

## **THE FEATURES OF LASER HAIR REMOVAL**

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The goal of the report is to present the main statements of the implementation laser technologies for solving cosmetic problems.

The knowledge of the structure and features of physiology of the skin, its biophysical characteristics, mechanisms of interaction laser radiation with biological tissues requires for establishment and improvement the laser technology for solving cosmetic problems. Also for such problems as rationale choice of parameters the laser beam and the methodology of the procedure. The removal of unwanted hair is a problem that worries both women and men. In cosmetology it is used two approaches, which are defined as:

- the depilation - removal of the hair shaft, located above the surface of the skin (shaving, chemical depilation, creams, ointments, waxes et al.);
- the epilation - removing hair from the root part, at which the damage of the follicular unit, which creates the final odds for hair growth ceases.

Laser hair removal is a method of removing unwanted hair using laser radiation. Compared with other methods of laser hair removal it is more effective, less painful, and one of the most popular technologies. The effect of laser hair removal is prolonged, that is, hair growth continues to be violated, and their number decreases after completion of epilation.

The mechanism is poorly understood, but it had discussed several options for the development process, such as:

- Thermal effect causes the coagulation of the blood vessels that feed the hair follicle. It leads to gradual atrophy of the follicle and stop hair growth;
- Thermal effect starts the process of programmed death in the cells of the follicular epithelium, which leads to atrophy of the follicle;
- There is a violation of the regulation of the phase of hair growth due to the violation of interactions between growth follicle cells.

Side effects of laser hair removal are possible persistent disorders of pigmentation, peeling, itching, erythema, swelling, blisters, pain factor, and in rare

cases - the scars as a result of severe burns.

To achieve the desired results and reduce the side effects requires an understanding of biophysical processes and informed choice of the radiation parameters, taking into account the individual characteristics of the skin.

More reasonable theoretical basis of the method of laser hair removal is considered to be the effect of selective photothermolysis.

The selective photothermolysis (selective laser coagulation) method of heating the tissue when exposed fotodekstruktsii piece of cloth containing a specific chromophore without thermal damage to the rest of the biological tissue in which the chromophore is absent or present in smaller quantities. The principle of selective photothermolysis has been proposed in 1983 by Anderson and Parrish and consisted of using a special thermal effect of the light energy with the wavelength which has the maximum difference in the absorption of the target and the surrounding tissue.

In the method of laser hair removal is considered to be selective chromophore melanin, and the choice of parameters of the radiation is determined by:

- The depth of hair follicles on the surface of the body;
- The coefficients of absorption and scattering of the laser beam, which determine the depth of its penetration;
- Thermal relaxation time of the epidermis and follicular structures, as necessary rate matching the ebb and flow of heat in the hair and the surrounding soft tissues;
- The rating zones biostimulation and destruction;
- The dependence of the effect of laser radiation on the hair follicle from the stage of the physiological condition of the hair.

With all the features of the structure and biophysical characteristics of fabrics when choosing the parameters of the laser radiation it is necessary to consider the following options:

- the wavelength;
- energy characteristics;
- pulse duration.

The report discusses the conditions for achieving the maximum positive result given laser hair removal skin type (according to table Fitzpatrick skin type definition) and the hair growth cycle.