

Nevus of Ota in Dark Skin—An Uncommon but Treatable Entity

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Background: Nevus of Ota can be effectively and safely treated since the arrival of q-switched lasers in dermatology. However, available literature is scarce regarding the treatment of Nevus of Ota in skin types darker than IV.

Objectives: We report about four Fitzpatrick phototype V patients treated for Nevus of Ota with a q-switched Nd:YAG laser at 1,064 nm.

Methods: Four patients with Fitzpatrick phototype V were treated for Nevus of Ota with a q-switched Nd:YAG laser at 1,064 nm in a private practice setting. Pulse diameter for the treatments was 2 mm and pulses were applied typically in a non-overlapping fashion. Treatment energies ranged from 4.1 to 9.5 J/cm².

Results: All four patients of this case series showed significant cosmetic improvement. Improvement ratings, based upon pre- and post-treatment photographs rated by blinded investigators, were in between 6 and 10 with a mean of 8.5 on a 10-point scale. Side effects were mostly short termed and typical for this laser technique. No post-inflammatory hyperpigmentation was observed however one case of permanent drop-like hypopigmentation was encountered.

Conclusions: A 1,064 nm q-switched Nd:YAG laser treatment could be an effective and reasonably safe treatment for patients with Nevus of Ota and Fitzpatrick skin type V. Patients should be counselled before treatment regarding the risk of permanent hypopigmentation. *Lasers Surg. Med.* 43:960–964, 2011.

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Key words: laser; Nevus of Ota; skin type; dark skin; Nd:YAG; pigmented lesion

INTRODUCTION

Nevus of Ota is a dermal melanocytic hamartoma. Despite its benign nature patients frequently seek treatment because of its facial location and the ensuing cosmetic disfigurement. Treatment options for Nevus of Ota have been very limited until the arrival of the concept of selective photothermolysis [1] and with it the use of q-switched laser technique in clinical dermatology [2–7]. Since then numerous publications have shown the efficacy and safety of the treatment of Nevus of Ota with different types of q-switched lasers. In 1992, two independent reports from Geronemus [8] and Goldberg and Nychay [9] demonstrate the efficacy and safety of the q-switched ruby laser for this indication. These findings have been confirmed

by more detailed and elaborate studies from other investigators [10–14]. Starting in 1994 q-switched Nd:YAG and Alexandrite lasers have also been shown to be safe and effective in the treatment of Nevus of Ota [15–21] and have established themselves as gold standard. Also acquired bilateral Nevus of Ota-like macules (ABNLM) or Hori's nevus responds well to q-switched laser treatment [22–24]. Q-switched laser treatment for Nevus of Ota is now common practice in dermatological clinics all over the world for patients with a caucasian and Asian skin type alike. The Asian population shows the highest incidence of Nevus of Ota and treatment parameters, efficacy and side effects have therefore been well established for the treatment of this skin type [25,26]. Lighter skin types do also not present a therapeutic challenge compared to the treatment of the Asian skin type [27]. However, case reports and clinical trials consistently exclude skin types V even though patients with this skin type also suffer from similar cosmetic disfigurement. So far only one publication showed promising results in the treatment of Nevus of Ota in patients with dark skin [28]. It is due to this scarcity of published data and consequently the fear of lack of efficacy and the risk for long lasting or even permanent hypopigmentation that there is still great hesitation in the treatment of Nevus of Ota in skin types darker than IV [29]. We hence decided to share our positive experience with the treatment of four Fitzpatrick phototype V patients with Nevus of Ota with a q-switched Nd:YAG laser at 1,064 nm.

What is known about this topic? The efficacy and safety of the treatment of Nevus of Ota with q-switched lasers in Fitzpatrick skin types I to IV is well established in the literature. A first case report has shown efficacy of this treatment in darker skin.

What does this study add? We present our positive and encouraging experience with the treatment of four Fitzpatrick phototype V patients with Nevus of Ota.

Author contributions: Drs Thierry Fusade, Severine Lafaye, and Hans-Joachim Laubach had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Conflict of interest: None reported.

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MATERIALS AND METHODS

In between 1999 and 2009, four patients with Fitzpatrick skin type V presented to our private practice laser clinic for treatment options to improve the appearance of their Nevus of Ota. One patient presented with a bilateral nevus and ocular involvement [26,30,31], all other patients showed unilateral affection. Patients or their parents were counselled before the first treatment regarding risks and side effects of this laser treatment including discomfort during treatment, post-treatment erythema, oedema, pinpoint bleeding, and crusting. Furthermore, patients or their parents were made aware of the risk of post-inflammatory hyperpigmentation as well as long lasting or permanent hypopigmentation. All patients/parents counselled in this manner decided to proceed with the treatment. Treatments were performed with q-switched Nd:YAG laser at 1,064 nm (Table 1). Due to an equipment upgrade in our practice within the study period patients were treated with either Medlite 2 and/or C3 (Hoya ConBio, Fremont, CA). Treatments were performed in general anesthesia in the case of an infant. For all other cases, infiltration anesthesia with local 1% lidocain/adrenalin-mix prior to the treatment was sufficient. Pulse diameter for the treatments was 2 mm and pulses were applied typically in a non-overlapping fashion. Treatment energies ranged from 4.1 to 9.5 J/cm². If large surfaces were affected, for example, cheeks and forehead or bilateral affection, single treatments were usually confined to a cosmetic unit (e.g., one cheek) and the remaining sites were treated in consequent sessions. If lesions were located in the orbital area intraocular eye shields were used after the application of intraocular oxybuprocaine hydrochloride eye drops (Cebesine 0.4%, Chauvin/Bausch & Lomb, Montpellier, France). Immediate skin whitening and subtle pinpoint bleeding was determined as optimal endpoint after the treatment. Aftercare consisted of simple petrolatum dressing until crusting resided. Treatments were sequenced typically 3 months apart however some situations required treatment intervals as long as 12 months. No further treatments were added if complete clearance was achieved or if no additional improvement could be observed.

Follow-up intervals are in between 3 months and 7 years after the last treatment.

For evaluation digital photographs were taken at baseline and up to 84 months after the last laser treatment. These photographs were then shown independently of

each other to two independent investigators blinded to the time point and the nature of the treatment. Investigators were first asked to rate on a scale of 0–10 the cosmetic appearance of the subjects’ faces for all randomly sorted photos. After this rating investigators were then shown both the baseline and the follow-up photograph together to detect more subtle changes in cosmetic appearance. Investigators were asked to determine if a change in cosmetic appearance in between both photos was present. If investigators determined the presence of an alteration they were then prompted to rate this again on a scale of –10 (worst possible degradation) to +10 (best possible amelioration).

RESULTS

Overall cosmetic appearance before treatment rated from individual photographs by two blinded investigators was scored in between 0 and 5 out of a maximum score of 10 with an mean score of 1.75 (Table 2). Overall cosmetic appearance at follow was scored in between 5 and 8 out of 10 with a mean score of 6.6 (Table 2). The calculated differences in between before and after treatment cosmetic appearance as rated by the blinded investigators are in between 1.5 and 7 out of 10 with a mean difference of 4.9 (Table 2).

If baseline pictures (Figs. 1a and 2a) were directly compared with follow-up photos and rated regarding their cosmetic appearance (Figs. 1a and 2b) all four subjects were rated as improved. Improvement ratings were in between 5 and 10 out of 10 with a mean improvement of 8.5 (Table 2).

Side effects typically included immediate whitening, pinpoint bleeding, erythema, oedema, and crusting of the treatment site. These side effects all subsided within 7 days. In one subject of this case series, a few areas of permanent guttatae-like hypopigmentation appeared after the treatment and persisted through the following 7 years (Fig. 2b arrow). It should be noted in this context that due to the very small nature of the hypopigmented maculae the patient did not feel cosmetically compromised and remained very satisfied with the treatment results (Table 3).

DISCUSSION

Q-switched lasers are currently the treatment of choice in the treatment of nevus of Ota in skin types up to Fitzpatrick skin type IV. However, this cosmetically

TABLE 1. Summary Treatment Parameters

Subject number	Treatment type	Treatment energy (J/cm ²)	Anesthesia	Number of treatments	Treatment intervals (months)
1	QS Nd:Yag	6–9	General	8	2–6
2	QS Nd:Yag	7–9	Locale	5	3–6
3	QS Nd:Yag	8–9.5	Locale	5	3–12
4	QS Nd:Yag	4.1–5	Locale	4	3–8

Please note a high variation in treatment energies due to change of equipment during the study period.

TABLE 2. Summary of Cosmetic Improvement Rating

Subject number	Investigator 1	Investigator 2	Average
1	10	10	10
2	7	5	6
3	9	10	9.5
4	8	9	8.5
Mean	8.5	8.5	8.5

Before and after pictures were shown next to each other for the cosmetic improvement rating by blinded investigators.

disfiguring disease also affects patients with darker skin types. Nevertheless clinical data regarding treatment efficacy is still lacking. Therefore, q-switched laser treatment of this patient population is often denied due to fear of long-lasting pigment changes and unsatisfactory treatment efficacy.

This is the first report of the successful treatment of four Fitzpatrick skin type V patients with Nevus of Ota with a q-switched Nd:YAG laser at 1,064 nm (Figs. 1 and 2). All four patients showed significant cosmetic improvement after an average of five treatment sessions, corresponding to the treatment numbers seen in other clinical trials in Asian patient populations [33].

Short-term side effects in this case series were similar to those described previously in the literature for lighter skin types [12,13,34]. Immediate skin whitening after the irradiation was followed by the formation of oedema and pin point bleedings in the minutes after the treatment. Treatment site crusting occurred in all patients in the days after the irradiation lasting for up to 8 days.

After a prospective clinical trial of Chan et al. [32] q-switched Nd:YAG appears to be the slightly more effective and safer laser for the treatment of nevus of Ota.

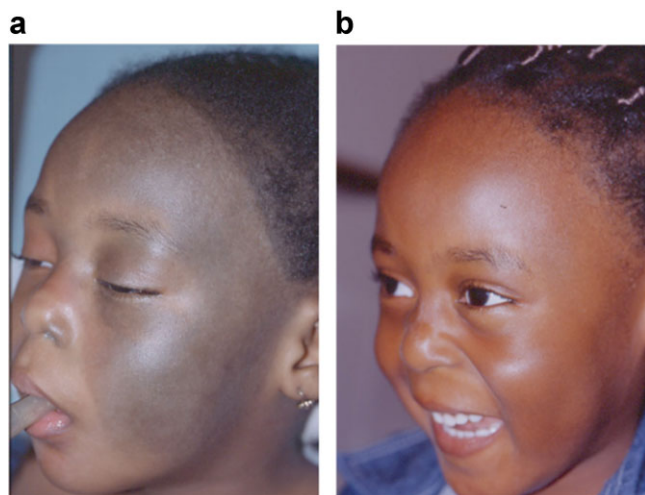


Fig. 1. **a:** Nevus of Ota in Subject after one q-switched Nd:Yag laser treatment. **b:** Cosmetic improvement 3 months after eight q-switched Nd:Yag laser treatment sessions.

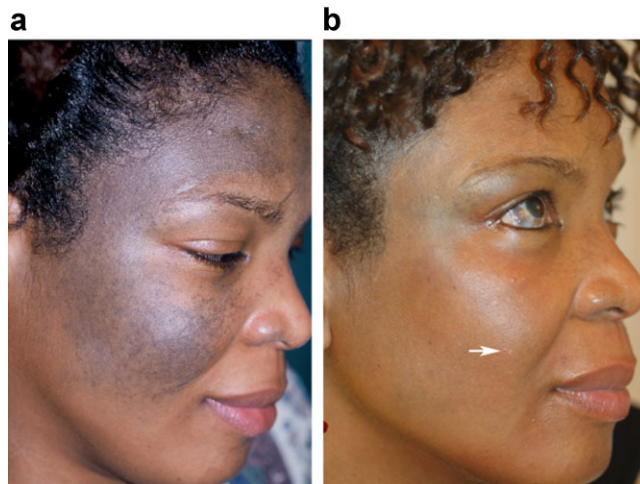


Fig. 2. **a:** Nevus of Ota in Subject 3 before q-switched Nd:Yag laser treatment. **b:** Cosmetic improvement 84 months after five q-switched Nd:Yag laser treatment sessions, small guttatae-like, long-lasting hypopigmentation apparent in treatment area (white arrow).

The described study did not enroll skin types V and VI and data on side effects comparing both of these wavelengths are not existent. Nevertheless these findings are congruent with our clinical experience and nevus of Ota is treated only with q-switched Nd:YAG laser independent of skin color. But looking at its slight superior efficacy in Asian skin we postulated that similar results could be found in even darker skin types.

The probably most feared long-term side effect is long-lasting hypopigmentation. In the studies of Chan et al. and Kono et al., the frequency of this side effect is in the range of 15% [35–37]. It is most likely due to irreversible melanocytic injury in the treatment area due to the selective photothermolysis of this absorber filled cell population. In our case series one out of four patients (25%) showed persistent drop-like hypopigmented maculae (Fig. 2b). However, due to the small size of these hypopigmented areas (<5 mm in diameter) the patient was at all times satisfied with the cosmetic outcome.

Other unwanted long-term side effects are post-inflammatory hyperpigmentation and scarring. In a large retrospective study in Asian patients Chan et al. found that hyperpigmentation occurred in 3% and scarring or textural changes in 1.9% and 2.9%, respectively [35]. No post-inflammatory hyperpigmentation or scarring was observed in any of our four patients. To reduce the risk for hyperpigmentation our patients were strongly advised to use sun-protection and as suggested by Manuskiatti et al. [38] no pre- nor post-cooling was performed to the treatment site. Recurrence of Nevus of Ota after laser treatment is also a dissatisfying long-term outcome for both, the patient and the physician. Yet no recurrence has been observed so far in our patient population. This might just be due to the insufficient number of patients in this case

TABLE 3. Summary Follow-up Period, Side Effects, and Recurrence

Subject number	Follow-up (months)	Long-term side effects	Recurrence
1	3	No	No
2	30	No	No
3	84	Hypopigmentation	No
4	8	No	No

series since the frequency of recurrence in Asian skin is only 1% for alexandrite and Nd:YAG and up to 7% for ruby laser treatments [35–37].

Another interesting new laser concept for the treatment of Nevus of Ota in patients with Fitzpatrick skin type V could be the use of fractional photothermolysis [39]. This concept if effective could be a reasonably safe and well-tolerated treatment due to the random and non-selective thermal injury. It remains to be determined how this new technique would compare to the already established method of q-switched laser treatment of Ota regarding efficacy and safety within different patient populations.

This case series certainly raises more questions than it can answer however it confirms the available retrospective data in the literature [28]. This data consists of one case series reporting about the treatment of two patients with Nevus of Ota with Fitzpatrick skin type V with follow-up periods of 2 and 3 months. The results are promising however the publication fails to provide a long-term follow up and the authors report about the complete absence of long-term side effects, which is contrary to our experience (Fig. 2b).

Further prospective studies would allow for the collection of sorely missing data in this specific patient population. At this time point, we do encourage the physician to offer this laser treatment even to the darker skin type patient with Nevus of Ota after appropriate counselling regarding risks and side effects.

All four patients of our case series showed significant cosmetic improvement. Side effects were mostly short termed and typical for this laser techniques. One case of permanent hypopigmentation was encountered however the affected areas were very small and cosmetically not disturbing to the patient. Based upon the presented experiences the treatment of Nevus of Ota with a q-switched Nd:YAG laser at 1,064 nm could be safe and effective even in the patient population with Fitzpatrick skin type V. We therefore do encourage the physician to offer this laser treatment to darker skin type patients with Nevus of Ota after appropriate counselling regarding risks and side effects.

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