

## Combination of Fractional CO<sub>2</sub> Laser Therapy and Photodynamic Therapy for the Treatment of Plasma Cell Cheilitis

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### Introduction

Plasma cell cheilitis (PCC) is a rare idiopathic inflammatory disorder of the oral mucosa characterized by a dense band-like infiltrate of plasma cells in the upper dermis [1,2]. The most common clinical presentation is a slowly evolving, erythematous-violaceous, ulcerated, and asymptomatic plaque of the lower lip. A biopsy with histological examination is generally required to make a differential diagnosis. PCC is not used to resolve spontaneously and it is often resistant to topical steroid treatment. The resolution has been documented after systemic or intralesional steroids, systemic griseofulvin, topical calcineurin inhibitors, and destructive measures, including laser therapy [2,3]. Successful therapeutic results have been achieved by combining two different therapies that act synergistically [4].

### Case Presentation

We report the case of a 40-year-old woman, who presented to our dermatology clinic with an ulcerated plaque of the lower

lip (Figure 1, A and B), persistent for eighteen months and already histologically diagnosed as plasma cell cheilitis. Since the diagnosis high-potency topical corticosteroid and tacrolimus 0.03% ointment had been utilized for six months, with no clinical benefit. We decided to try a combined treatment with fractional CO<sub>2</sub> laser therapy and photodynamic therapy (PDT). First, under topical anesthesia, the patient underwent a fractional CO<sub>2</sub> laser (Smartxide<sup>2</sup>, DEKA MELA) ablative treatment (power 5 W, scan time 300 ms, spacing 400 μm) and, immediately afterward, methyl aminolevulinate (MAL) 160 mg/g cream was applied on the treated area using an occlusive and nontransparent plastic wrap. Three hours later, the occlusive dressing was removed and the treated skin was exposed to 120 J/cm<sup>2</sup> of a red-light source with peak emission at 630 nm (PDT-CLD 100, EPEM) for two minutes. After therapy, the patient was warned to avoid direct sunlight for the first 36 hours. To promote quick healing, she was advised to apply until complete re-epithelialization a topical non-medicated ointment. Other two cycles of fractional CO<sub>2</sub> laser therapy and subsequent PDT were done, after 4 and 8 (Figure 1, C and D) weeks. A follow-up was performed



**Figure 1.** Clinical (A,C,E) and dermoscopic (B,D,F) presentation of the lesion before treatment (A,B), after 8 weeks (C,D) and at 12 months follow-up (E,F).

12 months after the first treatment. The patient reported only mild discomfort related to the red-light exposure after the first treatment cycle, then well controlled by the preventive use of sunscreens. The aesthetic outcome was excellent, without any clinically evident scarring (Figure 1, E and F). Laser-combined therapy is now used to treat lots of diseases [5].

## Conclusions

Vaporization of intracellular water induced by fractional CO<sub>2</sub> laser acts either ablating the abnormal epithelium with good hemostasis of the adjacent structures or favoring penetration of the photosensitizer (MAL). The interaction between the photosensitizer and the appropriate activating wavelength of light generates reactive oxygen species causing cell death by necrosis and apoptosis. PDT is able to selectively and effectively target the area to treat, with little or no risk of scarring. Such a combined approach is promising because of proven efficacy, minimum associate discomfort, and good aesthetic outcome. Moreover, besides the fact that they are all off-label, the distress associated with using topical treatments for long periods is greater. Further studies

with wider samples of patients are needed to validate this technique as a therapeutic standard for PCC.

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