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Fractional carbon dioxide laser in dermatology

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Introduction: Fractional carbon dioxide laser is the latest generation of the so-called fractional lasers combining fractional technology with deep ablative effect of CO_2 laser. Micro-ablative laser columns penetrate deep into the skin with a maximum depth 2.5 mm. The wavelength of 10.600 nm has a high percent of water absorption. Thus greater epidermal damage is avoided while lateral thermal damage is reduced. Recent studies are analyzing patient satisfaction with a treatment with fractional carbon dioxide laser. CO_2 laser is a powerful tool in the treatment of several skin diseases; wrinkles, scars, dilated pores, striae, syringomas and nevi. Some of its adverse effects are progressively reduced such as thermal trauma and recovery time, the need for efficient anesthesia, the risk of depigmentation and scarring, persistent long-lasting erythema and long-term avoidance of sun exposure. Therefore carbon dioxide laser, according to new findings, is a good opportunity for skin rejuvenation. Although ablative laser skin renewal is safer, cautious approach and selection of the treatment parameters is still necessary to minimize complications and to optimize the result. Many factors including skin type should be analyzed before the treatment. Sufficient follow up period is important for objective assessment of the treatment. In a study published in the *British Journal of Dermatology* in 2014 using profilometric analyses, group of authors from the Department of Dermatovenerology in Regensburg, Germany proved that the fractional CO_2 laser leads to reduction of wrinkle depth, which was different in various facial areas and most outstanding was at the cheeks.

Material & Methodology: We evaluate 207 patients in this study. 107 have been treated with fractional carbon dioxide laser and 100 patients as a control group treated with topical adapalene or freezing with liquid nitrogen or other physical procedures. We had 3 main indications to evaluate acne scars, rejuvenation and benign skin growing. In acne scars and rejuvenation; we used 3-4 sessions of carbon dioxide laser in 2 weeks or one month periods between two sessions. In patients with benign skin growing we used one or two sessions of fractional carbon dioxide laser.

Results: The results of the study show that fractional carbon dioxide laser is efficient and safe in the treatment of rejuvenation and acne scaring ($p<0.005$). The results in treatment of viral benign growth of the skin is not with same efficacy comparing with conventional methods used in control group which are showing significantly better results. Regarding side effects of the treatment fractional carbon dioxide laser is safe method of treatment for dermatological disorders without serious adverse reactions following laser treatment. Redness and swelling after the treatment were well tolerated in group of patients treated with fractional carbon dioxide laser in all indications.

Conclusion: Conclusion from the conducted study is that the fractional carbon dioxide laser is an effective means for skin rejuvenation and acne scars; it shows statistically significant better results in relation to the application of a topical retinoid in the treatment.

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