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Using 1064 nm Energy to Treat Facial Diffuse Redness

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Introduction

Diffuse redness refers to a condition caused by dilated capillaries, most commonly affecting the nose, forehead, and cheeks. These enlarged blood vessels do not present themselves as defined vasculature, but rather as a general facial redness, (for example, the often used description of “rosy cheeks”). Diffuse facial redness can occur as a result of aging, prolonged sun exposure, pregnancy, childbirth, oral contraceptives, and estrogen replacement therapy; heredity can also play a part. Diffuse redness is often associated with another inherited skin disorder, rosacea, which affects an estimated 16 million Americans (www.rosacea.org).

There are numerous treatment options and preventative measures (especially in the form of lifestyle changes) for rosacea and nondescript facial redness. These options include: topical creams and ointments, prescription medication, reduced sun exposure and limited alcohol consumption, among others.

Lasers and light-based devices are also effective in treating unwanted vascular lesions. In fact, the Vbeam® pulsed dye laser from Candela®, at a wavelength of 595 nm, is considered the “gold standard” for treating vascular anomalies of the skin. However, for some patients, such as the patient described here, the Vbeam does not always provide the desired result in treating diffuse redness.

In this paper, we discuss using a wavelength of 1064 nm using the GentleMAX® laser from Candela to address diffuse redness of the face.

Method

The GentleMAX laser has the ability to deliver either 755 nm (alexandrite) or 1064 nm (Nd:YAG) laser energy. For the treatment described in this paper, we used this device’s dual wavelength Nd:YAG treatment capabilities.

Treatment parameters utilized were as follows: 1064 nm energy, 10 mm spot, 0.45 msec pulse duration and 9.0 J/cm² fluence at a 7–10 Hz repetition rate with the Dynamic Cooling Device™ (DCD™) turned off (Candela’s “painting technique”). The handpiece is held just above the surface of the skin (1–2 cm), and depending upon where the diffuse redness is presenting itself, randomly moved over defined sections of the face (first the left cheek, then the right, then the nose) in a rapidly moving, sweeping motion intended to deliver the laser energy uniformly over the treatment area. Treatment endpoint is when the surface temperature of the skin reaches 40–45% C (measured by a separate hand-held IR thermometer) or patient discomfort halts the procedure.

A total of three passes are performed over the entire area in an effort to deposit as much laser energy as possible and maintain the temperature into the skin also long as possible.

The laser treatments are repeated at three to four week intervals up to a total of four to eight sessions.

Discussion

“Diffuse redness” is a very difficult condition to address, given the numerous biological, hereditary, and lifestyle components affecting its presentation.

Typically, we use the Vbeam to treat unwanted vascular conditions in our office, and, generally speaking, I have been extremely happy with the Vbeam’s performance over the years.

The optical absorption coefficients of hemoglobin are well understood at 595 nm (and for that matter, at 1064 nm). Generally speaking,



both oxygenated and de-oxygenated hemoglobin are better absorbed at the shorter laser wavelength. Therefore, it was somewhat surprising to us that the Nd:YAG wavelength effectively treated superficial vascular anomalies on patients we were treating with the GentleMAX. More surprising was that the patient identified in this Clinical Bulletin, who was previously treated with a pulsed dye laser, showed better results with the longer wavelength device.

Treatment outcomes at any wavelength are always subject to additional factors beyond straightforward absorption spectra, including the amount of targeted chromophore present (or potentially in this case, the ratio of oxy- and deoxy-hemoglobin present in the blood flow), the total amount of energy deposited, treatment technique differences, and/or non-defined patient variability.

Regardless of theory, the “painting” technique using 1064 nm energy, provides a nearly painless and very comfortable alternative in dealing with facial diffuse redness. This non-ablative treatment approach, using 1064 nm Nd:YAG energy, has been shown to significantly improve diffuse redness on multiple patients in our practice. While perhaps not the final solution in treating this condition, it nevertheless represents another treatment possibility of the GentleMAX laser and is potentially a treatment alternative for those patients not responding well to other treatment alternatives, including other light-based devices.

Additional research is recommended to optimize the treatment parameters referenced in this study.

Results



Figure 1—Left Cheek, Pre-treatment.



Figure 2—Left Cheek, Post-treatment.



Figure 3—Right Cheek, Pre-treatment.



Figure 4—Right Cheek, Post-treatment.