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Electron microscopy of skin in post-acne keloid cicatrices and their complex treatment with application of laser technologies

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Acne is the most common skin lesions, especially at young ages. It is typical that even after successful treatment, there are quite deep scars on the visible skin surface, at times with formation of keloid proliferates. The ultrastructure of these keloids, and their pathomorphosis in complex treatment with application of laser influences, had not been studied. This has determined the objectives of our study: to assess the ultrastructure of skin in complex treatment of post-acne scars with application of laser therapy.

Local laser irradioation – LLI were performed with “Mustang 017-MCS-PC” with attached to it magnetic nozzle, having magnetic field strength of 50 mlT, the time of exposition to irradiation -5 min, frequency 1000 Hz; and also with defocalized beam of KD-65 (China) – CO_2 laser, which had 5 W output power. All types of laser exposures were performed daily, with 5-10 session in total. Intravascular irradiation of blood-ILIB was administered every other day (10-12 sessions in total) with “Matrix-VLOK”, with attached to it irradiating nozzle, which emits waves with length of 0.63 microns, output power – 1.5-2 mW, and supplied with special Teflon coated needles. All types of laser action were carried out on the background of conventional medicamentous treatment.

Tissue samples were studied by means of light, transmission, scanning electron microscopies, and morphometry.

TEM studies showed thickening of the bundles of collagen fibers, with thickening of fibers themselves. The bundles are noted to be arranged in a rather random manner. Fibroblasts and fibrocytes are notable among the bundles. Pyramidal outgrowths of epidermis, with marked loosening of the surface layers are other features that could be identified (Figure. 1-3). There is also impairment of integrity of desmosomes of spinous layer of epidermis, which determine acantholysis. There are fragments of fungi located between cells of epidermsis and derma. Pathologic forms of erythrocytes (PFE) dominate in the lumen of blood vessels. Prevalence of PFE has also been revealed in peripheral blood. The latter explains the fact of disturbance of main microcirculatory parameters.

Complex treatment of keloids with use of ILIB and LLI leads to significant reduction of existing volumes of cicatrical tissue. This is associated with normalization of the ration of discocytes to PFE in the zone of keloids and in peripheral blood as well. Most beneficial effects are achieved through combination of ILIB, LLI and conventional medicamentous treatment.

LLI contributes to reducing pathologically changed cells and tissues, including forms of erythrocytes in the keloid area. ILIB on the other hand, acting on the peripheral blood and working in similar manner, normalizes normal ratio between various forms of erythrocytes, thus improving microcirculation. Activation of microcirculation potentiates action of medicaments.

Combined application of ILIB, LLI and medicamentous means is an effective complex treatment of post-acne keloids.

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Figure 1. SEM x1000

Figure 2. SEM x200

Figure 3.SEM x100