CUTERA®

genesis*plus*™

for skin rejuvenation...with patented microsecond technology

"GenesisPlus is my go-to-complexion laser for providing a global refreshening of the entire face. Virtually 100% of my patients are thrilled with their results, since many patients are looking for more affordable, no-downtime treatments that really work."

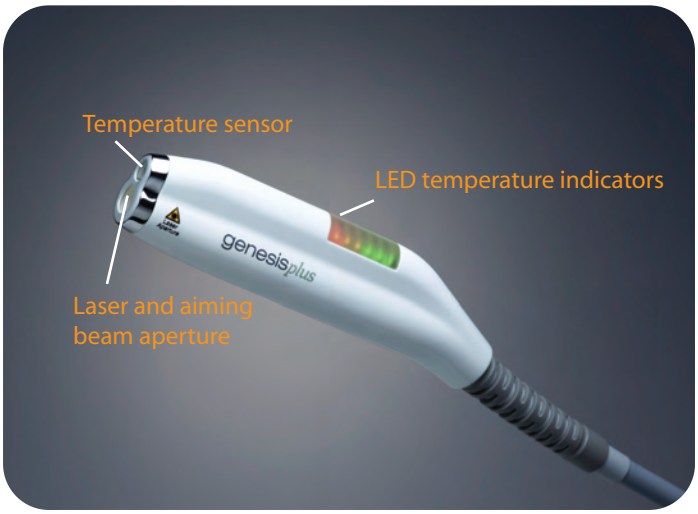
Debra Jaliman M.D., Dermatologist

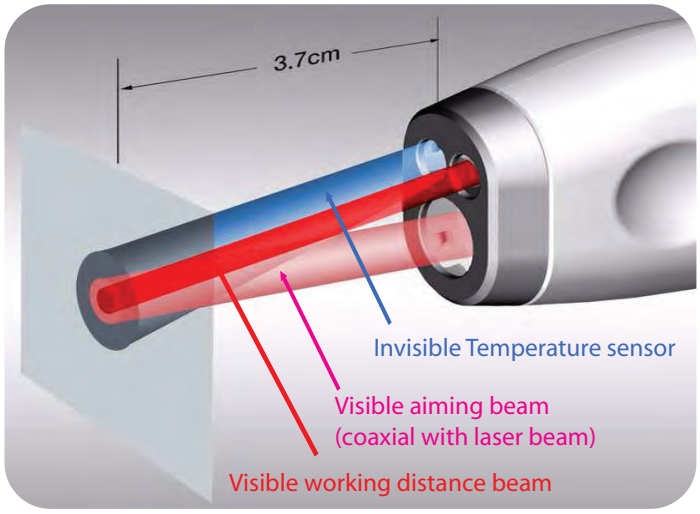
Skin Rejuvenation

GenesisPlus treats your patient's most common skin concerns including fine wrinkles, diffuse redness, rosacea, skin texture and pore size. All skin types can be treated and there is minimal discomfort and no downtime. Physicians often refer to GenesisPlus as their "go to" complexion laser.

New Handpiece Improves Predictability

- The integrated temperature sensor and multi-color display provide real-time measurement of the skin temperature during the treatment.
- The unique dual beam aiming system insures consistent treatment parameters throughout the procedure





Investigation to optimize treatment end point for a sub-millisecond Nd:YAG laser for skin rejuvenation using infrared thermometry

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Introduction

Laser Genesis is a popular, multi-purpose skin rejuvenation treatment using sub-millisecond 1064 nm laser pulses to gently heat the dermis. The laser energy is delivered by manually scanning the handpiece over a fixed treatment area. The rate of skin heating and the final skin temperature depend on a number of factors including skin type, treatment area, scanning (hand) speed, fluence, repetition rate and spot size. The spot size, in turn, is determined by the distance the handpiece is held from the face.

The new Genesis Plus handpiece has two important features that provide real time feedback during the procedure. The first is a unique triangulating aiming beam that aids the provider in keeping the handpiece the proper distance from the face. This insures a consistent spot size and fluence throughout the procedure. The second is a real time temperature sensor and multi-color display that monitor and display the skin temperature during the treatment. This provides measurement of a clinical end point for the procedure.

In this work we investigate the time and temperature profiles associated with the Laser Genesis procedures. The goal is to provide epidermal temperatures and temperature profiles associated with good clinical results for the Laser Genesis non-ablative skin rejuvenation procedure.

Materials and Methods

Four investigational sites were selected. Each reported consistently successful results with the Laser Genesis procedure. At each site the epidermal temperature was recorded throughout a Laser Genesis procedure using an infrared camera (Model A20, FLIR Systems, Wilsonville, OR). Thermal maps of the progression of mean and maximum temperature in the treatment area were developed using temperature analysis software (Thermacam Researcher version 2.9, FLIT Systems, Wilsonville, OR). Other data collected included fluence, number of pulses, repetition rate, skin type and size of treatment area.

Results

The treatment parameters varied for each site. The fluence ranged from 12-16 J/cm^2, the repetition rate from 7-10 Hz, and the number of pulses for a full face treatment from 10,000-15,000. The pulse width was fixed at 300 microseconds for all treatments. Figure 1 shows the time development of the average epidermal temperature of the treated zone for each of the four sites. All four treatments reached a final temperature in the range 39-41°C. Figures 2 and 3 show infrared and normal images immediately after treatment.

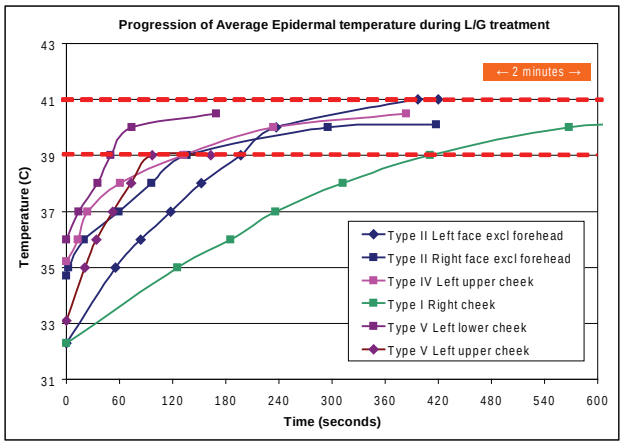

Figure 1. Time based average epidermal temperatures of treated zones from four investigational sites. Different colors on the plot indicate thermal information from different sites. Dotted red lines indicate the mean surface temperatures being maintained between 39 ºC and 41 ºC for duration of 2 – 3 minutes

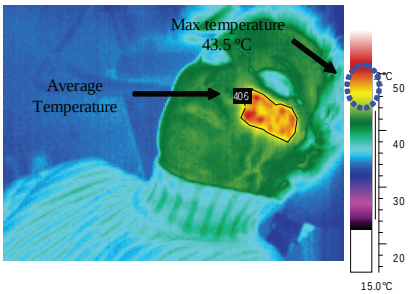

Figure 2. Infrared image of a treatment zone immediately after treatment. The average value of the epidermal temperatures within the treatment zone is above 40 ºC while the maximum temperature seen in the treated area is above 43 ºC.

Figure 3. Digital photograph of the treated area immediately after treatment. The treated zone appears erythemic at the end of the treatment and the uniformity of erythema is consistent across the treated zone, which could be used as a secondary marker to cease the laser treatment.

Discussion

The treatment times and rates of temperature rise varied significantly from site to site (Figure 1). This is expected because these parameters are highly dependent on fluence, repetition rate, spot size, scan rate and patient skin type. As noted above, these parameters changed significantly from site to site. The treatment end points show better agreement. All four treatments reached an average epidermal temperature between 39°C and 41°C for at least 2 minutes. This suggests that the treatment end point can be defined as maintaining the epidermis at a target temperature for a specific length of time. The new Genesis Plus handpiece provides the information needed to implement a time-temperature end point. The triangulated aiming beams aid the physician so that the treatment parameters remain constant throughout the procedure. The real time temperature monitor and display allows the physician to know when the skin has reached the target temperature. At that point the hand speed can be adjusted to maintain the temperature for the desired time. Together these features should allow more consistent Laser Genesis procedures and more repeatable results.

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