OVER TIME HISTOLOGICAL TISSUE CHANGES AFTER NON-INVASIVE TREATMENT WITH A 1210nm LASER.

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Background:

The objectives of this investigation are to evaluate the histological changes over time of non-invasive treatment with a 1210nm laser, chosen to target a mid-infrared lipid absorption band.

Study:

Non-invasive abdominal treatments with a 1210nm laser with surface cooling were performed patients prior to abdominoplasty. Histological samples was obtained from post- abdominoplasty tissue at 2 days, 1 week, 1, 3 and 6 months post laser and fixed in formalin or frozen for processing. Doses ranged from 120 to 200J/cm2 and from 220 to 480J/cm2 for 40s and 160s pulses, respectively. Samples were collected from Tissue sections were stained with H&E, nitroblue tetrazolium chloride (NBTC), cleaved caspace-3, and perilipin. Photographs and ultrasound were performed pre-treatment and throughout the study. Safety was evaluated by blood monitoring and skin evaluations.

Results:

Eight patients completed the study. Deep dermal and septal perivascular infiltrate was seen 2 days post laser. At 1 week, hyalinized and homogenous collagen bundles were noted at the dermal-hypodermal junction. Decreased NBTC staining showed damage zones predominantly in the hypodermis approaching 6 mm in thicknesses. Decreased perilipin staining was also seen which represents the first time laser damage to this lipid barrier membrane was measured. Caspase staining showed apoptotic adipocytes at the periphery of necrotic tissue.

Histiocytes were initially observed at the junction between apoptotic and necrotic adipocytes. Histiocytes, giant cells and fibrotic tissue still present at 6-months. The incidence of damage to the lower dermis is higher for 40s compared to 160s exposures.

Conclusion:

We observe histological changes occurring over a 6 month period, showing acute and long term changes. We were able to include or avoid damage to the lower dermis depending on the desired damage profile, showing significant fat reduction zones of hypodermal necrosis. Clearance of damaged adipocytes is slow with residual damage present at 6-months.

FOTO: Dr. Rox Anderson con el Dr. Fabian Perez Rivera en la 39th ASLMS Annual Meeting (2019)