

Therapeutic Outcome of Melasma Treatment by Sequential-pulse (Dual-pulse) 1064 nm Laser in Patients with Skin Phototypes I-III

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SUMMARY

Introduction: Melasma and post-inflammatory hyperpigmentation (PIH) cause significant social and emotional stress to patients. Although many treatment modalities have been developed for melasma and PIH, its management still remains a challenge due to its recurrent and refractory nature. By choosing the appropriate laser wavelength and pulse duration, the treatment options have increased, but the correct settings are vital in the treatment of melasma.

Objective: Low-dose QS induces sub-lethal injury to melanosomes, causing fragmentation and rupture of melanin granules into the cytoplasm. This effect is highly selective for melanosomes. The spot size of 2 mm, pulse duration of 0.3 ms of Nd:YAG laser produce also subcellular damage to the upper dermal vascular plexus, which is one of the pathogenetic factors in melasma. The subthreshold injury to the surrounding dermis stimulates the formation of collagen, resulting in brighter and tighter skin.

Method: We enrolled 14 Caucasian women with melasma with an underlying vascular component to receive six Q-switched, sequential short-pulse Nd:YAG laser treatments, 2 weeks apart. Objective (color measurement) and subjective (clinical evaluation of photographs by three dermatologists blind to the order of the photographs) assessments were obtained at baseline, after six treatments, and at the 3-month follow-up visit. A visual analogue scale (VAS) was used for patient assessment of changes at baseline, after six treatments and at the 3-month follow-up. This includes sun avoidance and aggressive sun protection with use of an effective sunscreen.

Results: Of the 14 patients, 12 completed the study. The mean melanin index (MI) showed statistically significant improvement after 6 treatments compared with baseline measurements. There were significant improvements in clinical evaluation after six treatments ($P = 0.00$); however, this difference was

visible after 3 months. At follow-up in the 6th week during the treatment protocol, there was an improvement in VAS ($P = 0.02$). There was also present an improvement measured by clinical evaluation. During the treatment protocol there was no visible erythema, burning sensation, scaling, hyperpigmentation or crusting.

Conclusion: Recent innovations have refined the traditional approach of melasma treatment to minimize side effects while retaining the therapeutic effect. These observations suggest that sequential-pulse (dual-pulse) 1064 nm laser therapy can be successful in clearing melasma with an underlying vascular component. This has to be confirmed by controlled clinical trial.

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