

EXECUTIVE SUMMARY

Fractional 1064-nm Picosecond Laser vs. Low-Fluence Q-Switched Nd:YAG Laser for Melasma

Zhang X, Yang H, Ge Y, Yang Y, Lin T. Comparison of efficacy and safety of fractional 1064 nm picosecond laser and low-fluence Q-switched Nd:YAG laser in the treatment of melasma. *Journal of Cosmetic and Laser Therapy*. Published online March 17, 2026. DOI: 10.1080/14764172.2026.2644196. PMID: 41841366.

Key Research Question

If both treatments operate at 1064 nm, does the fractional picosecond protocol improve melasma faster or more effectively than the tested low-fluence Q-switched Nd:YAG protocol?

Study Design

This retrospective comparative study included 99 women with melasma: 54 treated with fractional 1064-nm picosecond Nd:YAG (PSNY) and 45 with low-fluence 1064-nm Q-switched Nd:YAG (QSNY). Patients received 2–5 treatments at 2–4-week intervals. Modified Melasma Area and Severity Index (mMASI) was assessed at baseline and four weeks after the second and fifth treatments.

Key Findings

Outcome	Verified Finding
mMASI after 2 sessions	Mean reduction: PSNY 23.7% vs. QSNY 9.8% — a 13.9 percentage-point difference.
mMASI after 5 sessions	Mean reduction: PSNY 40.7% vs. QSNY 29.5% — an 11.2 percentage-point difference.
Treatment fluence	The authors report that the PSNY protocol used lower fluence than the QSNY protocol; exact values were not verified from accessible primary text.
Post-inflammatory hyperpigmentation	PIH: 7.4% with PSNY vs. 13.3% with QSNY. The difference was not statistically significant.

Evidence Interpretation

The tested fractional picosecond protocol produced faster and greater mean mMASI improvement than the tested low-fluence Q-switched protocol. Because both arms used 1064 nm, wavelength is not the principal confounder; however, fractional delivery, pulse domain, fluence and potentially other treatment parameters differed. The study therefore compares complete protocols rather than isolating pulse duration.

Strengths

The same 1064-nm wavelength in both groups makes this comparison especially useful for examining treatment architecture. The study also reports outcomes after both two and five sessions, allowing comparison of early and later response.

Limitations

Retrospective and nonrandomized design; all participants were female; treatment exposure varied from two to five sessions; exact device-level settings were not available from accessible primary text; and melasma is chronic and recurrent, so long-term durability is not established by these data.

Funding / Conflicts

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PLBG Evidence-Based Takeaway

In this retrospective comparison of 99 women with melasma, both tested 1064-nm Nd:YAG protocols improved melasma. The fractional picosecond cohort demonstrated faster and greater mean mMASI improvement than the low-fluence Q-switched cohort: 23.7% versus 9.8% after two treatments and 40.7% versus 29.5% after five treatments. PIH was numerically less frequent with fractional picosecond treatment —7.4% versus 13.3%—but the difference was not statistically significant. Because fractional delivery, pulse domain and fluence differed between protocols, the study does not establish that picosecond pulse duration alone caused the efficacy difference.