Treatment of lentigines by a novel high power diode laser at 755 nm: a case report

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The use of high-power diode laser with a wavelength of 755 nm is an effective and safe method for the correction and partial and/or total elimination of pigmented lesions, specifically solar lentigines. This wavelength has yet not been used in diode lasers to treat solar lentigines. Side effects are the usual ones, including darkening and scab formation.

Our patient was a 40-year-old woman of Caucasian origin and IV Fitzpatrick phototype, who presented with solar lentigines of different sizes and clear edges. The applied treatment was a high-power diode laser of 755 nanometer (nm), 21 millisecond (ms) long pulse and 25 J/cm^2 fluence. Initially, the darkening of the lesion occurred, followed by the appearance of a scab, which remitted 10 days after.

The use of high-power diode laser of single pulse at 755nm, 25J/cm^2 and 21ms, proved effective and safe concerning the removal of benign pigmented lesions.

Keywords: lentigo, hyperpigmentation, high-power diode laser

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INTRODUCTION

The application of long pulse Alexandrite laser at a wavelength of 755nm has been reported in scientific literature as an effective approach to eliminate pigmented lesions, specifically solar lentigines [1]. Additionally, diode lasers have also been employed at 810 nm [2]. However, a diode laser has never been used at 755nm for these treatments, due to its low availability in the markets. Removal of pigmented lesions with laser is a highly requested treatment, yet requires a specific procedure, considering the depigmentation parameters to be tuned for each case. This implies a precise laser selection, optimal pulse duration and adequate fluence, in order to obtain the highest efficacy and safety. Therefore, for a safe application of the treatment, it is essential to have a deep knowledge about the laser-tissue interactions and their selective photothermic effect on the pigmented lesions beforehand [3].

CASE PRESENTATION

The patient was a 40-year-old Caucasian woman presenting with a Fitzpatrick Phototype IV, and having several stains of melanic origin, fitting the solar lentigo description, with clear edges localized on the cheek zone [4-8]. (Figure 1)

Treatment with a diode laser at 755nm of the Primelase Excellence device from Cocoon Medical, Barcelona-Spain, was performed. The fluence used was 25J/cm^2 with 21ms pulse duration. A perforated spatula was used, hence avoiding direct contact between the skin and the diode laser applicator, and limiting the laser irradiation to the target. This way, the surrounding skin was protected and the tissue was prevented from cooling, which would have reduced the procedure's effectiveness. In certain lesions, two pulses were necessary to reach the end-point, the lesion darkening.

Cooling methods were required neither during

Figure 1. Enlargement of the area treated prior to the treatment.

nor following the treatment.

The pigmented lesions reacted positively to the applied light stimulation, becoming dark with a surrounding erythema, which disappeared 24 hours after the treatment.

Subsequently, during the 3-day follow-up, scabs were observed, spontaneously peeled between the 7th-10th day post-treatment, showing a complete elimination of the solar lentigines. Results can be observed in the following figures (Figures 2-4).

DISCUSSION

In recent years, a plethora of laser systems (long-pulse Alexandrite QS, long-pulse Nd:YAG KTP QS and high power Diode laser at 810nm) have been successfully utilized to treat pigmented lesions [9]. In particular, 810 nm diode lasers for hair removal have reported changes and even disappearance of these lesions such as nevi, since the absorption in both cases is dominated by the melanin as the chromophore [10]. Even if the results are generally successful, controversies still remain regarding the use of laser for certain pigmented lesions [11].

A correct identification of lesions that can be treated with this procedure is essential in order not to incur into unnecessary risks. For this reason, a dermatologist's support is recommended. If the parameters are selected correctly, most of the side effects are temporary and disappear promptly. However, rare, and even serious complications can arise if the operator is not trained to perform the treatment properly [3].

The 755nm wavelength targets the melanin present in the deeper layers of the tissue [12]. high-power diode lasers of 755nm are currently used in the Primelase Excellence device for high-efficacy hair removal, and have been reported as interesting alternatives for the traditional 755nm Alexandrite lasers [13]. By using the millisecond pulse mode as used in hair removal, the obtained effect is the carbonization of the target as well as the oxidation

Figure 2. Patient's face before (left) and after (right) treatment. Marking the area where the elimination of the lesion is observed.

Figure 3. Lentigo before (left) and after (right) treatment.

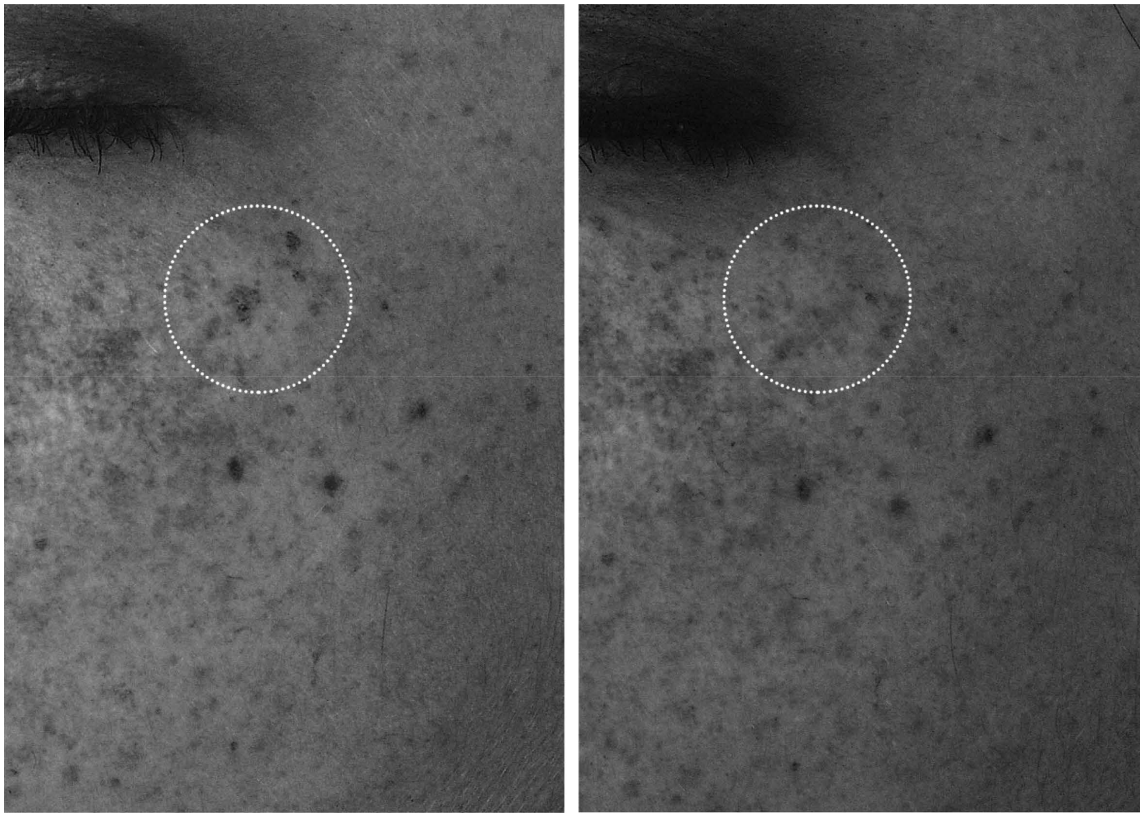

Figure 4. Lentigo before (left) and after (right) treatment.

of the non-carbonized fraction of the target that remains exposed to the interstitial environment after the destruction of the melanosome. These necrotic residues of melanin will be removed during the weeks following the treatment. The markedly thermal character of this procedure, compared to other nanosecond laser procedures, extends the post-treatment inflammatory response, making it is necessary to avoid any sun exposure during the following 15-21 days, despite the use of SPF50 sunscreen cream. If additional sessions are required, it is advised to wait 45 days between sessions.

CONCLUSION

The feasibility of removing pigmented lesions using a 755nm high-power diode laser was demonstrated. It is an effective and safe procedure and marks the appearance of a new therapeutic alternative for this indication.

Conflict of Interest: None declared.

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