

Picosecond Treatment of Freckles

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Introduction

Freckles (or ephelides) are a common skin pigmentary disorder in which small, well-defined macular lesions are situated prominently on the face, including the nose and maxillary region. They can be numerous, often numbering in the hundreds, with a diameter of around 1 - 2 mm, and appear brownish in color and are related to sun exposure. Laser technology is the primary method for the removal of freckles, with Q-switched (QS) lasers having long been considered a gold standard treatment for the condition. Recently, picosecond laser technology has garnered attention, with its highly efficient photomechanical effect and lower photothermal irritation.^{1,2} Conventional 532 nm wavelength QS lasers can easily lead to laser burn and post-inflammatory hyperpigmentation (PIH), especially for cases with high concentration of epidermal melanin. Picosecond technology is theoretically safer for skin that is higher on the Fitzpatrick scale.

Case History

A 30-year-old Chinese woman with Fitzpatrick skin type III presented with prominent bilateral facial brownish pigmentations ranging from 1 mm to 3 mm in diameter over the nose maxillary and cheek area. She had been experiencing these freckles for over three years, and the number

and color of the lesions had increased over time. Recently she discovered that cosmetic concealers cannot camouflage them. She was working as an office clerk and enjoyed outdoor activities during weekends with friends. Her compliance to sun screening precautions was fair; she occasionally wore a sun cap and applied sunscreen products in the early morning. She also had a family history of similar skin issues. She tried over-the-counter cosmetic skin care products and changed make up brands frequently, but the result was unsatisfactory. As the pigmentary problem worsened, she felt unhappy and embarrassed, and she believed the pigmentary disorder had negatively affected her social interactions. She expressed a preference for a modest treatment with minimal downtime.

Case Treatment

The patient's individual lesions were initially treated with a 532 nm picosecond laser (750 ps) at a fluence of 0.2 J/cm² and a spot size of 2 mm at frequency of 3.3 Hz. Following that, the background was treated with a global pico-toning technique utilizing a 1064 nm picosecond laser (750 ps) at a fluence of 0.4 - 1.0 J/cm², spot size of 8 mm, and frequency of 10 Hz, for a total of 3000 pulses over the full face. There was no immediate endpoint or mild erythema in the targeted area, and no frosting occurred.

Table 1. PICO Genesis™ parameter settings for treatment of Freckles

	Step 1: Individual spot tx	Step 2: Global tx
Wavelength	532 nm	1064 nm
Pulse duration	750 ps	750 ps
Fluence	0.2 J/cm ²	0.4 - 1.0 J/cm ²
Spot size	2 mm	8 mm
Frequency	3.3 Hz	10 Hz

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Mild erythema only occurred 2-3 minutes after the individual spot treatment most of which subsided after an hour following the treatment. A series of two PICO Genesis™ treatments were performed at two week intervals.

Case Progress

The freckles became superficial, darkened and then fell off approximately 5-7 days after the laser treatment. Residual erythema subsided for 3-5 days and no pain or wounding was reported. The patient was able to perform her usual skin care regimen, including face wash and makeup, without irritation or a stinging sensation immediately after each treatment. 90% of the freckles were cleared after two sessions of treatment, and a brighter background was achieved. The patient was satisfied with the quick and effective result and enjoyed the minimal downtime. There was no PIH observed in the post-operative follow-up post six months.

Conclusion

The PICO Genesis procedure is an effective treatment for freckles that's quick, comfortable and involves virtually no-downtime for common pigmentary concerns. Its highly effective photomechanical delivery and low photothermal irritation, make it a

viable treatment option on all skin types, including darker Fitzpatrick skin types.

1 Sierra R, Mirkov M. Impact of pulse duration from nanoseconds to picoseconds on the thermal and mechanical effects during LASER interaction with tattoo targets. Abstract presented at American Society for LASER Medicine and Surgery Conference. Boston, April 4-6, 2013

2 Fabi SG, Metelitsa AI. Future directions in cutaneous LASER surgery. *Dermatol Clin.* 2014;32(1):61-9.

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