JAPA
JOURNAL OF ASIA PACIFIC AESTHETIC SCIENCE

CASE REPORT

# Sequential Q-switched Nd:YAG Laser Therapy with Adjunctive High-Intensity Focused Ultrasound for Melasma and Acquired Bilateral Nevus of Ota-like Macules (ABNOM): A Four-Year Case Report

**Khor Yi Zhen[1]***

[1]UR Klinik Sutera Utama, Taman Sutera Utama, Johor

Correspondence: Khor Yi Zhen; UR Klinik Sutera Utama, 37, Jalan Sutera Tanjung 8/2, Taman Sutera Utama, 81300, Johor; Email: maxkhor898@gmail.com

Received: 27 February 2026; Accepted: 16 April 2026; Published: 20 May 2026

**ABSTRACT:** Management of patients with concomitant melasma and acquired bilateral nevus of Ota-like macules (ABNOM) remains challenging due to the risk of post-laser induction or exacerbation of melasma and the potential development of post-inflammatory hyperpigmentation (PIH). We report a case of a 56-year-old woman with long-standing facial melasma and ABNOM treated with low-fluence 1064 nm Q-switched Nd:YAG (QSNY) laser and high-intensity focused ultrasound (HIFU). A total of 31 QSNY laser sessions were performed at 1–2-month intervals, together with four sessions of HIFU over four years. Marked clinical improvement with progressive pigment lightening was observed throughout the treatment period. The modified Melasma Area and Severity Index (mMASI) score decreased from 11 at baseline to 3, representing a 73% reduction. Near-complete clearance of ABNOM lesions was achieved, accompanied by improvement in skin turgor and laxity. Throughout the treatment course, only mild transient erythema and post-laser hyperpigmentation were observed, both resolving spontaneously without intervention, with no other significant adverse effects reported. This combined approach resulted in sustained improvement in pigmentation and skin quality, suggesting that low-fluence QSNY laser combined with HIFU may be an effective and safe treatment option for patients with concomitant melasma and ABNOM.

Keywords: Melasma, ABNOM, Q-switched Nd:YAG, Laser toning, High-intensity focused ultrasound, Pigmentary disorders

## INTRODUCTION

Melasma and acquired bilateral nevus of Ota-like macules (ABNOM) are hyperpigmentary disorders that commonly affect sun-exposed facial areas in middle-aged women and have been associated with genetic predisposition and hormonal influences [1]. Melasma is characterized by irregular brown macules symmetrically distributed over sun-exposed areas, particularly the face, and commonly affects women with Fitzpatrick skin phototypes III–V [2]. In contrast, ABNOM, also known as Hori's nevus, presents as bilateral blue-brown macules involving the forehead, temporal regions, lateral and lower eyelids, nasal root, and alae nasi, without involvement of the conjunctivae or mucous membranes. It is a relatively common pigmentary disorder among Asian populations [3].

Several studies have identified melasma as the most common concomitant pigmentary disorder in patients with ABNOM [4,5]. Wang et al. reported that 24.0% of patients with ABNOM had concomitant melasma in their study [1]. In addition, Yang et al. demonstrated that increasing age in

patients with ABNOM was associated with a higher likelihood of concomitant melasma and darker lesion pigmentation, both of which may increase the risk of post-inflammatory hyperpigmentation (PIH), thereby complicating treatment and reducing therapeutic efficacy [6].

Q-switched lasers, particularly the 1064 nm Q-switched Nd:YAG (QSNY) laser, have been widely used for the treatment of melasma and ABNOM. The 1064 nm QSNY laser is considered relatively safe in darker-skinned individuals due to its lower risk of pigmentary complications [3]. However, the coexistence of melasma in patients with ABNOM has been identified as an important factor influencing the efficacy of Q-switched laser treatment, with treatment outcomes reported to be 47 times more favorable in patients without concomitant melasma [3]. Furthermore, Wang et al. observed that treatment of ABNOM using a 1064 nm QSNY laser may induce new melasma lesions or exacerbate pre-existing melasma, a phenomenon not observed in patients with nevus of Ota [1].

Therefore, careful selection of laser parameters and the use of adjunctive therapies may be beneficial in patients presenting with concomitant melasma and ABNOM. In the present case, we evaluated the efficacy of combined low-fluence 1064 nm QSNY laser and high-intensity focused ultrasound (HIFU) in a patient with untreated melasma and ABNOM of more than 20 years' duration.

## CASE PRESENTATION

A 56-year-old postmenopausal woman presented with a 20-year history of progressively worsening bilateral facial hyperpigmentation over the malar regions, extending to the temples and mid-cheeks, with intermittent exacerbations following sun exposure. She reported intermittent occupational sun exposure while working at her husband's factory, with inconsistent photoprotection (SPF 50 sunscreen used approximately 2–3 times per week). She had not received any prior treatment. A positive family history of similar pigmentation was noted in her mother. Her medical history was otherwise unremarkable, and she had no history of hormone replacement therapy.

On examination, speckled bluish-gray macules were observed over both malar regions, extending to the temples and mid-cheeks, along with diffuse brown patches with ill-defined borders over the same areas (**Figure 1**). The forehead, upper lip, and chin were spared. She had Fitzpatrick skin phototype IV. The baseline modified Melasma Area and Severity Index (mMASI) score was 11. A clinical diagnosis of melasma with concomitant ABNOM was made based on patient history and clinical examination. Wood's lamp examination and dermoscopy were not performed. Differential diagnoses were excluded based on clinical assessment, history, and lesion distribution.

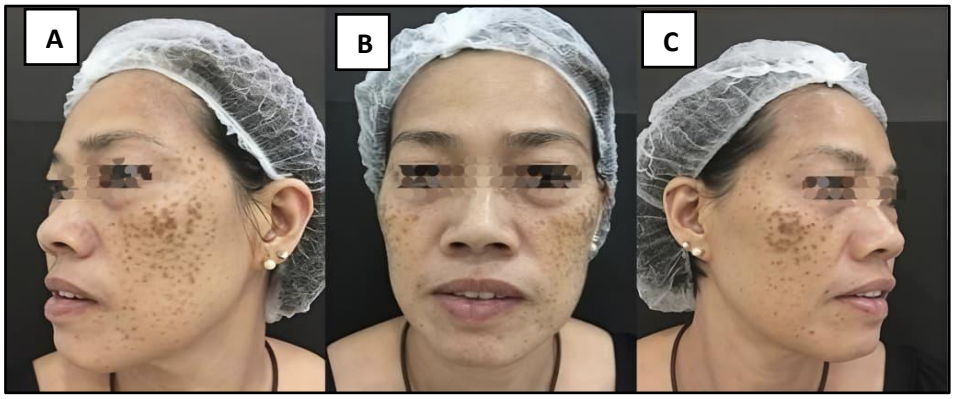


**Figure 1.** Clinical photographs at baseline showing facial hyperpigmentation over both malar regions: **(A)** left oblique (45°), **(B)** frontal, and **(C)** right oblique (45°) views.

## MANAGEMENT AND OUTCOME

Written informed consent was obtained prior to treatment and publication of this case report. The patient underwent a multimodal treatment regimen from 2022 to 2025, consisting of repeated 1064 nm QSNY laser therapy combined with adjunctive HIFU, together with strict and consistent photoprotection throughout the treatment period.

A QSNY laser system (Lutronic Spectra XT®, Lutronic, Korea) was used, and parameters were individualized according to the clinical features of melasma and ABNOM. For melasma, full-face toning was performed using low-fluence settings of

0.8–1.0 J/cm² at 10 Hz with an 8-mm spot size, delivering one pass per session. This aimed to achieve gradual pigment reduction while minimizing epidermal injury and reducing the risk of PIH. For ABNOM lesions, targeted treatment was performed using higher fluence settings of 4.0–4.8 J/cm² at 5 Hz with a 4-mm spot size, also with a single pass. Treatment was continued until a clinical endpoint of mild dermal whitening was achieved, with care taken to avoid overtreatment and excessive thermal damage. A total of 31 sessions were performed at 1–2-month intervals, with parameters adjusted over time based on clinical response and tolerance. Adjunctive HIFU was administered separately from laser sessions, with a total of four sessions performed in 2025. Multiple transducers were used (4.5 mm at 0.7 J, 3.0 mm at 0.5 J, and 2.0 mm at 0.3 J) to promote dermal remodeling, improve skin laxity, and enhance overall skin quality.

Marked clinical improvement with progressive pigment lightening was observed over the 4-year treatment period (**Figures 2** and **3**). The mMASI score decreased from 11 at baseline to 3, representing a 73% reduction in mMASI score. Near-complete clearance of ABNOM lesions was achieved, along with clinically appreciable improvement in skin turgor and laxity. Throughout the treatment course, only mild transient erythema and short-lived post-laser hyperpigmentation were observed, both of which resolved spontaneously without intervention. No significant adverse effects, including persistent hyperpigmentation, hypopigmentation, scarring, prolonged erythema, or edema, were reported. No recurrence was observed during follow-up.

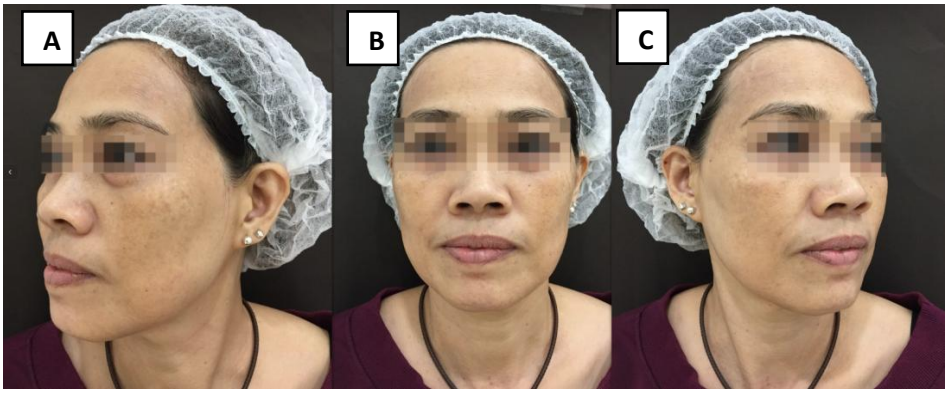


**Figure 2.** Clinical photographs showing marked improvement in facial pigmentation at 1 month after the 26th 1064 nm QSNY laser session and 1st HIFU treatment: **(A)** left oblique (45°), **(B)** frontal, and **(C)** right oblique (45°) views.


**Figure 3.** Clinical photographs showing near-complete clearance of facial pigmentation with improvement in skin quality at 1 month after the 31st 1064 nm QSNY laser session and 4th HIFU treatment: **(A)** left oblique (45°), **(B)** frontal, and **(C)** right oblique (45°) views.

## DISCUSSION

This case report describes the clinical outcome of a patient with concomitant melasma and ABNOM treated with combined low-fluence 1064-nm QSNY laser and HIFU therapy. QSNY laser has been widely utilized in the treatment of both melasma and ABNOM due to its favorable efficacy and safety profile. In melasma, low-fluence QSNY laser toning has demonstrated effectiveness with acceptable

tolerability in multiple studies [7-11]. Similarly, QSNY laser, including low-fluence settings, has been regarded as an effective and safe treatment modality for ABNOM [12-15].

Despite its efficacy, the management of patients with concomitant melasma and ABNOM remains challenging due to the risk of post-laser induction or exacerbation of melasma and the potential development of PIH. Patients with ABNOM and concomitant melasma generally exhibit less favorable treatment outcomes and a higher susceptibility to PIH, as well as worsening of melasma [6]. Earlier studies using higher fluence QSNY laser settings ranging from 7–10 J/cm$^2$ reported post-treatment hyperpigmentation in some patients [13,15]. In contrast, Cho et al. demonstrated favorable outcomes using lower fluence settings of 2.2–6.0 J/cm$^2$ for ABNOM, with no cases of hypo- or hyperpigmentation observed after multiple treatment sessions and high patient satisfaction rates [12]. Furthermore, Yang et al. reported reducing laser fluence to 2.5–4.0 J/cm$^2$ in patients with concomitant ABNOM and melasma in order to minimize disease exacerbation [6]. Therefore, in patients with concomitant melasma and ABNOM, the use of lower laser energy settings is recommended to minimize adverse effects. In the present case, low-fluence settings of 0.8–1.0 J/cm$^2$ were used for melasma, while 4.0–4.8 J/cm$^2$ was applied for ABNOM, resulting in marked clinical improvement by the end of the treatment course.

In addition, adjunctive HIFU may have contributed further benefit by improving pigmentation while enhancing skin turgor and laxity. HIFU promotes dermal remodeling and collagen stimulation, thereby improving overall skin quality and potentially contributing to pigmentary improvement. Importantly, no worsening of hyperpigmentation was observed during the HIFU treatment period. Several studies have reported improvements in skin laxity following HIFU treatment [16-18]. Furthermore, emerging evidence suggests that HIFU may enhance treatment outcomes in melasma when combined with QSNY laser therapy, with an acceptable safety profile [19,20]. No adverse effects were observed in this case, likely due to the use of conservative treatment parameters and appropriate treatment intervals, which are particularly important in patients with darker skin types.

## CONCLUSION

This case report suggests that repeated low-fluence QSNY laser therapy combined with adjunctive HIFU may represent an effective and safe treatment option for patients with concomitant melasma and ABNOM. The treatment approach achieved gradual pigment reduction with minimal adverse effects and was well tolerated. Nevertheless, further studies involving larger patient cohorts, standardized treatment protocols, and objective assessment tools are required to validate these findings.

## ACKNOWLEDGEMENT

The author would like to express sincere gratitude to the patient for providing consent to share her clinical case for academic and educational purposes. Appreciation is also extended to UR Klinik and the USMARI Research and Innovation Centre for their invaluable guidance and support throughout this work.

## CONFLICT OF INTEREST

The author declares no conflict of interest.

## REFERENCES

1. Wang B, Xie HF, Tan J, Xie HJ, Xu LY, Ding R, et al. Induction of melasma by 1064-nm Q-switched neodymium:yttrium-aluminum-garnet laser therapy for acquired bilateral nevus of Ota-like macules (Hori nevus): a study on related factors in the Chinese population. The Journal of Dermatology. 2016;43(6):655-61. DOI:10.1111/1346-8138.13193
2. Handel AC, Miot LD, Miot HA. Melasma: a clinical and epidemiological review. Anais Brasileiros de Dermatologia. 2014;89(5):771-82. DOI:10.1590/abd1806-4841.20143063
3. Zeng R, Liu YZ, Lin T, Guo LF, Ge YP, Zhang ML, et al. Effects of Q-switched laser treatments on acquired bilateral nevus of Ota-like macules: a retrospective comparative study. International Journal of Dermatology and Venereology. 2019;2(2):70-6. DOI:10.1097/01.JD9.0000559836.07162.f2

4. Ee HL, Wong HC, Goh CL, Ang P. Characteristics of Hori naevus: a prospective analysis. British Journal of Dermatology. 2006;154(1):50-3. DOI:10.1111/j.1365-2133.2005.06689.x
5. Wang BQ, Shen ZY, Fei Y, Li H, Liu JH, Xu H, et al. A population-based study of acquired bilateral nevus-of-Ota-like macules in Shanghai, China. Journal of Investigative Dermatology. 2011;131(2):358-62. DOI:10.1038/jid.2010.283
6. Yang X, Bi C, E T, Lin L, Cao Y. A retrospective study of 1064-nm Q-switched Nd:YAG laser therapy for acquired bilateral nevus of Ota-like macules. Skin Research and Technology. 2023;29(3):e13298. DOI:10.1111/srt.13298
7. Choi JE, Lee DW, Seo SH, Ahn HH, Kye YC. Low-fluence Q-switched Nd:YAG laser for the treatment of melasma in Asian patients. Journal of Cosmetic Dermatology. 2018;17(6):1053-8. DOI:10.1111/jocd.12760
8. Kaminaka C, Furukawa F, Yamamoto Y. The clinical and histological effect of a low-fluence Q-switched 1,064-nm neodymium: yttrium-aluminum-garnet laser for the treatment of melasma and solar lentigenes in Asians: prospective, randomized, and split-face comparative study. Dermatologic Surgery. 2017;43(9):1120-33. DOI:10.1097/DSS.0000000000001120
9. Gokalp H, Akkaya AD, Oram Y. Long-term results in low-fluence 1064-nm Q-Switched Nd:YAG laser for melasma: is it effective? Journal of Cosmetic Dermatology. 2016;15(4):420-6. DOI:10.1111/jocd.12253
10. Suh KS, Sung JY, Roh HJ, Jeon YS, Kim YC, Kim ST. Efficacy of the 1064-nm Q-switched Nd:YAG laser in melasma. Journal of Dermatological Treatment. 2011;22(4):233-8. DOI:10.3109/09546631003686051
11. Zhou X, Gold MH, Lu Z, Li Y. Efficacy and safety of Q-switched 1,064-nm neodymium-doped yttrium aluminum garnet laser treatment of melasma. Dermatologic Surgery. 2011;37(7):962-70. DOI:10.1111/j.1524-4725.2011.02001.x
12. Cho SB, Park SJ, Kim MJ, Bu TS. Treatment of acquired bilateral nevus of Ota-like macules (Hori's nevus) using 1064-nm Q-switched Nd:YAG laser with low fluence. International Journal of Dermatology. 2009;48(12):1308-12. DOI:10.1111/j.1365-4632.2008.04061.x
13. Suh DH, Han KH, Chung JH. Clinical use of the Q-switched Nd:YAG laser for the treatment of acquired bilateral nevus of Ota-like macules (ABNOMs) in Koreans. Journal of Dermatological Treatment. 2001;12(3):163-6. DOI:10.1080/09546630152607907
14. Park JM, Tsao H, Tsao S. Combined use of intense pulsed light and Q-switched ruby laser for complex dyspigmentation among Asian patients. Lasers in Surgery and Medicine. 2008;40(2):128-33. DOI:10.1002/lsm.20603
15. Kunachak S, Leelaudomlipi P. Q-switched Nd:YAG laser treatment for acquired bilateral nevus of ota-like maculae: a long-term follow-up. Lasers in Surgery and Medicine. 2000;26(4):376-9. DOI:10.1002/(sici)1096-9101(2000)26:4<376::aid-lsm5>3.0.co;2-j
16. Vachiramon V, Techakajornkeart R, Leerunyakul K, Chayavichitsilp P. Accuracy of a high-intensity focused ultrasound device with and without real-time visualization system in face and neck treatment of skin laxity. Journal of Cosmetic Dermatology. 2021;20(1):132-7. DOI:10.1111/jocd.13512
17. Aşiran Serdar Z, Aktaş Karabay E, Tatlıparmak A, Aksoy B. Efficacy of high-intensity focused ultrasound in facial and neck rejuvenation. Journal of Cosmetic Dermatology. 2020;19(2):353-8. DOI:10.1111/jocd.13008
18. Han HS, Park JW, Kim SY, Yoo KH, Choi SY, Kim BJ. Safety and efficacy of high-intensity focused ultrasound for treatment of periorbital, perioral, and neck wrinkles: prospective open single-center single-arm confirmatory clinical trial. Dermatologic Therapy. 2022;35(5):e15420. DOI:10.1111/dth.15420
19. Abdulhadi S, Al Mousawi MS, Kattoof WM. Melasma removal using Q-switched neodymium-doped yttrium aluminium garnet laser toning and high-intensity focussed ultrasound. Journal of Pakistan Medical Association. 2024;74(10 Suppl 8):S326-31. DOI:10.47391/JPMA-BAGH-16-75
20. Vachiramon V, Iamsumang W, Chanasumon N, Thadanipon K, Triyangkulsri K. A study of efficacy and safety of high-intensity focused ultrasound for the treatment of melasma in Asians: a single-blinded, randomized, split-face, pilot study. Journal of Cosmetic Dermatology. 2020;19(2):375-81. DOI:10.1111/jocd.13044