

AMERICAN SOCIETY FOR LASER MEDICINE AND SURGERY

LATE-BREAKING ABSTRACTS

ABSTRACTS

CUTANEOUS LASER SURGERY

#LB1

HIGH POWERED BLUE LIGHT PROPERTIES IN SKIN, BONE, MUSCLE, CARTILAGE AND FAT

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Background: A high-power blue semiconductor laser system was developed and utilized in order to ascertain potential clinical indications using a variety of animal tissues. This highly efficient, handheld device was constructed using new laser technology, and may be of significant interest in both the medical and industrial worlds.

Study: This study utilized a high intensity 446 nm semiconductor laser system in two modes to ascertain the laser tissue interaction in skin, muscle, fat, cartilage and bone. Using multi beam and single beam configurations, continuous wave (CW) power was delivered with intensities between 10 and 1000 W/mm². Tissues were exposed with pulse durations from 100 msec to multiple seconds. Direct visual observation of laser tissue interaction was observed and analyzed histologically.

Results: Both modalities induced striking vaporization of skin, the multibeam module being more efficient at debulking tissue, and the single module providing efficient drilling and tissue incision. Muscle similarly could be drilled or vaporized, but fat simply melted. Cartilage had a unique response in that, at low powers, this device could be used for cartilage shaping, and at high powers, creating clean and discrete holes of up to one centimeter. Histologically, full thickness skin vaporization was confirmed with a high degree of coagulation and few or no red blood cells in tissue specimens.

Conclusion: Blue wavelengths have not previously been described in this capacity. We have demonstrated that high power CW blue laser light can efficiently vaporize skin, muscle and cartilage with little or no bleeding. This could hold significant implications for the future in cutaneous laser surgery, and also robotic endoscopic surgeries, in particular for otolaryngology, orthopedic, urological, pulmonary, and potentially neurological surgery.

#LB2

EFFECTS OF POWER DENSITY AND PULSE MODULATION ON ABLATIVE FRACTIONAL LESION GEOMETRY

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Background: Ablative fractional laser treatments have become widely used. They are typically characterized by wavelength, pulse energy and spot size. While effects of power density have been investigated for large-spot, standard ablative techniques, there is very limited data available related to the effects of power density for ablative fractional lesions. It is also a challenge to vary in a controlled manner the power density of ablative CO₂ laser pulses, as they have typically a very irregular pulse profile. We used a custom-built, high-frequency pulse-width-modulated CO₂ laser to investigate the effects of variation in power density on fractional lesion geometry.

Study: Full thickness human skin samples, procured as discarded tissue from abdominal surgery, were used for the tissue exposures. An UltraPulse CO₂ laser (Lumenis, Yokneam, Israel) was modified to allow for a high-frequency pulse-width-modulation of the laser. This allowed the generation of quasi-CW mode pulses over a wide range (1–0 W) of output power in a controlled manner. The energy per pulse was kept at a constant level of 100 mJ per pulse with a constant spot size of 120 μm. The resulting fractional lesion geometry was assessed and quantified by histology.

Results: Reduction of power density resulted in a reduction of ablation depth in particular for power densities of 20 W and lower. Ablation and coagulation zone diameters were relatively independent over a wide power range. For power levels of less than 5 W, the ablation zone diameter was decreased and the coagulation zone increased.

Conclusion: Power level has a significant effect on the ablation depth and coagulation zone. This should be taken into consideration when characterizing ablative fractional lesions.

#LB3

FRACTIONAL CO₂ LASER IN THE TREATMENT OF PRIMARY CUTANEOUS AMYLOIDOSIS: THE POSSIBLE MECHANISMS OF ACTION

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Background: Current available treatments for primary cutaneous amyloidosis are quite disappointing. This study aims at assessing the efficacy of different modes of fractional CO₂ laser in the treatment primary cutaneous amyloidosis.

Study: Twenty five patients, 16 with macular amyloidosis and 6 with lichen amyloidosis were treated by 3–4 sessions of fractional CO₂ laser using two modes, superficial ablative mode [short pulse duration, 500 msec and lower fluences, 10–15 J] and a rejuvenation mode [longer pulse durations, 800 msec and higher fluences, 25 J]. Skin biopsies were obtained prior to treatment, and one month after the end of the last sessions. Results were evaluated clinically, histologically [hematoxylin and eosin and Congo red staining] and by image analysis. In order to study the mechanism of action, 3 patients were subjected to additional biopsies on the second, fourth, and sixth day after the first treatment session.

Results: At the end of the treatment sessions, there was a significant improvement in color, texture as well as pruritus in both macular and lichen amyloidosis. Histologically, a significant reduction in the amount of amyloid was demonstrated in hematoxylin and eosin as well as Congo red stained sections. Image analysis showed a decrease in the amount of melanin deposits that did not reach statistical significance. A significant decrease in epidermal thickness was also obtained. Biopsies, taken during the first week, failed to demonstrate any amyloid material in the created microthermal treatment zones. Clinical and histopathological results of the two treatment parameters showed no significant differences. Transient post-inflammatory hyperpigmentation was observed only in two patients in the areas treated by the rejuvenating mode.

Conclusion: Fractional CO₂ is a safe and effective method for treatment of primary cutaneous amyloidosis. The superficial ablative mode is recommended for both clinical subtypes. Although induction of transepidermal elimination is suggested, the exact mechanism of action cannot be determined.

#LB4

COMPARING THE EFFECTIVENESS OF LOW FLUENCE QUALITY SWITCHED Nd:YAG LASER AND LOW FLUENCE QUALITY SWITCHED ALEXANDRITE LASER FOR MANAGEMENT OF MELASMA IN ASIANS: PRELIMINARY STUDY OF A DOUBLE-BLINDED, SIDE-BY-SIDE COMPARISON

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Background: Low fluence quality switched Nd:YAG laser (QSYL) has been used to treat melasma in recent years. Many published articles showed its efficacy and safety while using appropriate parameters. However, there is no report using other wavelengths for the same purpose. This study's objective is to compare the efficacy and safety for melasma using QSYL and quality switched alexandrite laser (QSAL) by side-by-side comparison.

Study: In a prospective double-blinded study, twenty-two Japanese females with melasma on their cheeks, age 49.5 ± 6.2 , skin photo type III or IV were enrolled. All cases received QSYL at 1064 nm, 2.13 ± 0.19 J/cm² on one cheek and QSAL at 755 nm, 0.77 ± 0.12 J/cm² on the other cheek; both treated 3 passes with 6 mm spot size by randomized manner at 2-weeks apart without any anesthesia or combination therapy. Efficacy was evaluated by two blinded assessors using modified Melasma Area and Severity Index (mMASI), measured data by spectrophotometer and multi-

LED reflectance device at 2 to 8 weeks after the last treatment. Patients' preference also recorded.

Results: Number of treatments was 5.2 ± 2.0 . mMASI and melanin index on QSYL and QSAL treated side were decreased from 24.6 ± 8.0 to 8.9 ± 5.6 (63.8% improvement), 25.2 ± 7.3 to 8.9 ± 6.8 (64.8%) and 202.8 ± 49.2 to 160.0 ± 35.0 (23.1%), 204.3 ± 50.8 to 157.0 ± 36.5 (23.2%), respectively. Data from multi-LED reflectance device showed similar improvement. All data, including patient preferences showed no statistical differences. All cases responded to treatment and no case showed severe adverse effect including worsening of melasma.

Conclusion: To our knowledge, this is the first study to use a direct side-by-side comparison of QSYL and QSAL to treat melasma using low fluence, multiple passes and treatments. Our data showed both lasers successfully managed melasma in Asians at early weeks of evaluation.

#LB5

RADIOFREQUENCY AND MAGNETIC PULSE FOR BODY CONTOURING: BRAZILIAN MULTI-CENTER EXPERIENCE

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Background: Body Sculpting has been the objective of several procedures. In Brazil, the desire for body contouring improvements is more frequent than ever in everyday practice. In Brazil the combination of Multipolar Radiofrequency and Magnetic Pulse technology has become a common modality in the aesthetic market for non-invasive body contouring.

Study: A multicenter study in Brasil: Belo Horizonte, Campo Grande and Sete Lagoas with 260 subjects, 234 females, 26 males, 20–65 years old (avg 43), body mass index 23–29 (avg 26.4). Treated areas: Abdomen, Flanks, Arms and lipodystrophy areas in legs. 1 or 2 areas of 20 cm × 20 cm during the same session. Subjects were submitted to 6 sessions, spaced 1 week apart. Treatment protocol use Magnetic Pulse and MultiPolar Radiofrequency applied for 60 second over the area treated so that the surface temperature reached 40–42 Celsius. After reaching this temperature kept applying for another 15 minutes, always with the temperature maintained between 40–42 Celsius.

Results: Photographs and circumference measurements were made at fixed reference points (Example: Abdomen Area - Upper, Middle and Lower Abdomen) before treatment and 2 weeks after the final session. Improvement in body contouring was noticed on all subjects. No adverse side effects were recorded during or after the treatment.

Conclusion: In the Brazilian experience the combination of MultiPolar Radiofrequency and Magnetic Pulse has proven to be safe and effective for the purpose of body contouring and with a high subject satisfaction.

#LB6

RESOLUTION OF POST SURGICAL AND FILLER BRUISING USING OPTIMIZED PULSED LIGHT

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