated in the sideburn area at the patient's request for comparison.

Laser Treatment Parameters in a Case of Ota Nevus

Month	Laser	Fluence, J/cm^2	Spot Size, mm	No. of Pulses	Pulse Duration	Repetition Rate, Hz	End Point	Results
1	755-nm QS nanosecond	6	3	653	N/A	N/A	Whitening	Lightening
2	755-nm QS nanosecond	6	3	875	N/A	N/A	Whitening	More lightening
3	755-nm QS nanosecond	6	3	1024	N/A	N/A	Whitening	Little improvement
4	755-nm QS nanosecond	6.5	3	1186	N/A	N/A	Whitening	Little improvement
5	755-nm QS nanosecond	7	3	706	N/A	N/A	Whitening	Little improvement
6	755-nm QS nanosecond	7	3	78	N/A	N/A	Whitening	Slight improvement
7	755-nm QS nanosecond	7	3	993	N/A	N/A	Whitening	Slight Improvement
9	1064-nm SS picosecond + nanosecond	1.8	5	379 (at picoseconds), 40 (at nanoseconds)	750 picoseconds, 2 nanoseconds	2	Darkening, erythema	No improvement
10	1064-nm SS picosecond + nanosecond	1.8	5	420	750 picoseconds	2	Darkening, erythema	No improvement
11	532-nm SS picosecond	0.5	6	339	750 picoseconds	1	Whitening	Notable improvement
14	532-nm SS picosecond	0.5	6	362	750 picoseconds	1	Whitening	Dramatic improvement

Abbreviations: QS, Q-switched; N/A, not applicable; SS, solid state.

dark brown–blue patch on the right temple and malar and buccal cheek present since birth that had failed to respond to an unknown laser treatment that was administered outside of the United States (Figure, A). To ascertain the diagnosis, a biopsy was performed, showing histology consistent with Ota nevus. Initially, the 755-nm Q-switched nanosecond laser was recommended for treatment. Over the course of 7 months

(1 treatment session per month [Table]), the patient saw improvement but not to the desired extent. The patient then underwent 2 treatments at 4-week intervals with the 1064-nm solid-state picosecond and nanosecond lasers; however, no improvement was seen following these 2 sessions (Table).

The next month the patient received treatment with a novel 532-nm solid-state picosecond laser using the following parameters: fluence, 0.5 J/cm^2; spot size, 6 mm; repetition rate, 1 Hz; pulse duration, 750 picoseconds; 339 pulses. The end point was whitening. A remarkable clinical response was demonstrated 6 weeks later (Figure, B). A second treatment with the 532-nm solid-state picosecond laser was then performed at 14 months. On a return visit 2 months after the second treatment, the patient showed dramatic improvement, almost to the degree of complete resolution (Figure, C).

Comment

Pigmentation disorders are more common in patients with skin of color, and those affected may experience psychological effects secondary to these dermatoses, prompting requests for treatment and/or removal.[7] Although the 532- and 755-nm Q-switched nanosecond lasers have been used to treat Ota nevi,[3] the challenge remains for patients with skin of color, as these lasers work through photothermolysis, which generates heat and may cause thermal damage by targeting melanin. Because more melanin is present in skin of color patients, the threshold for too much heat is lower and these patients are at a higher risk for adverse events such as scarring and hyperpigmentation.[6,8]

By delivering energy in shorter pulses, the novel 532-nm solid-state picosecond laser shows greater fragmentation of melanosomes into melanin particles that are eventually phagocytosed.[8] In our patient, dramatic improvement was noted after only 2 treatments, as evidenced by other picosecond treatments on Ota nevi,[6,8] suggesting that fewer treatments are necessary when using the 532-nm solid-state picosecond laser for Ota nevi.

Although the 532-nm solid-state picosecond laser was cleared by the US Food and Drug Administration for tattoo removal, this laser shows potential use in other pigmentary disorders, particularly in patients with skin of color, as demonstrated in our case. With continued understanding through further studies, this picosecond laser with a shorter pulse duration may prove to be a safer and more effective alternative to the Q-switched nanosecond laser.

Conclusion

As shown in our case, the 532-nm solid-state picosecond laser appears to be a safe and effective modality for treating Ota nevi. This case demonstrates the potential utility of this laser in patients desiring more complete clearing, as it removes pigment more rapidly with lower risk for serious adverse effects.

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