

Targeted Laser Treatment of Solar Lentigines and Hyperpigmentation on Sun-Exposed Facial Areas Using the 2910 nm Fiber Laser: A Case Study Demonstrating Safety and Efficacy

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INTRODUCTION

Solar lentigines and hyperpigmentation are common pigmentary disorders that significantly affect patient quality of life and aesthetic appearance.¹ Solar lentigines, often referred to as age spots or sunspots, are benign hyperpigmented lesions associated with cumulative ultraviolet (UV) exposure and intrinsic aging.² They have been reported to affect more than 90% of those age 50 years or older, especially fair skinned individuals.² The main cause of hyperpigmentation is sun exposure and can often occur after laser or light treatment.³

This presents treatment challenges, particularly in patients with Fitzpatrick Skin Types III–VI, due to the elevated risk of post-inflammatory hyperpigmentation (PIH).⁴ Individuals with darker skin types have increased risks of other adverse events associated with conventional energy-based devices.^{5,6} The 2910 nm cold fiber laser (UltraClear®, Acclaro Medical) offers a novel approach to safely and effectively target pigmentary disorders by delivering precise, controlled ablation with minimal thermal diffusion.⁷

This white paper presents a case study highlighting successful treatment of solar lentigines and hyperpigmentation on sun-exposed facial areas using the 2910 nm cold fiber laser, with an emphasis on patient safety, efficacy, and the unique capabilities of this technology.

Technology Overview: The 2910 nm Cold Fiber Laser

The 2910 nm cold fiber laser is an advanced ablative resurfacing system utilizing a wavelength with high absorption in water, allowing precise fractional ablation with minimal collateral thermal injury by minimizing unintended heating of surrounding tissue, reducing the risk of PIH, scarring, and prolonged downtime.^{7,8}

This technology incorporates customizable settings, including Ultra and Clear modes, which allow clinicians to tailor treatments based on skin type, lesion depth, and desired clinical outcomes.

CLINICAL CASE SERIES: TREATMENT PROTOCOLS & OUTCOMES

Patient Profile:

- Age: 47 years
- Fitzpatrick Skin Type: III
- Clinical History: Persistent solar lentigines and hyperpigmentation on sun-exposed facial areas

Treatment Protocol:

The patient received a single treatment session utilizing the 2910 nm cold fiber laser with the following parameters:

Treatment Parameters	1 st Pass	2 nd Pass
Mode	Ultra	Clear
Coverage (%)	2%	30%
Ring (1,2,3)	1	1
Ring Depth (µm)	300 µm	30 µm
Coagulation / Therme	0	0

This dual-pass technique combines deep fractional ablation with Ultra Mode to target dermal remodeling*, followed by superficial Clear Mode to refine the epidermal surface and address pigment irregularities.

Adjunctive Skincare:

- 10% Tranexamic Acid was applied immediately post treatment
- 10% hydroquinone/5% kojic acid two times per week after two weeks of laser treatments (the patient had been using this for 2 weeks prior to after photos)

*Through a presumed mechanism of action of collagen remodeling.

Clinical Outcomes

At follow-up, the patient demonstrated significant improvement in both solar lentigines and hyperpigmentation on sun-exposed facial areas with notable brightening of the complexion, reduction in pigmentation density, and enhanced overall skin texture.

Importantly, no adverse events such as PIH, scarring, or prolonged erythema were observed, demonstrating the safety of this treatment approach in Skin Type III.



Before and After Observations

- Marked reduction in hyperpigmented lesions
- More uniform skin tone
- Improved skin smoothness and luminosity

Dr. Mahto and Dr. Keigwin's Perspective:

1. *" Compared to fractional ablative CO₂, UltraClear offers similar resurfacing potential with significantly lower downtime and risk. In particular, the ability to perform "fractional cold ablation" makes it a standout for treating pigment in patients where barrier function, comfort, and reduced risk of PIH are priorities."*
2. *"[UltraClear's] cold-fibre technology bridges a gap between aggressive ablative resurfacing and non-ablative rejuvenation, offering pigment removal with precision and minimal inflammation."*
3. *"By preserving the stratum corneum to a greater degree than traditional ablative systems, UltraClear creates a controlled microenvironment where actives can penetrate more efficiently without overwhelming the skin barrier."*

Discussion: Importance of Safe, Effective Treatment for Pigmentary Disorders

Treating solar lentigines and hyperpigmentation on sun-exposed facial areas, especially in patients with mid-range to higher Fitzpatrick skin types, demands a careful balance between efficacy and safety.⁴⁻⁶ Traditional ablative or intense energy-based treatments often carry increased risks of exacerbating pigmentation disorders through thermal injury or inflammation.⁴⁻⁶ The 2910 nm cold fiber laser offers several key advantages:

- Precise Fractional Ablation: Enables targeted lesion removal while preserving surrounding tissue
- Minimal Thermal Diffusion: Reduces risk of PIH4
- Customizable Treatment Modes: Allows staged, controlled resurfacing tailored to the patient's skin type and condition
- Enhanced Safety Profile: Suitable for treating pigmentary conditions in Skin Types I–VI with reduced complication rates

This case reinforces the laser's ability to improve solar lentigines and hyperpigmentation on sun-exposed facial areas while maintaining a good safety profile, which demonstrates that it could be an effective modality for pigment correction in diverse patient populations.

CONCLUSION

The 2910 nm cold fiber laser demonstrates a safe and effective approach for treating solar lentigines and hyperpigmentation on sun-exposed facial areas, even in patients with Fitzpatrick Skin Type III. Through precise, staged fractional ablation with minimal coagulation, clinicians can achieve significant pigment reduction, improved skin quality, and high patient satisfaction with reduced downtime and risk of adverse events.^{7,8}

Ongoing clinical studies and real-world outcomes will continue to validate this technology's role in managing complex pigmentary disorders safely across varying skin types.

ACKNOWLEDGEMENT

The clinical outcomes described in this paper reflect the expertise of Dr. Anjali Mahto and highlight the precision and versatility of the 2910 nm fiber laser (UltraClear®, Acclaro Medical).

DISCLAIMER

The information, including but not limited to, text, graphics, images and other material contained in this presentation are for informational purposes only. No material in this training module is intended to be a substitute for professional medical advice, diagnosis or treatment.

This clinical training module is intended for educational purposes only. Patient results may vary, and treatment outcomes are influenced by multiple factors including skin type, medical history, and provider technique.

Sample treatment parameters provided in this module serve as general guidance from industry experts and should not replace clinical judgment. When in doubt, always perform test spots prior to treatment to assess patient tissue response and safety. Providers must refer to the UltraClear User Manual and Quick Reference Guides for official device instructions, safety protocols, and additional guidance.

By using this training module, you acknowledge that **Acclaro Medical is not responsible for any adverse events, misuse, or misinterpretation of the information provided.** Providers should always adhere to applicable regulatory guidelines and best clinical practices when performing treatments.

For further assistance, contact Acclaro Medical Clinical Support
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