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Cooling Options with the GentleLase Pro

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Introduction

Historically, lasers have had various options for cooling of the epidermis. These include contact cooling, external cold air flow cooling, and cryogen spray options.

Contact cooling usually involves either a metal chilling plate or a sapphire cooling lens. These devices are chilled down to 5–10º C and cooling is established by physical contact with the skin prior to and immediately after the laser pulse. The advantages of this technique are that low cooling may be established and consumables such as cryogen are not used. The major disadvantage is that of unpredictable cooling depending on the length of contact time and poor visibility while cooling the skin.

Cold air flow is established with a chilling device that has high air flow at a specified temperature, often 0º C. The advantages of this device include large volume air flow at a predictable temperature. The disadvantages include the usual bulky tubing through which the air is delivered, patient annoyance of blowing cold air onto the face, and the inability to direct the air exactly where the laser device is delivering the pulses.

Cryogen spray cooling has been a patented cooling system long used with Candela® lasers. This system has the advantage of delivering very low temperature coolant in very predictable amounts and times. The cooling also may be delivered almost simultaneously with the delivery of the laser pulse. Excellent visibility is maintained during the firing of the coolant and the laser pulse. The single disadvantage of cryogen spray has been the perceived cost of the consumable spray which, surprisingly to many, typically works out to be less than a half a penny per pulse*.

Discussion

There are special instances when using one type of cooling over the other might be advantageous. Airflow cooling is often useful when large areas are being treated and bulk cooling is helpful, non-ablative resurfacing is one example. While epidermal protection is not usually needed with the low fluences that are used with non-ablative resurfacing, the pre-, parallel, and post-cooling capabilities of air cooling is still useful to enhance patient comfort.

Similarly, treatment of epidermal pigmented lesions with the GentleLase Pro does not warrant any significant epidermal protection because the surface pigment is the actual target. Even though protection is not specifically desired, some patient comfort delivered by the airflow cooling is pleasant to the patient.

The Dynamic Cooling Device™ (DCD™), with many laser wavelengths, has long been a standard for epidermal protection in laser hair removal. The DCD is also used for the treatment of vascular lesions where the targeted chromophore is blood, but the presence of a competing chromophore (melanin) in the skin requires epidermal cooling to avoid injury. There are many studies that have examined the effectiveness of lasers using the DCD while having a great safety record with epidermal protection.

With all applications, care needs to be taken to insure that the selected cooling methodology is compatible with the laser settings. Over cooling or under cooling may result in a lack of treatment efficacy or worse, patient injury. When treating with air cooling, fluences and repetition rates are typically lowered and pulse durations generally extended compared to recommended treatment parameters when using DCD. Common adjustments include reducing fluence by 10 to 20% (e.g. from 18 to 14 J/cm^2 when using an 18 mm spot with 755 nm), decreasing rep rate (from 2 to 1.5 Hz) and extending pulse duration (from 3 to 5 ms) when using cool air.

As always, test spots are recommended when selecting laser and cooling parameters with appropriate follow-up to insure safe, efficacious operation.

Having the option of airflow cooling or the DCD sets the GentleLase Pro apart from all of other long-pulsed Alexandrite lasers.

Figure 1 - Incorporates the Dynamic Cooling Device

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