

**INSTITUTE OF QUANTUM MEDICINE
HUMANITARIAN-INFORMATION TECHNOLOGIES
DESIGN & PRODUCTION COMPANY
(JSC "MILTA-PKP GIT")**

**QUANTUM THERAPY
IN PRACTICAL COSMETOLOGY**

Methodological Guide for Physicians

Moscow 2001

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The present Methodological Guide is intended for cosmetologists who work at a problem of treating the diseases of skin, nails and hairs of the head. There are considered: structure of the hairs and dermatic integument, general principles with respect to care of hairs, causes of some dermatological diseases which leads to alopecia in children, men and women. There are contained recommendations for prevention of diseases and treatment of the hairs with using of medicinal plants and experience of folk medicine. Methods of alopecia prevention and treatment are discussed in detail. Electromagnetic fields of infrared laser apparatus of the RIKTA family are proposed to be used as a leading therapeutic factor. Efficiency of these apparatus has been proved in many cosmetological salons and parlors of some medical institutions.

The Guide will be also helpful for patients who can make treatment by themselves at home provided that a physicist (cosmetologist-laserotherapist) prescribes the treatment method and follows the treatment process.

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“The medicine of tomorrow helps to stay in good health today”

FOREWORD

Dear colleagues,

The Institute of Quantum Medicine and the Humanitarian-Information Technologies Design and Production Company (JSC "MILTA-PKP GIT") hereby offer a methodological guide on the use of RIKTA, a magneto-infrared-laser (MIL) quantum therapy apparatus, in practical cosmetology.

Quantum medicine is known as a promising and highly effective branch of contemporary medicine. It owes its birth to the findings of quantum physics, the millennia-old stock of knowledge gained by Oriental medicine, and the high technologies of the present day. Quantum medicine is based on interactions between living organism and electromagnetic waves. When certain types of electromagnetic fields are externally focused on a living organism, that is a case of quantum therapy, prevention, and rehabilitation. When we analyze and measure internal electromagnetic radiation generated by a living organism, we deal with quantum diagnostics. Quantum medicine, therefore, encompasses all elements of human health care: prevention, diagnostics, therapy, and rehabilitation. Firstly, the term “quantum medicine” underscores the priority of quantum physics in the postulated quantum nature of living matter and in the attendant query to ensure the sustainable health of a living organism. And secondly it suggests extremely low and absolutely safe energy impact levels of electromagnetic radiation on the human body. Indeed, the quantum is the smallest elementary quantity of electromagnetic radiation. Quantum therapy deals with very low energy levels typical for information exchange processes. Many effects produced by quantum therapy can be explained by an information, rather than energy-related, positive impact on intracellular processes and intercellular interactions.

In the process of its evolution, the human race has continuously been submerged in a natural system of electromagnetic fields and is part of it. Life is impossible without the impact of the Earth’s natural electromagnetic fields, to which all living creatures have become adjusted in the course of their evolution. There are electromagnetic fluctuations everywhere both in the external environment, and inside a living organism. Naturalists, physicists, biologists and physicians now take the view that electromagnetic radiation plays a paramount role in living processes. The reason why scientific thought had difficulty realizing this earlier is that the human being cannot feel electromagnetic influences directly. In addition, electromagnetic impact levels both inside and between living systems are so small that they cannot always be measured with sufficient accuracy instrumentally. Still, many phenomena occurring in living nature defy any other explanation than electromagnetic impact both at the micro level (atoms, molecules, and cells), and at the macro level (organs, systems, whole organisms, and communities of organisms). Electromagnetic fields are present in any chemical and physical process. Even when we take prescribed medication, we experience the effects of electromagnetic radiation. Under the impact of ferments, the drug is subjected to biochemical reactions, which provoke transfers of electric charges – electrons, and changes in the energy states of atoms and molecules. These biochemical transformations invariably produce some kind of electromagnetic radiation or other.

It is now obvious that living cells interact with one another, exchanging energy and, what is extremely important, trading information with the help of fluctuations in the infrared, microwave, acoustic, and other bands. What is particularly interesting is that a major role in

intercellular interaction is played by optic coherent, monochromatic and polarized radiation, which is close in its parameters to the infrared laser radiation used in the RIKTA technologies.

Following many years of research, scientists and doctors have been able to select a combination of electromagnetic fields that exercise a most favorable influence on living processes. These produce synergies, i.e. mutually reinforcing effects in which the combined action of several types of radiation generates much greater effects than the sum of separate actions by each of the curative factors. The key physical factors of the RIKTA multi-factor quantum therapy technology are narrow-band infrared laser radiation, broadband infrared and broadband red radiation in the optical band; and a static magnetic field.

Sometimes, quantum therapy is equated with physiotherapy. This is not so because unlike conventional physiotherapy, quantum therapy affects deep-rooted processes of life occurring both at the level of atoms, molecules and cells, and at the organ and system level of the organism as a whole. Quantum therapy has proven able to help restore damage or malfunctioning in cellular membranes and thereby re-establish the severed information and energy links between cells, organs, and systems.

Here are the key effects that quantum therapy may arouse in an organism:

- at the level of cells: heightened energy exchanges in cells and tissues, intensified synthesis of protein – RNA and DNA, reduced excitability of receptors in cell membranes, improved indol and serototin exchanges in cerebral cells, normalized neurotransmitter levels, and calcium-blocking effect;
- at the level of organs: increased speed of blood flow, rheological and microcirculatory effects, regulation of adenohipophysis, normalized thyroidal functioning, stimulation of the genital glands, and coronoactive, antispasmodic and metabolizing effects; and,
- at the level of the system and organism as a whole: stimulation of specific and non-specific immunity, improved blood circulation, anesthetization, reduced excitability of vegetative centers, improved conduction of nerve fibers, reduced glucocorticoid activity of the adrenal glands, reduced peroxidate oxidation of lipids, regulation of feedback, enhanced neurohumoral factors, increased production of ferments and ATF, reduced cholesterol levels, increased synthesis of collagen, improved trophic supply to tissues, increase regeneration of the epithelium and skin, prevention and treatment of cellulitis, normalization and increased synthesis of prostoglandines, and anti-inflammatory, anti-hypostatic, resorbent, sanogene, adaptive, stress limiting, hypolipidemic, and anti-oxidant effects.

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1. BASIC PRINCIPLES OF QUANTUM THERAPY USING APPARATUS OF RIKTA FAMILY

Quantum therapy that is based on using apparatus of the RIKTA family provides multi-factor simultaneous impact of pulsed infrared laser radiation, pulsed broadband infrared radiation, pulsed red light and static magnetic field on a patient.

The main curative factor of quantum therapy is the pulsed infrared radiation of GaAs laser. Monochrome (narrow band), coherent (in space and time) and polarized laser radiation strongly stimulates blood circulation, membranous and cellular metabolism, activates neurohumoral factors and immunocompetent systems, harmonizes hormonal factors of metabolism.

Clinical effects of the infrared laser radiation are as follows:

- protein synthesis activation,
- enzyme activation,
- increased production of adenosine triphosphate (ATP),
- improved blood microcirculation, composition and functions,
- tissue regeneration,
- increased collagen synthesis,
- antiinflammatory effect,
- antiedematic effect,
- analgetic effect,
- reduced cholesterol contents,
- stimulation of specific and nonspecific immunity factors,
- strong antioxidant effect,
- normalization of prostoglandine synthesis,
- reduced level of lipoid peroxide oxidation.

Biologic activity of pulsed broadband infrared radiation of semiconductor LEDs is less as compared with laser radiation because it is of wider spectrum, incoherent and nonpolarized. It penetrates more depth and harmonizes tonus of central and vegetative nervous systems.

Clinical effects of the broadband infrared radiation are as follows:

- slight warming of tissue structures,
- impact on receptors in skin and increase of a threshold of painful sensation,
- activated microcirculation,
- prevention and treatment of cellulite,
- increased regeneration of epithelium and skin,
- increased penetration of laser radiation into tissues.

Pulsed broadband red radiation of semiconductor LEDs penetrates small depth. Nevertheless it provides favorable effect because of decreasing intensity of inflammatory process in skin and subcutaneous fat, especially in zones of the organism with big quantity of loose connective tissue.

Besides, red light visualizes the treatment zone and provides local heating and useful psychotherapeutic effect.

Clinical effects are as follows:

- local anesthesia;
- improved microcirculation;
- antiedematic effect;
- pronounced therapeutic effect in a region of joints with big quality of loose connective tissue;
- prevention and treatment of cellulite.

Static magnetic field strictly orients axes of molecular magnetic dipoles increasing internal energy of molecules. It also allows to keep the ionized molecules in dissociated state. This increases efficiency of another curative factors of quantum therapy at molecular and cellular levels.

Clinical effects are as follows:

- anesthesia,
- increased cellular membranous potential,
- improved tissue trophicity,
- increased antiedematic effect.

All the aforesaid curative factors intensify each other when acting simultaneously, provide unique therapeutic, energy-harmonizing and preventive effects of applying RIKTA apparatus.

Photon energy provided by laser radiation of RIKTA apparatus is less than 1,5 eV. It is very small to initiate ionization (dissociation) of organic molecules, disturb natural processes and break biopolymer bonds. This avoids risk of complications and side effects, and provides high laser safety of the RIKTA apparatus.

Tissue penetration depth is determined by the apparatus parameters, in particular wavelength of pulsed laser (0,89 μm). In the long-wavelength infrared spectrum biologic tissues are the most optically transparent.

Absorbed energy quantity (dose) depends on availability and quantity of photoacceptors, i.e. the structures capable to absorb light of the given wavelength.

Power flux density (W/cm^2) and energy flux density (J/cm^2) which are delivered into biotissues, shall be set by choice of laser pulse repetition frequency (5, 50, 1000 Hz, or variable frequency).

Universally recognized that low frequencies are used for repair and regeneration of tissues, decrease of cholesterol and promotion of immunity, and also provide antiinflammatory effect, while high frequencies provide analgetic, antiedematic and spasmolytic effects.

1000 Hz frequency is preferably used for laser puncture with the help of light guides.

Variable frequency is used to provide prompt analgetic effect and maximum excitation of elements responsible for immunity.

2. BASIC PHYSICS OF QUANTUM THERAPY

Physical-biological interaction mechanisms of biological tissues and low-dose quantum radiation can't be considered good enough studied in spite of numerous scientific-practical researches.

Basic effect of infrared radiation is weak heating at big penetration depth. Therapeutic effect is connected with activation of microcirculation process in biotessue, activation of molecules, and potentiation of physical and biochemical processes.

Pulsed broadband red radiation in a visible spectrum has a little more quantum energy as compared with infrared radiation (less than 2 eV). This energy is insufficient to provoke destructive processes in tissues, but is capable to activate different processes in biologically active zones. These are the zones with big quantity of loose connective tissue, e.g. zones in a region of major joints, paravertebral sections of Zakharyin–Ged zones and some others. Besides, dermal blood-vascular and lymphatic networks are immunocompetent structures.

According to aforesaid, static magnetic field has a potentiating influence upon all the components of multi-factor quantum therapy. It is known that processes of electrolytic dissociation of molecules constantly proceeds in the organism in parallel with processes of molecules' recombination (recovery). Energy that is released as a result of dissociation, is used practically in whole for recovery of molecules. And all the systems aim at thermal balance. Photoelectric effect, when induced emf reaches values promoting dissociation, is intensified by a static magnetic field that allows to keep molecules in a dissociated state for a certain period. This leads to generation of energy which, on the one hand, performs non-radiating transitions in the intercellular space and, on the other hand, promotes formation of a temperature gradient in structures of biological object. Besides, permeability of biopolymers is increased under the influence of magnetic field, and this increases penetration of infrared radiation into tissues and intensifies turbulence processes in circulating liquids.

Owing to inter-repulsion of like charges, ionized liquid tightly snuggles up to the walls of a channel that leads to intensification of metabolic processes. Thus, a physical basis of biostimulation effect in the living organism at the cellular, tissue, organ levels, and also at the level of organism in whole, is an influence of the aforesaid radiation upon atoms and molecules. Electron-excited states of atoms and molecules appear as a result of absorption of light quantum; these states are accompanied by migration of electronic excitation, which leads to initial photochemical effect and triggering secondary photochemical reactions.

To clearly understand processes at atomic-molecular level that initiate subsequent series of biologic transformations, it is expediently to consider, first of all, technical characteristics of the RIKTA family apparatus, and to explain principle of their operation from point of view of quantum therapy.

Wavelength of infrared radiation of GaAs laser is 890 nm. According to data of several domestic and foreign authors [A.V. Cherkassov (1986), V.I. Matveyev (1988), A.R. Evstigneyev (1987), V.S. Siniakov (1983), Joon et al. (1987), Muller (1900), T. Ohshiro (1988), and some others] tissue penetration depth of low-dose laser radiation mainly depends on wavelength. The diagram below (Fig. 2.1) illustrates the light penetration into tissue vs radiation wavelength [T. Ohshira (1988)].

1 – Relative penetration

2 – Wavelength, μm

Fig. 2.1. Relative penetration into biotissue depending on light wavelength

It is seen from the diagram that the most biologic transparence of biotissue is for radiation in the long-wavelength infrared spectrum. So, this is the laser radiation wavelength that mainly determines energy penetration into biotissue.

At the same time energy of photons in infrared spectrum varies in the range from 1 to 1,5 eV. Biopolymer's inter-atom binding energy is in the range from 2,06 to 12,6 eV. For instance, minimum binding energy (C=N) is 2,06 eV, and values of binding energy C=C are more. So, the energy of photons of infrared radiation is not enough to destroy strong intermolecular bonds in biopolymers. From the other hand, this energy is enough to stimulate oscillation process in molecules of biologic matter and to activate electronic excitation of atoms. Within these processes the light energy is practically completely expended for photo-physical reactions, i.e. converts to thermal energy. This causes thermal expansion of cytoplasm and membranous canals, canalization of biologic process, change of viscoelastic properties of plasmolemma and intracellular membranes. Thermal gradient which generated by radiation of the RIKTA apparatus is small enough (less than 1°C) and much lesser the values capable to initiate nonreversible changes of cellular structures (Fig. 2-2).

- 1 – Zone of RIKTA operation
- 2 – Thermal activation
- 3 – Protein denaturation
- 4 – Coagulation
- 5 – Evaporation
- 6 – Carbonization
- 7 – Reaction

Fig. 2.2. Approximate thermal limits of biologic reactions (according to T. Ohshiro)

The wave band of broadband pulsed infrared radiation of the RIKTA apparatus is 800-900 nm. Quantum energy here is higher than is peculiar to infrared radiation and run up to 1,6 eV. However incoherent, nonpolarized, broadband nature of the radiation also predestines safe influence upon biotissues. This radiation,

Broadband pulsed red radiation of 600-700 nm wavelength has maximum photon energy of about 2 eV. This energy is close to binding energy of carbon and nitrogen atoms (C=N). When tissues absorbs light of this spectrum, there is possible a dissociation of separate molecules of the surface layer but destructive effects are not available. Besides, pulsed red light visualizes operation of the apparatus emitter that is a strong psychotherapeutic factor for a patient. It should be noted that a generally tonic effect of a visible red light had been recorded long ago as a scientific fact (Fig. 2.3).

Electromagnetic spectrum

- 1 – Ultraviolet
- 2 – Visible range
- 3 – Long-wavelength infrared
- 4 – Wavelength, nm
- 5 – Photon energy, eV
- 6 – Ionization energy
- 7 – Energy of molecules' dissociation
- 8 – Energy of electron excitation
- 9 – Energy of oscillation processes
- 10 – Binding energy, eV

Fig. 2.3. Energy of photons and tissues' binding chemical energy (according to V.I. Kozlov, V.A. Builin et al., 1993)

Static magnetic field induction of the RIKTA apparatus is 35 ± 10 mTl. This is enough to reorient molecules-dipoles in flow media and in some of ionized media. There has been theoretically based and practically proved that biostimulation effect is intensified under combined action of components of quantum therapy when using the aforesaid physical characteristics of RIKTA radiation.

Pulsed power of laser radiation of RIKTA-01 (M1) is no less than 4 W, and RIKTA-02 (M2) – no less than 8 W. In case of continuous wave this power should provide a high energetic influence. But RIKTA apparatus operates in a pulse mode, and pulse length is $(90 \dots 130) 10^{-9}$ s = (90...130 ns). During this time, which is commensurable with a molecule time lag, molecules accumulate energy enough to excite and trigger physical-chemical reactions. When the pulse expires, reactions' activity at the atomic- molecular level is slowly decreased. As is well known, in case of external influence the entire biosystems trend to recover their disturbed balance. If any abnormalities, provoked by some pathologic process, exist in biotissue, then a recovery of such pathologic balance is harmful, and bioactivation should be kept. So, to fix activation, realize positive biological changes and loose harmful adaptation mechanisms as applied to various types of topology, the RIKTA apparatus is capable to generate different pulse-repetition frequencies, namely: 5 Hz, 50 Hz, 1000 Hz or variable frequency in the range of 1...250 Hz. Quantity of energy applied at the selected frequency into biotissues during a treatment procedure is enough for supporting atomic-molecular transformations, arising intensifying resonance effect and triggering mechanisms of prompt adaptation at the predictable level.

All optic laws are valid for infrared and red spectrum (Fig. 2.4).

As applied to quantum therapy, there are 5 kinds of interaction between radiation and biotissue

1. Reflection
2. Refraction
3. Passing through
4. Absorption
5. Dispersion

Reflection. Reflectance from skin (i.e. incident-to-reflected power ratio) is in the range of 10...15% and depends on radiation spectrum, and also on degree of skin pigmentation and wrinkling, availability of fat and moisture which, in its turn, depends on sex, age and skin colour (race). In infrared spectrum the skin could reflect up to 40% radiation. There are some fluctuations depending on sex and age of a patient, pigmentation of his (her) skin, etc. It is possible to reduce reflection and thereby increase efficiency of a treatment by means of cleansing of the treatment zone, which should be cleaned by spirit or ether to eliminate fat and sweat, or wiped off by iodine or brilliant green solution. Another method is a direct contact of the RIKTA emitter with the skin. The emitter has to be slightly pressed to the skin to provide local blood outflow and thereby to increase a tissue transparency.

- 1 – Emitter
- 2 – reflection

3 – reflection and dispersion

5 – absorption

6 – BIOTISSUE

7 – passing through

Fig. 2.4. Passing infrared radiation through biotissue

Refraction and passing through. Negligible part of incident power (less than 1%) are loosed due to refraction from biotissue and passing through biotissue, thereby it does not participate in biostimulation. These losses can be neglected because they are very small.

Absorption. Energy absorption is determined by interaction between photons that are contained in emitted from apparatus monochromatic, coherent, polarized laser radiation, and electrons of biomolecules. When photon falls into electron, photon's energy is absorbed by electron that increases its energy by means of transition to higher orbit. Then electron returns to the origin orbit through intermediate orbits. During this process it emits photons with different values of energy (different wavelengths) which equal differences of electron's energy at intermediate orbits. Absorption of origin laser radiation in tissue is high enough, and loss of power flux density is several tens times (up to 100) per each 1 cm penetration, even in the most transparent infrared spectrum. At the depth of only 3 cm the loss reaches 10^6 times! Intensity of energy absorption essentially depends also on a structure of biotissue. Investigations of domestic and foreign scientific proved that the skin absorbs 25-30%, muscles and bones – 30-80%, parenchymatous organs – up to 100% infrared radiation in the wavelength band of 800-1200 nm.

Dispersion. Photons, radiated by electrons of excited biomolecules, generate secondary radiation flow which propagates (disperses) in all directions and excites other molecules of biotissue, and so on. Because of variety of molecules in organism, the secondary radiation is broadband, incoherent and nonpolarized. Losses of secondary radiation are significantly smaller as compare with laser radiation and equal less than tenfold per each 1 cm depth of biotissue (100...1000 times at 3 cm depth). That is why the secondary radiation provides more tissue penetration depth. Another factors increasing a depth of effective influence are transfer of excited molecules by blood and lymph over a whole organism, and also deep penetration of excitation through the canals connecting biologically active points and skin zones with appropriate internal organs. It could be supposed that at the depths exceeding 3 cm the main biologic effect is provided not by the primary radiation (in particular, laser radiation), but namely by the secondary dissipated, broadband, incoherent, nonpolarized radiation similar to broadband infrared and red radiation of the RIKTA apparatus.

Usual power and energy flux density at the certain penetration depth depends on a distance from the apparatus emitter to biotissue surface and on a depth of tissue location. Energy in the air (power flux density of divergent optical beam) decreases proportionally to square of distance from the emitter to surface of biotissue (skin, mucous membrane). Power flux density within biotissue decreases abruptly (see above) and essentially depends on the kind of biotissue. In case when biotissue is treated through dressing, each bandage layer additionally decreases a power flux density in 1,5-2 times.

The most important documents for medical laser operation are the "Sanitary norms, and rules of laser design and operation "№ 3804-91, and also GOST P50723-94 "Laser safety" which contain terms, definitions, symbols and equations for counting some values of laser influence upon biotissues.

The following values and equations are of great importance for users:

P_{imp} – pulsed radiation power, W

E – irradiation degree, or power flux density, W/cm^2 . This is a ratio of radiated power to the area of irradiated surface perpendicular to radiation direction.

H - energetic exposition, or energy flux density, J/cm^2 . This is a product of irradiation degree and duration of a therapy procedure. E and H values are directly proportional to pulse-repetition frequency, f , provided by the apparatus

For the RIKTA apparatus:

$$E = \frac{P_{imp} \times \tau_{sec} \times f_{Hz}}{S_{sq.cm}} \text{ mW/cm}^2 \text{ (or } \mu\text{W/cm}^2\text{),}$$

where P_{imp} – pulse power of laser radiation, W;

τ - pulse length, sec

f - pulse-repetition frequency, Hz

S – irradiation area, cm^2 (equals aperture of the RIKTA emitter (4 cm^2) in case of contact treatment method)

Energetic exposition

$$H = E \times t_{sec} \text{ (J/cm}^2\text{),}$$

where t – duration of a treatment procedure at the given frequency.

Dose Q – total energy per a treatment procedure, J (equals a product of average power and a procedure duration)

$$Q = P_{imp} \times \tau \times f \times t \text{ (J)}$$

Calculated values of energetic exposition of laser radiation for basic model (M-1) of the RIKTA-01 apparatus are given below in a Table 1.

Table 1

Calculated values of power flux density (E) and energy flux density (H) of the RIKTA-01(M-1) apparatus with 4 W pulse power

Frequency, Hz	$E, \mu\text{W/cm}^2$	$H, \text{mJ/cm}^2$ for t=1 min	$H, \text{mJ/cm}^2$ for t=2 min	$H, \text{mJ/cm}^2$ for t=5 min	$H, \text{mJ/cm}^2$ for t=10 min
5	0,5	0,03	0,06	0,15	0,3
50	5	0,3	0,6	1,5	3
1000	100	6	12	30	60
1...250	12	0,7	1,5	3,6	7

Notes:

Values in Table 1 don't consider reflection losses of energy and are valid for a contact treatment method.

Only pulse infrared laser radiation is taken into account in Table 1. Another types of the treatment impacts are less biologically effective and are not considered here. Their use leads to increasing bioeffect and promotes radiation to deeper penetrate biotissue. But it is not correct to calculate H as a sum of energy of all kinds of radiation. The RIKTA apparatus

allows, if necessary, to adjust average power of laser radiation in a range from zero to maximum value. When using a distant radiation, decrease of power flux density inversely proportional to squared distance from the apparatus emitter to skin surface should be taken into account.

Change of H value (energetic exposition of laser radiation) in a wide range from 0,01 J/cm² to 1 J/cm² doesn't affect the optical properties of biotissue, i.e. penetration doesn't depend on power or energy flux density. To have a biophysics estimation of reactions in biotissue and in a whole organism, and also to have a quality estimation of influence of laser radiation stimulating power (dosage) on the kind of bioeffects appeared, the law of Arndt-Shultz is useful.

According to this law, weak stimulators provide strong reaction in biologic systems, moderate stimulators - moderate reactions, moderately strong stimulators slightly impede a system and very strong stimulators block a system. The Arndt-Shultz law graphic representation by Dr. T. Okhshiro is shown in a Fig. 2.5.

- 1 – Stimulation intensity
- 2 – Norm
- 3 – Deceleration
- 4 – Stimulating power

Fig. 4.5. Schematic interpretation of the Arndt-Shultz law: interaction of laser beam and tissue

The graphic illustrates the states of small volume of biotissue's cells (1), organ in part or in whole (2), and organism in whole (3) appearing under impact of laser radiation and containing several phases. At the left part of the graphic there is a zone of insensibility (radiation levels are much less as compared with a level of background noise), where primary reaction of biological object can not be detected neither by subjective nor by objective methods. Then, when increasing a dose (H), the tissues' temperature begins to rise. A zone up to 40°C is considered as a zone of biostimulation. If a tissue's temperature exceed 40°C, there will begin denaturation of protein and change of lipid. These processes could be at first reversible and play positive role in development of final adaptive processes. Nonreversible degeneration is observed at the temperature of over 40°C, and coagulation of protein – at the temperature of over 63°C. These phenomena could be observed in case of a high-energy impact, which is used in particular branches of medical practice (oncology and others) and has not any connections with the RIKTA apparatus. In quantum therapy practice there are only used the curve section to the right of a zone of insensibility, which corresponds to the state of biostimulation, and initial section of a zone of reversible stimulating biodepression, where nonreversible transformations are impossible.

According to T. Okhshiro, these are the technical parameters that determine reaction of a "laser-biotissue" system. The Arndt-Shultz curves are different for different type of lasers. But it is not possible to define specific curve for each type of laser, that is why the graphic (Fig. 2.5) provides qualitative but not quantitative representation.

To determine duration of quantum therapy procedure it is necessary to take into account "therapeutic corridor". This is a range of values where smaller level of therapeutic impact could provide weakly pronounced biostimulating effect or very low rise of the effect. At the same time the stronger level is not desirable because it leads to nonreversible depression.

The Arndt-Shultz curve will be of some different form for the RIKTA apparatus. A zone of insensibility will be kept, but initial prompt reaction for infrared radiation of small dose (less than $0,02 \text{ J/cm}^2$) could be at first quite imperceptible, nevertheless prompt adaptation is often observed even at H values from $0,03$ to $0,1 \text{ J/cm}^2$ per procedure. Most investigators define a stimulating range from $0,2 \text{ J/cm}^2$ per procedure (V.I. Kozlov, V.A. Builin et al.) to 9 J/cm^2 (V.I. Eliseyenko). It should be emphasized that wide "therapeutic corridor" is peculiar for quantum therapy; "therapeutic corridor" for mono-laser radiation is more narrow.

According to aforesaid, photon energy in infrared spectrum is small to realize hypertemperature, denaturing, destructive, degenerative processes. But upper values of "therapeutic corridor" are just also actual for quantum therapy because processes of prompt stimulation are not infinite and they are limited by compensating abilities of the organism. There are no doubts that to provide prompt and long-term adapting transformation, it is more rational to use a course of cyclic-regular low-energy treatment procedures rather than to increase the procedure duration or heighten radiation power flux density.

Let us consider one more effect typical for quantum therapy – effect of intensification of biologic influence of pulse laser radiation upon organism as compared with continuous-wave radiation at the same wavelength and average power.

Many periodicals and monographs that are devoted to laser therapy contain values of energetic exposition ("therapeutic corridor") of laser radiation, H (J/cm^2), for continuous-wave lasers. Numerous investigations made by several scientists convincingly proved that pulsed lasers provide biological effect at the level of average power significantly less as compared with continuous-wave lasers because of higher biological efficiency. There is assumptions that this is because of modulation frequencies coincide with biorhythms of processes in the body's organs and tissues. M.T. Alexandrov et al. (1987) used as example a treatment of pathology of maxillofacial area to show that pulse infrared laser radiation provides the same therapeutic effect as continuous-wave radiation but at the power level of approximately 10 times less (efficiency factor $K_{\text{eff}} = 10$). Similar effect is observed by other authors representing in their papers the values of intensification of therapeutic effect when using pulse radiation. These values are in a range of sevenfold-tenfold. V.I. Korepanov (1995) has proposed a value of $K_{\text{eff}} = 8$ for the RIKTA apparatus. Therefore to provide the same effect with the help of the RIKTA apparatus, the doses, recommended in a literature for continuous-wave lasers, should be reduced approximately by 8 times. Or energetic exposition (dose H, J/cm^2) per one procedure, calculated for the RIKTA apparatus by Table 1, should be multiplied by 8 to compare this empirical value with recommended values of the "therapeutic corridor", if it is set for continuous-wave radiation.

Here we have finished consideration of physical characteristics of the RIKTA apparatus and some physical principles, which are necessary for users to understand processes going on at atomic-molecular level and determining subsequent cellular, tissue and other transformations provided by the RIKTA apparatus. Additional information on this theme you can see in the literature listed in a section "References".

3. BIOLOGICAL FUNDAMENTALS OF QUANTUM THERAPY

These are photo-physical and photo-chemical reactions that are in a basis of photo-biological process within the tissues of the organism. Photo-physical reactions are primary caused by heating of tissues and non-radiating propagation of heat in the tissues. Photo-chemical

reactions are connected with electrons' transferring between different orbits of atoms of the light-absorbing matter.

Penetration depth of laser radiation into biotissues of a human body depends on wavelength. In the band according to long-wavelength infrared radiation, i.e. 0,74-3,0 μm (740-3000 nm), biologic tissues are considered relatively optical transparent. Maximum transparency is in the range of 0,8-1,2 μm (A.R. Evstigneyev, 1987). Phenomenon of optical transparency of biotissues in infrared spectrum has been repeatedly confirmed in the papers of domestic and some foreign authors (see Fig. 3.1).

λ μm

epiderma
external layer
Malpighian layer
derma
hypodermic layer

Fig. 3.1. Penetration depth of laser radiation through dermatic integument of a human body (Slinely D., Wolbrast M., 1980); from the manual "Laser in clinical medicine", edited by Prof. S.D. Pletnev. Medicine. Moscow, 1996.

Penetration depth of radiation also depends on its absorption by different tissues. In particular, skin, subcutaneous fat and muscles absorb 20-30%, bones - about 50%, and parenohymatons organs – up to 100% energy.

For a comparison, laser radiation of devices operating in a visible light spectrum (e.g. wavelength is 0,63 μm) penetrates biotissue no more than 15 mm deep, and just at the first millimeters losses coherence and polarization (V.S. Siniakov, 1983).

There are two categories of photo (light)-dependant structures in a human body:

- the first structure – photoreceptors, i.e. specific light-sensible biotissue represented by retinue of eye;
- the second structure – a big group of photoacceptors.

Owing to their properties, photoacceptors are capable, in one or another degree, to absorb light quantum of specific wavelength. Among these photoacceptors there are the following: hemoglobin, cyclic nucleotides, iron- and copper-containing enzymes of cytochrome system, almost all enzymes of Krebs' cycle, some pigments and other structures.

As applied to the RIKTA apparatus, the main absorbing component of a human body is blood. Concentration of energy, absorbed by blood, several times exceeds all other values (V.G. Dobkin, 1989).

Another photoacceptor of infrared laser radiation is water. Water in a human body is in a state of permanent microphase gel-ash transitions. Bound water (water that is mainly bound with molecules of protein) is of only about 5%, and each aminogroup binds 2,6 molecules of water (V.I. Kozlov at al., 1993). Under the influence of laser radiation there shall be changed pH, electroconductivity of water, and oxygen dissolubility in water (K. Kamikava, 1988).

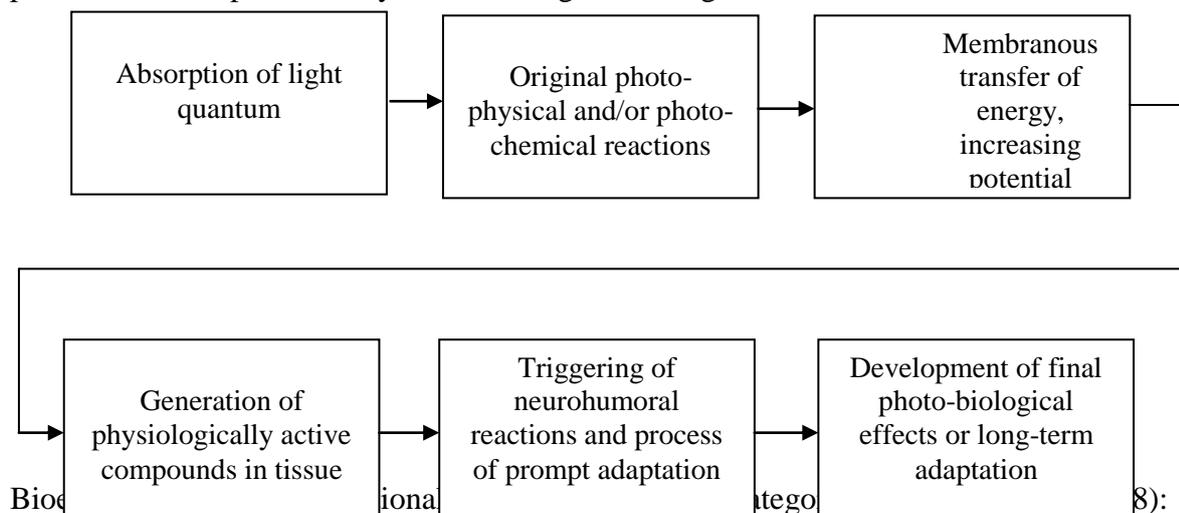
One more aspect of bioeffect of infrared lasers is influence upon oxygen. As a result of photon absorption, molecular oxygen transforms into single oxygen (O_2) which has a very short period of life. In spite of short period of life it is very biochemical active, especially related to membranous plasmatic complexes.

One of basic biologic effects of laser radiation is an influence upon K^+ - Na^+ co-transport inside and outside the cell (A.I. Moroz, 1989). This promotes fast reduction of cellular and tissue edema.

Energy of photons in infrared spectrum is in a range from less than 1 eV to 1,5 eV. This value is enough to stimulate electronic excitation of atoms and to activate oscillation process in molecules. Light energy is nearly completely transforms to heat energy; this leads to thermal extension of protoplasm and change of properties of cellular and intracellular membranes. It should be reminded that photons of infrared spectrum can not destroy strong bonds of biopolymers. This explains a lack of negative influence of quantum therapy on a human body in case of using wide "therapeutic corridor".

There are evidences that a peculiarity of infrared radiation is a lack of resonance absorption of the photons by biotissues. The resonance absorption appears when energy of photon equals a difference between the energy of normal state of atom and the energy of the lowest level of excitation. Energy of quantum at the wavelength of 0,89 μm (RIKTA) doesn't reach this difference. Nevertheless, perhaps just owing to a lack of resonance absorption, infrared radiation penetrates deeper biotissues and stimulates photo-physical reactions at membranes. Appearance of a temperature gradient leads to thermodiffusion outflow of K^+ and Na^+ from membranous, opening of membranous canals, going ions out of the cells with a purpose of recovering thermochemical ion balance, leaving a cell by non-bound water and increasing potential energy of a cell (M.A. Kaplan, 1989).

All this is valid both for structure organic cell and immonocompetent cells of the blood and tissue structures, histiocytes, fibroblasts, leukocytes, lymphocytes, etc. Activity of specific cellular structures leads to growth of immunoglobulin level, increasing activity of enzymes, mediators of nervous synapses, estragens, 17-oxyketosteroids, prostoglandines, β -endorphynes, accumulation of ATP, and other biochemical transformations. This multi-stage process can be represented by the following block diagram:



I. Initial effects which are usually not subjectively experienced in infrared spectrum. Objective sensing is possible by means of special biophysical and biochemical methods.

-
- II. Secondary effects – development of prompt adaptation and compensating reactions which appear as a result of realization of the initial effects.
 - III. Effects of "post-action" – development of long-term adaptation, normalization of pathologic processes, fixing of compensating reactions.

Components of this process appear depending rather on existing situation in a human body that is connected with a progress of specific pathology, than on the photo-impact. As a result, there will be triggered a sequence of transformations, and adaptation reaction shall be realized by the organism. That is why there is a few of initial acts and there are various secondary appearances and final results that often surpasses the very bold forecasts and expectations (V.I. Kozlov at al., 1993).

The aforesaid could be well illustrated by block diagram from the book "Fundamentals of Laser Physio- and Reflexotherapy" (V.I. Kozlov, V.A. Buyilin at al., 1993) (see Fig. 5.2).

Fig. 3.2. Photo-activated processes in organism

PG – prostoglandines; SOD – superoxydysmutase; POL – peroxide oxidation of lipids; IM – immune

1 – Activation of microcirculation; 2 – Change of PG level; 3 – Smoothing osmotic pressure; 4 – Reducing tissue edema; 5 – Reactivation of SOD and catalase; 6 – Reducing POL; 7 – Analgetic effect; 8 – Activation of neurone metabolism; 9 – Increase of endorphyne level; 10 – Increasing threshold of pain sensitivity; 11 – Stimulation of reparative processes; 12 – light quantum; 13 – accumulation of ATP; 14 – Activation of cell metabolism; 15 – Increasing polypheration of fibroblasts and other cells; 16 – Acceleration of defect's epithelization; 17 – Synthesis of protein and collagen; 18 – Capillary neoplasm; 19 – Stimulaltion of immune response; 20 – Increasing prolipheration of IM-cells; 21 – Acceleration of IM-cells' ripening; 22 – Increasing production of IM-globulin; 23 – Reflexogenic effect; 24 – Stimulation of teleneurons; 25 – Excitation of nerve centers; 26 – Stimulation of physiological functions

Bioistimulation, or exactly to say, its intermediate and final results that consists in development of the processes of prompt and long-term adaptation, depend rather on compensating abilities of the photo-effect than on the photo-effect itself. It is obviously that absorption of light quantum by elements of biotissue leads to triggering of a diversity of biochemical reactions and biological responses. These processes depend both on physical characteristics of a specific apparatus, i.e. on quantity and quality of energy penetrating the tissues, and, first of all, on conditions of compensating mechanisms and all adapting systems that exist in each specific situation.

Quantum therapy is characterized by very low levels of energy. It is statistically reliable that the described methods with aforesaid exposure time and frequencies don't cause exacerbation in patients. But nevertheless some patients could be extremely sensitive, so reactions that are appeared in a process of quantum therapy must be attentively observed. Antioxidants are required to be prescribed to prevent an acute condition of the concurrent chronic pathology.

Last experiments showed that medical effect of quantum therapy noticeably grows in case of providing time intervals during a treatment procedure: a pause of 2-3 sec per each minute is recommended if one specific zone should be irradiated during several minutes. (S.D. Pletnev, A.K. Polonsky, 1996).

4. ANATOMY AND PHYSIOLOGY OF DERMATIC INTEGUMENT

Dermatic integument of adult human being with a surface area of 1,5-2 sq. m is not only an external covering but also an organ with complicated structure and numerous essential functions. About 25% volume of the circulating blood is deposited in this organ.

Considering the skin is a surface-located organ, it is mostly subjected to external aggressive impacts. From the other hand, dermatic integument is closely connected with internal organs, and this explains different structural changes of specific parts of the skin in case of sickness of one or another internal organ. This phenomenon is in a base of diagnosis and therapy using zones of Zakharyin – Ged.

As only pathologic processes in dermatic integument are touched in this methodical guide, it is expediently to briefly consider the structure and main functions of the human being's skin.

4.1 Structure and composition of the skin

The skin is complicated medium with extreme heterogeneity of its physical characteristics. There are three basic structural layers: epiderma, derma and hypodermic fat (hypoderm).

Epidermis. This layer is of 150-200 μm deep and is separated from derma by a well-defined boundary layer. Epidermis's cells in a zone of the boundary layer are permanently divided and slowly move towards external surface of epidermis when losing nucleus and being subjected to hornification. Horny cells are hulled from the skin surface. Cellular composition of the skin is completely renewed in 3-4 weeks. In a process of moving from the boundary zone to the surface, epidermis's cells passes through five (5) stages. Accordingly, five structural layers are distinguished in epidermis: external horny layer, and then deeper to skin: clear layer, granular layer, spinous layer and basal-cell layer. Surface of the horny layer is covered with aqueous-fatty emulsion film, which has low heat-conductivity and reduces superficial absorbing ability of epidermis. The film contains triglycerides (50%), waxy spirits (24%), fatty acids (18%), cholesterol (8-9%).

Horny layer of epidermis is of 13-15 μm thick and consists of keratin scales of 100-1000 nm wide and 70-100 nm thick. Keratin is protein that contains 18 amino-acids and has high mechanical strength owing to disulfide bonds which could be only destroyed by strong acid or alkali. Keratin constitutes 50-80% of total mass. Water content is 2%.

Clear layer of epidermis consists of one-three rows of scales that are similar to scales of the horny layer but have a less density of keratin packing. Keratin content is 50-85%, water content is 10-14%.

Granular layer of epidermis is of 10-20 μm thick and consists of one-two rows of cells with insertion of keratin. Typical size of cells is 10 μm ; distance between cells is 20-30 nm.

Spinous layer of epidermis is 100 μm thick and consists of 3-15 rows of cells. Cell spacing of 12-15 nm long are filled with gel of high viscosity. The layer contains keratin and 72% water.

Basal-cell layer of epidermis is of 15-18 μm thick and consists of cells capable to divide, and cells containing melanin (a matter absorbing ultraviolet light of 280-320 nm wavelength). Keratin and water contents are the same as in the spinous layer.

Derma. Boundary zone between epidermis and derma is an area with pronounced barrier functions. Exchange processes between epidermis lacking in blood supply and underlying derma are realized via this area. Non-planar boundary increases contact area and heighten bond strength. Epidermis is separated from derma directly by basilar membrane of 40-50 nm thick which has a high strength. The membrane strength is mainly provided by collagen fibers. Besides, the basilar membrane contains laminin that provide fastening to cell of the basilar layer, and proteoglycon that plays a role of a permeable barrier. Derma is 1-4 mm thick and subdivided into two layers: papillary layer and reticular layer. Fibrous structure of derma is a strong support for epidermis.

Papillary layer is actually a rich network of the collagen fibers of 5-7 μm diameter. Water content is 71%.

Reticular layer consists of thick collagen, elastic and reticular fibers. Water content is 61%. Inter-fiber space is filled with a gel "cementing" the structure. There are blood vessels and teleneurons in upper layers of derma.

Derma is closely connected with hypodermic fat. This layer consists of more or less large fat cells which are mixed with fibers of connective tissue, teleneurons, and lymphatic and blood vessels. Hypodermic fat serves as softening and heat-insulating layer.

It should be noted, that some structure are available in the skin which must be certainly mentioned. First of all, this is a rich vascular network consisting of arterioles, veinules and capillaries. Secondary, this is lymphatic vascular network. And, at last, these are sweat glands whose basis is on a boundary between derma and epidermis, and ducts of 60-70 μm diameter come out on the skin surface.

Being an organ with a pronounced boundary functions, the skin simultaneously performs some other diverse functions. Among those there are the following: reception, thermoregulation of organism, sensory and immunologic functions.

Barrier function. The skin, separating organs of human body from environment, plays a role of boundary area through which an organism provides interaction with environment, matters and energy (function of physical-chemical barrier for transportation of matters).

There are interesting functions of the skin in reply to impact of electromagnetic waves. For instance, as applied to infrared radiation of different wavelength, reflection factor changes in a range from several to 50 percents. Reflection of visible light is more as compared with reflection of infrared radiation.

Physical thermoregulation of organism. Thermoregulation is mainly connected with transportation of water through the skin and operation of microcirculating channel. Transportation of water through the skin is connected with water evaporation through a system of sweat glands (perspiration) and, passing by sweat glands, through the epidermis layer (imperceptible perspiration). Heat emission owing to imperceptible perspiration could reach 25% total heat emission of the organism.

Immunologic function. Quite recently it was ascertained that the skin is an important and inseparable component of the immune system. It actively participates in immune homeostasis and also plays a role of immunogenesis organ. A leading role in realization of immunologic

functions belongs to T-lymphocytes and Langerhans' cells. T-cells are able to differentiate in the skin and be the carriers of transplantation antigens, to participate in generation of antibodies, to discharge lymphokines. Langerhans' cells basically function as epidermal macrophages. They catch antigens from environment, treat them or keep at own surface, participating in this way in immunologic memory.

Sensory function. The skin is a large receptor field, by which an organism is connected with environment. Nerve receptors and fibers (afferent, efferent) directly connect the skin with nervous system and internal organs. The skin contains different types of receptors. All skin's receptors are the specialized. Nevertheless, they have many similar properties and they reply to impact of external signal by means of generation of acting potentials.

Protective-adaptive functions. The skin is a homeostatic system that functions in the interests of a whole organism and provides local transformations to maintain homeostasis of organism in whole. Biologically expedient protective-adaptive reactions are as follows: inflammation, hyperemia, release of physiologically active matters, pigmentation. Some of the reactions have independent significance in case of impact of external factor. Participation of the skin in immunologic reactions and vascular reactions connecting with thermoregulation, intensification of regional and capillary blood flow, increasing permeability of vascular walls, intensified generation of physiologically active matters which are sometimes considered as separate functional component of the skin, - all these processes are also caused by external factors. Mast cells take a central place in realization of the skin's function under consideration: they accumulate histamine, serotonin, heparin, adenosine triphosphate (ATP). These cells (sometimes called "unicellular endocrine glands") play important role in providing regional homeostasis and triggering local preventive reactions.

So, the skin play important role at all stages of impact of external factor (physical, chemical, biological stages). Both general and specific for the given impact transformations and reactions could appear in the skin, which owing to humoral and nervous mechanisms will influence on vital activity of a whole organism, and vice versa. These effects are the basis of reflexotherapy and treatment of internal diseases by influence on dermal zones of Zakharyin-Geda. These are the effects that explain why correction of internal organs and systems are required for cosmetic treatment of dermatic integument, especially in cases of aging of the skin and formation of wrinkles.

One of the factors promoting acceleration of aging process and, as a result, withering of the face skin is disturbance of metabolism and availability of excess residues in the organism. Absorption of toxic matters in a form of residues takes place in the intestine. This problem should be taken into account in case of complex approach to a treatment of dermatic integument. Therefore, to our mind, a general correction of internal organs is absolutely required before beginning of any local cosmetic manipulations. JSC "MILTA-PKP GIT" has developed the "Universal Rehabilitation Program" (URP) that allows to recover homeostasis, to reduce contents of residues in the organism, to recover normal microcirculation, to improve rheologic properties of the blood, and to reduce thromboses. This program is realized with the help of quantum therapy apparatus of the RIKTA family.

Treatment by the URP program, as applied to cervical section of the vertebral column and carotid arteries, provides recovering blood supply of dermatic integument of the head. Then local procedures could be applied, because reduction of tissues' turgor and formation of wrinkles at the face take place owing to deterioration of trophicity of dermatic integument and

disturbance of blood flow. Phenomenon of arteriole-veinole shunting is observed when capillary network is in spasms, and the blood discharges from arteriole directly to veinole channel. Disturbances of microcirculation appear in a form of spasms in arterioles and dystonia of veinoles, and also in formation of slag-syndrome when blood plasma separates from regular elements, and erythrocytes stick together promoting intravascular thrombus formation. Released fibrin completes formation of micro-thromboses. The blood plasma percolates through thinned epindima of vessels into inter-cellular space. The cells become degraded and destroyed. Degradation products of their membranes, represented by lipoprotein complexes, lipide crystals and phospholipids, are really auto-allergens. Their presence in tissues leads to triggering cascade mechanisms of "peroxide stress" and, as a result, to increasing generation of free radicals (synclete oxygen, super-oxide radical, hydroxyl groups) in tissues. Free radicals destroy the cells' membranes, and a process gets out of control.

5. MECHANISMS OF AGE-SPECIFIC CHANGES IN DERMATIC INTEGUMENT OF HEAD AND NECK

In a process of aging a genetic program is realized at a level of cellular biology, and a face changes appearance and tissues morphology. These changes are caused by different reasons. Among those are the following: the skin's senescence (change of density and elasticity of tissues, ptosis of tissues, formation of wrinkles); changes of fatty tissue (resorption and ptosis); change of volume and morphology of bones (disappearance of teeth, disturbance of cranio-cervicofascial statics, disappearance of adhesion between soft tissues and adjoining tissues, histologic and morphologic changes of muscles). This is a result of senescence of cells and extracellular connective tissue.

Four anatomic-morphologic formations play a basic role in a process of the face aging: skin, ocular muscle at a level of lower eyelid, cellular-fatty tissue located above nasolabial groove (nasolabial fold), and skin muscle of the neck which causes formation of saggy cheeks.

Epidermal layer becomes progressively thin with decreasing mitosis number and intensification of desquamation. Life span of the cells reduces in average from 100 to 48 days. A number of basic (mast) cells, just as melanocytes, reduces by 10-20% per each 10 years.

Region of derma-epidermis junction flattens in proportion to progressive loss of cyclicity related to all the skin. Derma-epidermis interface is a basis element in formation of wrinkles. Its condition reflects the skin physiology.

Superficial derma atrophies, and represents a disorganization of collagen fibers, degeneration and rarefaction of elastic fibers, and loss of liquid in the main substance. In parallel, colloidal masses accumulates in derma giving yellowish shade to the skin.

Hair integument modifies under influence of saturation with androgens. Xeroderma, which arises owing to reduction of sweat and fat secretion, increases a loss of elasticity. Being incapable to withstand heaviness, the skin sinks under impact of own weight. Wrinkles and folds are the consequence of these changes. Additional effect is aging of deep structures.

Factors that could have an influence on a senescence of the skin are as follows: heredity, age, habit of smoking, long action of direct sunlight, deterioration of cerebral activity. Transformation of folds into wrinkles becomes permanent owing to fixation by skin-bone

points. Wrinkles of "spider's lines" or "crow's feet" type near eye are formed between fixed orbital and zygomatic points.

Anthropometric measurements of people at the age from 20 to 101 showed the following changes of a cranium skeleton: reduced height of both jaws especially in case of loss of teeth and lysis of tooth sockets; increasing, in proportion with age, all transverse dimensions of face; thickening of the two superficial thirds of skull's fornix in women; reduction of volume of the lower third of face; increasing of nasofrontal angle in women; increasing of forward flaring of supraorbital arcade; increasing of bone projections, including frontal bone; change of contour and shape of chin accompanied with false prognathism (the jaws forward flaring) owing to rotation of a lower jaw, which leads to common hollowness of the face profile. Contrary to majority opinion, cranium-facial skeleton increases without decreasing sizes of bones.

Reduction of muscular mass, change of metabolism and increasing of mass of fat tissues characterize muscular aging. Ligaments at neck-genial angle weaken, and muscle changes a shape because of changing configuration of cervical region of the vertebral column.

A fat tissue in a newborn child is rich and fills up a face in a form of homogenous mass being especially dense at cheeks, zygomas and temples. Homogeneity in adult people is kept but a tissue becomes thinner. A volume of cheeks and temple play not so important role. In the "third age" these tissues "melts".

At the levels of face and neck a fat tissue subdivided into functional and metabolic ones. The functional fat tissue is weakly subjected to weight variations and serves as a space for sliding the muscles and for superficial aponeurosis. The metabolic fat tissue could be of very different weight in different people. This tissue contains: hypodermic genial fat, above- and under-mandibular fat, lateral neck fat distributed along front edge of nodding muscle.

Parotideo-masseteric region is not practically subjected to aging; the skin is externally supported and prevented from weakening by two zones of splicing fibers – zygomatic zone and masticatory zone. Both dermatic and fat layers ages jointly.

On the contrary, sagged cheeks between masticatory and mandibular ligaments have a tendency to ptosis because they are a lower continuation of a thick nasolabial fold. Constitutionally this is caused by displacement of superficial suprazygomatic fat – at the upper part, and – at the lower part – by a zygomatic fat that goes down toward nasolabial fold owing to permanent contraction of zygomatic muscles. Nasolabial fold and sagged cheeks form the skin sack that is filled with a structured fat often containing fibrous elements. There are not available any participation of muscles related to these two showings of aging.

As a rule, accumulations of fat correspond to zones of skin ptosis (Fig. 5.1).

Accumulations of fats in a neck region always take a middle position and can be of great sizes ("turkey neck").

Fig. 5.1. Localization of fat depots coinciding with zones of skin ptosis

6. METHODS OF COSMETIC LASER-PUNCTURE AND COSMETIC LASER-MASSAGE OF FACE AND NECK

6.1. Principles of cosmetic laser-puncture and cosmetic laser-massage

The first method of cosmetic laser massage is used as prophylaxis to prevent a face skin wrinkling and activate functions of facial nerve before applying cosmetic treatment procedures.

The method consists of five (5) phases (Fig. 6.1). Massage is performed with a help of cosmetologic light guide nozzle that is screwed in emitter (terminal) of the RIKTA apparatus.

Starting point of massage is zone E6. The treatment, consisting of rotary movement of the emitter in combination with slight pressure, passes to zone E4 and after that - to zone A situated in the middle of distance between E4 and VB2. Next zones of the treatment are E6 and then VB2. The last way of treatment is from zone VC24 to zone E6.

Each segment of the total route must be passed about 10 times.

Frequency 50 Hz is recommended for first five procedures.

Next five procedures should be performed at the frequency of 1000 Hz.

Zones' designations

1. VC24
2. E4
3. A
4. VB2
5. E6

Fig. 6.1. Method of face cosmetic laser-massage

Advantage of the method is applying quantum multi-zone therapy.

The second and main method of multi-factor cosmetic treatment (Fig. 8.2, 8.3) is developed to delete wrinkles and edemas in the area of face and neck. Direct result of the treatment is rejuvenation of the skin.

It should be noted that all local procedures must be preceded by a treatment in accordance with the Universal Rehabilitation Program (Fig. 6.4). In the absence of the cosmetologic light guides nozzle, the optimum choice is a laser-puncture of the points shown in Fig. 6.2, 6.3 during 1-1,5 minutes per point at the frequency of 1000 Hz. The emitter shall scan in directions indicated by arrows (five scans in each direction). The scanning speed is 1 cm/sec. Frequency is 50 Hz for first five procedures and 1000 Hz for next five procedures.

Given the cosmetologic light guide nozzle, massage movements shall be the same as for the first method: five passes along each line with delay of 3-4 seconds in each zone.

Frequency is chosen similarly: 50 Hz for first five procedures, 1000 Hz for next procedures.

Treatment course consists of 10 procedures. Procedures shall be performed daily or every other day.

The best is considered the schedule when first five procedures are performed daily and next procedures - every other day.

Each procedure begins with moving from zone V2 to zone TR23, and then from zone V1 to zone VB1.

Then there will be performed massage beginning from zone E2. Next step is a treatment of frontal area. Neck area will be treated the last.

Good addition to facelifting could be auricular laser-puncture. This method is based on irradiation of points AT-55, 95, 51, 22, 33, 11, and 97 at the frequency of 1000 Hz for 30 sec. per point.

During the treatment course, the food allowance must be added with combination of vitamins and micro-elements.

Cosmetic creams and masks made of natural components could be also used.

Zones' designation

- 1. VG24**
- 2. PC2**
- 3. VB14**
- 4. V2**
- 5. TR23**
- 6. V1**
- 7. VB1**
- 8. E2**
- 9. GI 19**
- 10. E4**
- 11. VC24**

Fig. 6.2. Second (main) method of cosmetic multi-factor treatment

Zones' designation

- 1. E2**
- 2. GI 19**
- 3. E4**
- 4. VC24**
- 5. V10**
- 6. VC22**

Fig. 6.3. Second (main) method of cosmetic multi-factor treatment

UNIVERSAL REHABILITATION PROGRAM

Fig. 6.4. Method of treatment according to the Universal Rehabilitation Program

No.	Treatment area	Frequency	Exposure time
1	Zone of apex cardiac beat	5 Hz	2 min
2	Mesosternum	50 Hz	1 min
3	Epigastric zone	50 Hz +5 Hz	1 min at each frequency
4	Hypochondrium zones	50 Hz	1 min per each
5	Subclavian fossae	50 Hz	1 min per each
6	Sinocarotid triangles (pulse zones on carotid arteries)	50 Hz	1 min per each
7	Suboccipital fossae	50 Hz	1 min per each
8	Spinous process of VII cervical vertebra ("tuber" at rear side of the neck base)	50 Hz	1 min
9	Zones of kidneys and adrenal glands (left and right)	50 Hz +5 Hz	1 min at each frequency

6.2. Verrucae (warts)

Filtering virus, the same or very close varieties for all the verrucae forms, provokes verrucae. The disease is contagious. Infection is transmitted as a result of direct contact between sick and healthy persons. Traumatosis of the skin, xeroderma, pH reduction of aqueous-lipoid mantle of the skin stimulate development of the disease.

Important role of the central nervous system is supposed in pathogenesis. This is confirmed by events of recovery by means of suggestions and hypnosis. Incubation period is from several weeks to several months.

There are several species of verrucae (warts).

Ordinary, or simplex, verrucae. They are caused by the *Molitor verrucae* virus, and mostly observed among children and young persons. The verrucae locate at hands, feet and rarely at face.

Above the skin level there are arisen solid, morbid, semi-spherical, noninflammatory nodules, which are greyish, brown or flesh-colored, with clear edges. They have granular, rough and sometimes-tuberous surface. The size is in the range of a pin's head to a lentil. Essential conglomerates could be formed as a result of the verrucae fusion. Hyperkeratosis and papillomatosis are the typical diagnoses of histological examination.

Verrucae plana juvenilis. These are solid flat nodules of millet seed/lentil size arising slightly above the skin level. They have a flat surface and polygonal or rounded outline. Sometimes they are flesh-colored, sometimes their color is yellowish-pink or yellowish-brown. Usually the multiple flat verrucae are distributed on a back of the hand, on the face (at frontal region), neck, forearms; their linear distribution is less probable. Hyperkeratosis and acanthosis are the typical diagnoses of histological examination.

Verrucae plantaris (plantar warts) are a variety of the ordinary verrucae. They are caused by the constant pressure of shoes, traumata of plantas, hyperhidrosis of feet. The yellowish-brown verrucae plantaris with rounded or oval outline make difficult to walk because of strong painfulness. They look like corns. Usually their quantity is small. Hyperkeratosis, acanthosis and papillomatosis are the typical diagnoses of histological examination.

6.2.1. Treatment of verrucae

Tradition treatment methods for verrucae are as follows: hypnotic suggestion, cryotherapy, diathermocoagulation and a therapy based on using preparations with antiviral activity.

Method of the verrucae treatment with a help of the "RIKTA" apparatus does not exclude using medicinal preparations and hypnotic suggestion. And quantum therapy could also be used as independent method.

The treatment course consists of 10-15 procedures; the second course is possible too. The main purposes are stimulation of nonspecific immunity, local influence upon lesion sites to increase a cellular immunity, and also an influence upon a central nervous system.

Each procedure begins with the noninvasive action on blood, which is better to be provided regionally; i.e. if the verrucae are situated on hands, irradiation is recommended to be done in the regions of ulnar or axillary arteries during 5 min at 50 Hz frequency.

Given the generalized process, it is better to start with performing the Universal Rehabilitation Program (Fig. 6.4).

Then the local irradiation should be applied to the lesion sites. Solitary verrucae are treated by the emitter situated in the center of a lesion site. The procedure duration is 3-5 min per each site at 1000 Hz frequency.

Given the generalized process, the local treatment of conglomerate is provided by means of slow emitter scanning with a speed of 0,5 cm/sec during 10 min at 1000 Hz.

It should be noted that to increase the treatment effect and reduce a total time of the treatment, it is recommended, before local applying the apparatus, to treat lesion sites with alcohol solution of a brilliant green. This shall be done to reduce a laser radiation reflection from the dermatic integument that equals 30-50% of the total radiation. As a result of the aforesaid preparation reflected portion is only 10%, and tissues utilize the rest 90%.

The action upon a central nervous system is performed by the laser-puncture method. There shall be used the following points of a floor of the auricle (*concha auriculae*): 22, 25, 28, 34, 55, 100. The procedure duration is 30 sec per point at the frequency of 1000 Hz.

To increase a local effect it is possible to use the points of floor of the auricle, corresponding to projections of the lesion sites, e.g. hand, foot, forehead, forearm.

When using the laser-puncture method it is necessary to start the quantum therapy procedure just with this method and then to transfer to the common multi-zone therapy. The last phase of the procedure should be a local action upon the lesion sites.

6.3. Herpes simplex

This disease is caused by filtering virus and characterized with eruption, on hyperemic background, of grouped bubbles with initially transparent and later turbid contents.

Preferable localization zones are the lips, cheeks, wings of nostril, mucous membrane of the oral cavity (*tunica mucosa oris*), cornea and genital organs. The bubbles shrink to scab that are torn away without any cicatrices. After bubbles are open, there will be formed a painful erosion with hyperemic, slightly swollen edges.

Herpes simplex is usually arisen as a result of disfunction of the gastroenteric tract, pneumonia, intoxication, febrile disease, dysmenorrhea. The fatigue, rigor, anxiety and worsening appetite sometimes precede eruption. Regional lymph nodes could be increased.

There are different clinical forms:

- 1) mild (abortive) case with prompt solution for small population;
- 2) edematic form followed by striking hyperemia and essential edema;
- 3) serious form;
- 4) zosteriform;
- 5) relapsing form with localization on the red border of lips, buttocks, external genital organs.

6.3.1. Treatment of Herpes simplex

Treatment approach related to the herpes simplex is similar, irrespective of localization, to the method used for a treatment of verrucae. This is because of two these diseases belong to the same group - viral dermatosis.

The treatment course usually consists of 10 procedures. As a rule, a local irruption disappears at the end of the course. Longer course is required in a case of relapsing herpes. It is necessary

to start the procedure with the Universal Rehabilitation Program (URP) (Fig. 6.4). Then a local irradiation of lesion sites shall be done. The irradiation period is 5-10 min depending on a size of the lesion site. Laser puncture is aimed to increase organism resistibility and restore its disturbed functions.

The treatment in a region of a floor of the auricle is performed at 1000 Hz frequency during 30 sec per point (Nos. 22, 100, 55, 34, etc.).

It is also possible to use a corporeal laser-puncture stimulating the points of common action. This procedure is performed at a frequency of 1000 or 5000 Hz during 2 min per point.

If a physician decides to use a laser puncture, it is necessary to start next session of the treatment just with this procedure.

The same sequence is used for a treatment of herpes zoster, but it must be added with a laser-therapy of appropriate vertebral column's segments; duration of the paravertebral treatment is 2 min per segment at 50 Hz.

6.4. Acne vulgaris

Acne vulgaris appears in the beginning of pubertal period in connection with the increased function of sebaceous glands under influence of excretion of gonadotrophic hormones. Androgenic hormones increase the acne vulgaris both in men and women. High concentration of estrogens suppresses secretion of the sebaceous glands, promoting regression of the acne vulgaris.

Development of the disease could be stimulated by seborrhea with corresponding disfunction of sympathetic diencephalic center and change of sebum cutaneum composition. Ethnological factors are strains of staphylococcus and coria bacteria; predisposing factors - side by side with hyperandrogeny - are disorder of gastroenteric tract, hypovitaminosis, anemia, heredity, types of diet and metabolism.

The affected regions are usually face, upper part of thorax and back. Excessive sebum secretion and follicular hyperkeratosis lead to sebaceous gland occlusion with horny stoppers - comedones. As a result of excessive sebum secret and invasion of pyococcus infection there will be arise the acne papulosa and acne pustulosa. In a process of fusion and extending the foci could be subjected to hardening, infiltration and abscess formation and leave depigmentated cicatrices creating the rough and motley skin surface.

6.4.1. Treatment of acne vulgaris

Tradition treatment of acne vulgaris supposes prescribing and taking drugs, such as antibiotics, vitamins A, E, C, folic and nicotinic acid. As to the quantum therapy procedure, it should be started with a common action directed to recovery of homeostasis, i.e. with the Universal rehabilitation program (URP).

Before a local treatment of the lesion sites on the dermatic integument it is necessary to make some preparations. First off all soften the sites to be treated by means of vapor bath or compress. Then carefully squeeze out the acne until they are clearly visible.

After cleansing required region with toilet water containing alcohol, the local therapy can be started. The treatment will consists of slow scanning the lesion region during 5-10 minutes. If acne is only situated at face, 5 minutes are enough; if acne is distributed along thorax and back, the treatment period shall be longer.

Treatment frequency is 50 Hz. One course of treatment consists of 10-15 procedures.

In case if a physician uses a laser puncture, the points of a floor of the auricle are as follows: 22, 95,34, 28, 25, 58. The treatment is aimed to normalization of a hormonal background and should be performed before multi-zone therapy.

6.5. Postoperative cicatrices

A treatment of postoperative wounds and cicatrices is performed to provide faster healing after operation or trauma, and later - to reduce formation of colloidal cicatrices.

Related to recent postoperative wounds the treatment is performed by means of slow scanning along the cicatrix during 10 min at 50 Hz frequency. If the colloidal cicatrix is not formed, the further treatment will be the same.

If the colloidal cicatrix begins to form, the treatment shall be performed at 1000 Hz frequency.

The recommended treatment course is 10 procedures.

It is desirable to use URP as a basic scheme of the treatment.

6.6. Treatment of fungus diseases of nails and nail matrix

The best approach related to a treatment of fungus diseases is a parallel use of quantum therapy and pharmacotherapy jointly with the Universal Rehabilitation Program as a basic scheme of the treatment.

A nail matrix is irradiated during 3-5 min per nail. Pulse frequency for the first five procedures is 50 Hz, for subsequent procedures - 1000 Hz. It is recommended to cleanse the nails with 5%-iodine solution before the treatment to reduce a reflection of laser beam from a nail and to increase the absorbed dose.

The recommended treatment course is 10-15 procedures.

6.7. Treatment of cellulitis

According to existing conceptions, cellulitis is not considered as an ordinary obesity; it is officially recognized as a disease of subcutaneous fat. Up to 80% of women are suffered from cellulitis irrespective of age, habitus, weight and physical activity. Cellulitis could arise even if a person is only fourteen years old.

In healthy fatty tissues the products of vital activity of a cell exude through the cell membrane and are carried away by a flow of blood. Disfunction of this mechanism leads to cellulitis: the membrane conduction is blocked, the products of a cell vital activity don't exude and the cell

is calcinated. Affected cells form groups and create solid formations in the connective tissue. The formations blockade blood supply and lymphatic outflow, increasing calcination of fat cells. If, in addition, the teloneurons are squeezed, painful sensations will appear. Besides, the cellulitis cells attract water, stimulating edema of the lesion regions - this is an edematic form of cellulitis.

In case of essential lesions of the blood circulation and lymphatic outflow the tissues begin to became fibrous - this is a fibrous form of cellulitis.

The basic etiologic sources of cellulitis are hormonal disfunctions. The starting mechanisms of cellulitis are pregnancy, pubertal and climateric periods, beginning and termination of taking contraceptive tablets. Wrong diet, stresses, environment pollution and hypodinamia also provoke a development of cellulitis. A hereditary predisposition also plays an important role.

Initial phase of cellulitis is easily identified. It is necessary to slightly press a skin by the thumb and forefinger. Appearance of specific tubercles, so-called "orange crust", means beginning of the disease. Usually the disease localizes at the femurs, buttocks, popliteal fossae and belly.

Considering all the aforesaid a physician has to use the Universal rehabilitation program in addition to a direct treatment of a lesion tissue. Relating to this specific case the Universal rehabilitation program is an important factor promoting reduction of intoxication, harmonization of the immune system tonus and activation of microcirculation.

Fig. 6.5. Scanning mode for cellulitis treatment

After the Universal rehabilitation program is completed it is necessary to provide a treatment of the lesion region in a scanning mode during 5 minutes at variable (sweeping) frequency. It is reasonably to use a special terminal, so-called "laser shower", allowing to cover a big enough surface (Fig. 6.5). The treatment course consists of 10-15 procedures; repeated courses could be performed after 3-4 weeks.

It should be noted that quantum therapy related to cellulitis is especially effective in combination with other methods of treatment: vitamin therapy, phytotherapy, balneotherapy, exercise therapy, etc.

7. ALOPECIA

7.1. Structure of hair and dermatic integument of the head

What is the hairs, what is their structure and history of their life?

The head skin, as all the rest human skin, is intended to defend under-disposed parts of organism against damage, penetration of microorganisms and other injurious substances. It also participates in the water metabolism and heat exchange with environment.

The head skin consists of a superficial layer - epidermis, represented by the multi-layer flat horny epithelium and deep layer of cutis (derma).

The superficial layer (horny layer) consists of a lot of horny scales containing protein (keratin) and air bubbles. This layer is watertight; it is characterized by a high enough density and elasticity. Microorganisms can not penetrate it.

The horny scales are constantly hulled and replaced by the news.

The hair has a shaft extending above a skin surface, and a root disposed in a thick of the skin.

The root ends with an expansion - the bulb where the hair grows (owing to reproduction of the bulb cells).

Connective tissue - a pappila - extends to a bottom of the bulb. It rich in blood capillaries feeding the bulb and also contains nerves. A matrix disposed above the pappila represents a sprout part of the hair. The hair grows owing to division of the cells that move upward.

The hair root is enveloped with a hair follicle that is actually an extension of the epidermis surrounded by the connective tissue.

A number of follicles on a hairy part of the head are, on average, 100000 with some deviations to bigger (for fair-haired persons) or smaller (for red-haired persons) numbers. The follicle is closely connected with muscular fascicles raising the hair, and sebaceous glands near a top edge of the follicle. When contracting, the muscle raises the hair and presses the sebaceous gland that leads to elimination of a secretion. Only the hairs disposed on a chin and in a pubic region do not have this muscle.

Adult persons have 3 kinds of the hairs:

- **long hairs** - on a hairy part of the head, in the beard and moustache of men, in axillary cavities and in a pubic region.
- **bristly hairs** - in eyebrows and eyelashes, in external acoustic meatus and nostrils.
- **fluff hair (*lanugo*)** - almost on a whole dermatic integument of the human being.

A length of the hair shaft is in a range of 1-2 mm - 1,5 m; a thickness is 0,005-0,6 mm.

The hair follicles develop cyclically. A cycle of each hair follicle consists of 3 phases:

- the first phase, anagen** - period of active formation of the hair;
- the second phase, catagen** - is characterized with reduction and termination of mitosis and is a transition to the third phase;
- the third phase, telogen** - period of rest.

The third phase is the last one in a development cycle of the hair, which during some time after completion of the cycle is kept in the follicle (though a growing of a new hair already has begun), and then the old hair falls out.

The cycle duration is variable and depends on the genetic code, age, topography of hairy regions and other reasons. Normal duration of the development phases related to the hairy parts of the heads of adult persons are as follows:

anagen phase - approximately 2-6 years (4 years on average);

catagen phase - shortest phase, only 2-3 weeks;

telogen phase - 3-4 months.

Life span of the hair depends on many factors: age of a man, his nervous system, endocrine glands, metabolism, etc.

Considering the phases duration, a correlation between the anagenic and telogenic hairs typical for healthy persons is about 9:1.

Basing on a total quantity of the hair follicles on the head of a healthy person (about 100000 on average) and a typical ratio of the anagenic and telogenic hair (9:1) it could be calculated that a person has to daily loss up to 100 hair. This is a physiologic norm for a middle-aged person. In spring and autumn this figure could be some more. In case of appearance of anxious symptoms of intensive premature loss of the hair, it is necessary to contact a physician.

7.2. Types of alopecia

7.2.1. Classical male alopecia (androgenic alopecia)

Related to men this process begins from a front line of the hair, i.e. from a forehead, and then gradually steps back.

In other cases alopecia begins from a rear part of a vertex and then progresses turning into a classical bald spot.

Some men have "alopecia genes" that could be inherited both from mother and father. These genes "reward" a man with a genetic predisposition to alopecia.

The hair shedding begins when a testosterone in the blood is replaced with a dihydrotestosterone (DHT) - the enzyme called "5-alpha reductase". The mentioned above genes of some follicles are programmed for a generation of this enzyme and DHT, which are the sources of compression and reduction of the follicles.

As the hairs compressed they became thinner, shorter and softer at each stage of anagen. In the course of time the follicles only produce a primal hair which is like a fluff of velvet.

But not all the follicles of the dermatic integument of the head are subject to action of DHT. Some of them are not compressed and continue to produce the normal healthy hair. These hairs growing at the sides and rear part of the head of men with a bald spot will form a classical, horseshoe-shaped lock. Even if the follicles are moved to a bald surface, e.g. with a help of transplantation, they continue to function because the transplantation does not provoke any changes in the genetic code.

7.2.2. Female baldness (androgenic alopecia)

Mechanism of loosing the hair related to women is similar to the male mechanism: women also could have a congenital "alopecia gene". But the main cause is reduction of level of female hormones - estrogens capable to protect female organism against some kinds of diseases connected with excess of androgens.

If the androgenic balance is disturbed, androgens begin to predominate and compress the follicles having a genetic predisposition (sometimes, especially related to young healthy women, androgens could act otherwise). Usually this type of the hair shedding follows a reduced level of estrogen provoked by a surgical, chemical or natural menopause.

Forty-five years old - this is the age mostly disposing to androgenic alopecia.

The hair shedding typical for women, suffering from the female androgenic alopecia, is different in comparison with men. Very seldom women have a front line of the hair stepping back. More often they loss the hair on a vertex and at the sides of the head - above the ears. And, in opposite to men, women with a formal alopecia very seldom become really bald, usually they only have thinning hairs.

Most of women have only negligible thinning of the hairs, so a skillfully made haircut is enough to hide this disease. The hair shedding becomes visible for other people only if 50 per cent of the hair integument is lost; nevertheless many women become panic-stricken long before such situation.

If there is nobody in a family history who suffered from the hair shedding, then the female alopecia begins to develop only after menopause. But if some of the relatives whenever suffered from alopecia, even young woman could sometimes have this disease. Types of the hair shedding, connected with uncommon endocrine disturbances when a level of male hormones in organism is higher than usual (androgenetic disturbance), are more seldom for women. These cases are usually accompanied with the elements of asculinization (growing of the hair on the face and body, increasing of muscular mass, lowering of the voice timbre and increasing of a clitoris) and also with other signs, such as termination of menstrual cycles, female infertility and appearance of acne.

7.2.3. Focal alopecia (partial or total loss of the hair)

Focal alopecia is a form of the hair shedding mainly appearing after formal alopecia. The state is characterized by a sudden appearance of clearly outlined rounded bald spots. Most of patients meet this disease at the age of 25. Only quarter of the patients are people older than 40.

Focal alopecia usually begins from appearance of several hairless circles on the head; sometimes these are different areas, such as eyebrows and beard. In most cases this disease terminates in a year. Sometimes the hairs begin to grow anew but at the same time other bald spots appear. Usually alopecia region extends until it covers (better to say, "opens") all the head, this case is called a "total alopecia". There is also a form when all the body could loss the hairy integument - eyelashes, eyebrows, the hair on face, pubic, etc.; this kind of alopecia is called "general alopecia".

In case of this kind of disease actively functioning follicles are damaged and this reduces growing of hairy integument. Unfortunately, the causes of the disease are not yet explained. There is not available a clear understanding if any mechanisms exist that can stop alopecia in people with the genetic predisposition. There are not yet exact answers to these questions.

Recent investigations showed that a focal alopecia is actually an autoimmune disturbance. In other words, immune system works against the organism. It is supposed, that in this case there are produced the antibodies essentially reducing generation of the hairy integument and compressing follicles. As a result, the hairs do not appear at the skin surface. This effect is an expression of one of the types of hibernation (i.e. rate deceleration of the organism vital activity); nevertheless the follicle is still alive and capable to restore a generation if it receives appropriate signal.

Heredity is also a very important factor in a focal alopecia: in each fifth case somebody of the family members suffers or suffered from a focal alopecia. The disease is more inherent in families inclined to allergic disease, such as asthma, pollinosis, eczema or other autoimmune disturbances, e.g. disease of thyroid gland, diabetes, or vitiligo in the earliest years. Though some investigators observed a connection between a hard stress and appearance of a local alopecia, this disease is not considered as psychological or emotional disfunction. (Of course, stress could lead to a mental disturbance that can be cured with a help of medicaments, psychological consulting or medicinal therapy). As follows from some investigations, it is reasonably to assume a connection between alopecia and activity of immune system that could be disturbed by a stress.

Unfortunately, at present there are not available effective medical means against a focal alopecia. But a diseased state of the most patents disappears in the same enigmatical manner as appears. There are some medical remedies that could help, but for many persons, suffering from more serious forms of the disease, the best method to hide alopecia is, at present, a chignon or a wig.

7.2.4. Telogen evaporation

Usually the telogen phase in a cycle of the hair growing is a phase of rest, and approximately 10 per cent of the hair exist simultaneously in this phase. Telogen evaporation begins after 10 per cent of the hair transfer to this phase. As a result, a number of the daily shedding hair exceeds the normal hundred.

The telogen evaporation mostly connects with stresses caused by serious infectious diseases, such as pneumonia, by cardiac attack, infections fever or surgical intervention. Rarely they could be psychological stresses. The hair shedding mainly goes on approximately three months after the event caused a stress. Sometimes a reason is an applying of anticoagulants; in this case the hair shedding begins approximately 3 months after applying the medicine. A normal cycle of the hair growing is restored after termination of taking the medicine.

Rare causes of the telogen evaporation could be skin diseases and seborrhea (also called "skin seborrhea").

One of the forms of the telogen evaporation is a "pulling alopecia". The reason is a strong tightening of the hair. People who use such the haircuts as a "horse tail" or "corn-cob"; often suffers from this type of the hair shedding. reduction

Sometimes the tight headdresses, strong waving, tight plaits disturb follicles. Usually in case of the pulling alopecia the hair shedding is in the regions of maximum tension - i.e. above ears and on a front line of the hair. This type of alopecia is self-disappearing after deletion of the causes. Unwillingness to change the haircut could lead to a cicatricial alopecia.

The telogen evaporation could also appear after the childbirth - about 20% of women are subject to this disease. This mechanism connects with hormonal changes during a pregnancy which reduce (by about 10%) usual level of the hair shedding. A normal process of the hair growing is usually restored in 9-10 months after the childbirth.

Other reason of the telogen evaporation could also be oral contraceptives (preventing a pregnancy).

Sometimes the hair shedding is a problem for people constantly keeping a vegetarian diet or deliberately cutting down their food (in a case of nervous anorexia). This is because the hair follicles are unable to bear a lack of protein.

A low consumption of zinc is also ruinous for the hair.

If the diet is kept rich enough in proteins and zinc, the normal growing of the hair will be restored.

7.2.5. Anagen evaporation

Anagen evaporation means a loss of the hair at a phase of active growing of the hair. In this case the hair shaft became so thin that the hair grows weaker and breaks. The reasons of the disease are taking narcotics, chemical weed poisoning and serious endocrine disturbances. The disease begins several days or even several months after aforesaid events. This form of the hair shedding also typical for cancer patient subjected to chemical therapy or radioactive irradiation. Taking excessive doses of vitamin A could also be a reason of the hair shedding.

This disease is more serious in comparison with the telogen evaporation because the hair shedding is 85-90 per cent, and sometimes up to 100 per cent of the total hairy integument.

Some medicinal preparations could be the sources of the anagen evaporation. Mostly they are as follows:

- beta-blockers (inderal, lopresor, tenormin),
- calcium blockers (calan, isoptin),
- preparations against Parkinson's disease,
- preparations against gout (lopurin, zyloprit)
- preparations against epileptic convulsions (tridion),
- antidepressants (tricycline, amphetamine),
- medicaments affecting on thyroid gland (carbisol, iodine).

Sometimes the sources of alopecia are specific endocrine disturbances, such as hyperthyrosis (increased activity of thyroid gland) and hypothyrosis (reduced activity of thyroid gland).

A process caused by endocrine pathology is, as a rule, reversible. The hairy integument recovers during a treatment of the basic disease.

7.2.6. Traumatic alopecia

The hair traumata can be of different forms.

Physical trauma - because of very often combing the hair and making the haircut with a help of curling irons or metal curlers.

Chemical trauma - because of wrong use of agents and paints for bleaching and coloring of the hair, chemical fixative and gels for haircuts.

The hair trauma could also be caused by a long action of the direct sunlight or chlorinated water in a swimming pool.

Tight hair-dresses, wigs, bands also can damage the hair because of a constant rubbing and compressing of the skin.

There is a disease called trichotillomania when a man suffers from an obsession to pull out his hair. Mostly the disease appears in a childhood but also could appear in any age. Perhaps there is some emotional pre-condition of the disease. Specialists note that both the habits to pull out the hair and to suck fingers disappear, as children become adult. Related to adult persons and teenagers trichotillomania could give warning of availability of more serious psychological causes, which should be determined and treated. The hair mainly restored just after deletion of the pernicious habit.

The traumatized hairs usually look dry, brittle, stranded and withered.

7.2.7. Cicatricial alopecia

Cicatricial alopecia appears when the hair follicles are affected or damaged by a disease. A lesion can be caused by a skin infection due to bacteria, fungi and viruses; fire or chemical affection; accidental cuts and excoriation; chronic pulling alopecia, radiation or chilblain.

Other potential sources of cicatricial alopecia are as follows: protozoiasis (leishmaniasis), neoplasms (basalyoma, reticulosis), bacterial infections (tuberculosis, syphilis) and also systemic lupus erythematosus, dermatomyositis.

7.2.8. Other causes of alopecia

Diseases leading to the hair shedding (e.g. infantile diseases including rickets) could also cause alopecia. Usual symptoms are weakening of the hair shaft and breaking the shaft near the root. Besides, the hair could have a specific structure and be simply thin because of disturbed metabolism.

These kinds of disease could disappear with age.

Senile alopecia is thinning the hair that begins at the age of fifty and progresses as aging. This is a natural symptom of aging, both for men and women, differing from androgenic alopecia which could appear simultaneously with senile alopecia.

Physicians who are specialists in these spheres prescribe the treatment course for the patients in accordance with the type of disease.

7.2.9. Quantum therapy influence upon skin

According to data of electronic microscopy, applying quantum therapy to treat the skin led to increasing of proliferative and metabolic activity in epidermocytes including the hair follicles. Extasia of microvessels of papillary layer of derma has been noted. In the connective tissue, particularly in fibroblasts, there was discovered a relative volumetric growth of intracellular structures connected with a synthesis of collagen. There has been registered increasing activity in neutrophiles, macrophages and mast cells.

Aforesaid transformations underlie the treatment of alopecia: just after 4-5 procedures of quantum therapy a growing of lanugo at the head has been observed.

Using traditional and antimycotic methods of treatment as a background, quantum therapy allows providing a high effective treatment that results in intensification and speeding-up the hair growth in combination with improvement of the blood and lymph microcirculation.

Considering the fact that absolute majority of dermatological diseases connect with disfunction of immunologic reactivity and (or) metabolic disturbances on a basis of internal pathology, it is recommended before a course of the local laser therapy, or simultaneously with this course, to apply quantum therapy to organs or systems which have an etiopathogenic connection with the disease.

At present we have proposed the above-described Universal Rehabilitation Program that shall be used as etiopathogenic part of alopecia treatment.

It should be noted that this unique method has been started not from scratch. Moscow joint-stock company "MILTA-PKT GIT" gained a vast experience in applying quantum therapy for a treatment of different diseases including treatment of the hair shedding and the head skin. The first results of the hair sanitation and alopecia treatment have been obtained with a help of well-known apparatus "RIKTA". The encouraging results became an incitement to design a special apparatus of this family to solve the problem related to the hair. Completed long researches allow to now representing the excellent technology that, we are absolutely sure, will help millions of people to get the health and beautiful hair.

In your professional activity a beam of the soft infrared laser radiation will provide:

- ⇒ decrease of the hair shedding (prompt and reliable effect);
- ⇒ prompt normalization of the hair state in case of a local baldness (*alopecia areata*);
- ⇒ structure improvement of weak and thin hair;
- ⇒ normalization of sebaceous gland functioning (elimination of dry and greasy dandruff);
- ⇒ bringing injurious substances out the organism via lymphatic system with subsequent moving away jointly with urine;
- ⇒ improvement of blood circulation for the head skin (increasing inflow of nutritious substances stirs up flabby and weak cells);
- ⇒ achievement of the hair elasticity, brilliance and color.

7.3. Applying of quantum therapy for treatment of alopecia

7.3.1. Indications for applying quantum therapy

Indications for applying apparatus of "RIKTA" family are the following types of diseases of the hair and head skin:

- alopecia (total, focal, band);
- baldness (except cases of full atrophy of main mass of the hair follicles caused by deep aging processes);
- lavish hair shedding;
- brittle and breakable hairs;
- lacklustre hairs with a flabby structure;
- dry/greasy hairs;
- dandruff.

Besides a treatment of the diseased hair the methods of quantum therapy can be used as effective preventive remedy allowing to keep the beautiful and healthy hairs up to extreme old age.

7.3.2. Treatment of alopecia (baldness)

A lack of the hair on the head of teenagers (youths, and especially girls) is a complex disease overburdened with difficult social and ethical-psychological problems.

Children's alopecia is one of the widespread dermatic diseases - from 0,5% to 8,0% of all dermatoses.

Eighty five per cent (85%) of all the patients are people younger than at the age of 40.

Baldness is considered as a disease of trophoneurotic origin. There is discussed a possibility of affection of the superior cervical sympathetic ganglions, influence of vasomotor disfunctions, disturbance of endocrine glands. Some authors discover a certain connection between a baldness and focal infection. During several last years there was proved an influence of ecologically negative factors; this conclusion is confirmed by the events in a city of Tchernovtsy.

Serious forms of baldness are accompanied with the certain immunologic deviations: reduction of T-lymphocyte contents, dissociation of a helper-suppression ratio, increasing titre of antibodies, migration of suppression-cytotoxic T-lymphocytes. High index of a spontaneous KS-test allows supposing a presence of the persistence infection.

Well-known approaches to the treatment of alopecia are based on medicamental methods improving trophicity of skin. The preparations prescribed contain zinc, selenium and decoctions of medicinal plants applied directly to the focus. The results obtained do not satisfy both physicians and patients because efficiency doesn't exceed 10-20%. Relapses and side effects appear very often. In most cases the useful effect is absent at all.

Depending on complexity of a disease and a depth of the hairy integument there are four forms of the early baldness:

- total alopecia;
- rounded baldness of a big area;
- multifoci baldness;
- "nested" baldness with 1-2 foci.

Careful analysis of anamnesis allows assigning several causes of the disease development. These are psycho-emotional stress; medicamental, alimentary and helminthic intoxications; acute viral infection shortly before the disease; traumata of the head.

Equally with alopecia, patients often suffer from accompanying diseases: pathology of nervous system and/or endocrine system, disease of gastroenteric tract, LOR-organs, traumata of cervical part of the vertebral column. Quite often there is available a hypertension-hydrocephalus syndrome, reduction of arterial blood-filling, increase of peripheric vascular resistance. The following disturbances are distinctive for some patients: disturbances in a system of basilar veins, asymmetry in blood supply of vertebral arteries, disturbance of vascular tension, asymmetry of blood supply, cytomegalovirus infection which is related to the chronic opportunist infections that origins in a new-born period.

The treatment with help of quantum therapy is performed in accordance with the following instructions. To improve rheology, microcirculation in the brain and processes of metabolism, nootropyl, cavinton and vitamin complex are prescribed according to the applied recommended dosage. Just before a procedure the lesion foci should be moistened with a solution of plasmolys with dimexide.

7.3.3. Procedure of quantum therapy

Procedure of quantum therapy begins with the Universal Rehabilitation Program (see Fig. 6.4). Then the affected regions of head shall be treated.

In addition a laser-puncture of the points on a floor of the auricle will be performed. The points to be treated are as follows: 22, 55, 35, 100, 101, 51, 37, and also the points corresponding to affected hairy parts of the head: back of the head (*occiput*), skull apex, temple, forehead, etc. (Fig.7.1). In a case of accompanying diseases it is possible to treat the points of affected organs. A frequency is 1000 Hz, exposure time is 30 sec.

Method of a treatment of the affected regions with help of the "RIKTA" apparatus is as follows:

- treatment course - 1- procedures;
- duration of a local irradiation - 10-15 min.

Related to the focal alopecia irradiation should be performed at a frequency of 50 Hz during no more than 5 minutes per focus.

Related to the total and rounded baldness of a big region there shall be performed a scanning of total affected region at a frequency of 50 Hz during 15 min. The scanning rate is 1 cm/sec.

Functions of laser-puncture points on a floor of the auricle:

- 13. Adrenal gland**
- 22. Endocrine glands**
- 29. Back of the head**
- 33. Forehead**
- 35. Temple**
- 36. Skull apex (point of vertex)**
- 37. Cervical part of the vertebral column**
- 51. Vegetative nervous system**
- 55. Antistressing point**
- 95. Kidney**
- 100. Heart**
- 101. Lungs**

Fig. 7.1. Laser-puncture points on a floor of the auricle used for a treatment of alopecia

8. CONCLUSION

Dear colleagues!

The present methodological guide is the first of the issued by our organization - JSC "MILTA-PKP GIT" - that is completely devoted to the items of using quantum therapy for treatment of the skin and hair. It contains the experience results of applying various remedies and methods for a treatment of different lesions of the hairs and skin, and contiguous diseases of human body, that were picked up by the authors from different publications devoted to this problem in combination with our own experience in this field. Attention is particularly focused on highly promising method of treatment with the help of specific model of apparatus RIKTA that JSC "MILTA-PKP GIT" has specially designed for treatment of different types of alopecia.

As physicians will use the guide and we will accumulate own experience, the methods could be inventively modified and developed.

We will very appreciate if you can send to our address any new methodical developments and statistical results of the patients treatment to include them to next editions of the guide.

May the gratitude of the cured patients be the best bounty for you and us!

We want to wish you every success in your noble work - healing of people.

"MILTA-PKP GIT" Team

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