FRACTIONATED DELIVERY OF ER:YAG LASER LIGHT TO IMPROVE EFFICACY AND SAFETY OF ABLATIVE RESURFACING PROCEDURE

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Background and Objective: Skin resurfacing with Er:YAG (2940 nm wavelength) laser is an established procedure for treating rhytides and improving skin texture. However, bulk nature of laser-induced damage limits the depth of treatment and creates risks of skin infection and permanent scarring. We have investigated fractional regime of delivering the light of the Er:YAG laser in vitro in order to maximize treatment depth while increasing the safety margin. Clinical tests have been initiated.

Materials and Methods: A newly developed prototype of fractional Er:YAG 2940 nm system (Palomar Medical Technologies, Inc.) has been used. The system provides stamping mode of treatment with energies up to 5 mJ per microbeam. Fresh porcine skin (Yucatan pig) was used as an in vitro model to assess immediate tissue effects. Quantitative measurements of treated skin surface shrinkage and histology were employed as evaluation techniques. Both single-pulse and multiple stacked pulses regimes were investigated.

Results: Immediate post-treatment shrinkage of the skin surface up to 20% linear has been demonstrated. Histologically, well-defined column-shaped zones of ablation were revealed, with depth increasing proportionally to microbeam energy and/or number of stacked pulses. Minimal coagulation margins around the ablated channels were observed. Results of the in vitro study warranted transition to clinical tests.

Conclusion: Fractional delivery of Er:YAG laser light offers a significantly increased depth of treatment in comparison to bulk mode. At the same time, safety margin should be enlarged due to substantial volume of tissue remaining intact. This combination potentially opens new opportunities for the Er:YAG resurfacing modality.