

## Musical-field mesotherapy is an innovative technology for skin rejuvenation and recovery. Biophysical factors of health-improving effects

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### Summary

In 2009, an innovative technology for healing and rejuvenating the skin was patented - musical-field mesotherapy (MPM), based on the simultaneous musical-acoustic effect on the hearing organ and problem areas of the skin. The article presents the theoretical substantiation of the MMM, describes the method of its implementation and the results of the tests carried out. The effect is felt already after the first MMM session, and after several procedures, positive changes in the physical properties and appearance of the skin become statistically significant.

Keywords: musical field mesotherapy.

### Abstract

In 2009 the innovative technology for skin rejuvenation and improvement - a musical-field mesotherapy (MFM), based on simultaneous is musical-acoustic influence on an organ of hearing and problem zones of a skin is patented. In article theoretical substantiation MFM is presented, the technique of its performance and results of the spent tests are described. The effect is felt already after the first session MFM, and through some procedures positive changes of physical properties and appearance of a skin become statistically authentic.

Key words: musical-field mesotherapy.

Musical-field mesotherapy is an innovative technology for healing and rejuvenating the skin related to music therapy (MT) - a dynamically developing area of health care that uses more than 50 different musical-acoustic methods and approaches to correct mental and physical health, prevent diseases, social rehabilitation, creative and spiritual development of the individual.

In 2003, the Ministry of Health of the Russian Federation approved a manual for doctors "Methods of Music Therapy" [1]. In 2005, the resonance-reflex theory of MT was formulated, which summarized the results of our own research, scientific works of the 20th century and modern authors, and also took into account the experience of traditional Chinese and Indian medicine in the use of music for therapeutic purposes [2, 3]. According to the resonance-reflex theory of MT, the perception of sounds in the audible range (16–20,000 Hz) is carried out through the multilevel acoustic-reactive system of the body. Each part of the acoustic reactive system generates its own reactions in response to sound signals.

The hearing organs produce complex neurohormonal reactions, activate emotions, feelings, and after that - secondary cardio-respiratory and other physiological reactions

Acoustic stimulation of acupuncture points can alter activity physiological systems, activation of vibroreceptors triggers the antinociceptive effect and can reduce pain sensitivity. These reactions are of a neuroreflex nature.

The skin as a whole works as a membrane that transfers the energy of mechanical vibrations of low intensity to the internal organs, as well as the energy of electromagnetic fields that arise in the aquatic environment of the body, due to the transformation of acoustic energy. These energetic processes, including infrasonic vibrations, can cause direct resonant responses from organs and cells.

All of the above factors provide profound psychological and physical effects of MT. Understanding the complex mechanisms of the impact of musical acoustics on the human body from the standpoint of medicine, biophysics, psychology, musicology and neurophysiology led to the rapid development of the direction, the emergence of

new methods, a significant expansion of the scope of MT.

In medicine, MT technologies are used primarily for psychological and physiological correction, relieving pain syndromes, restoring reduced or lost functions, which has already found wide application in the clinic of internal diseases, in spa practice, in surgery, and medical rehabilitation. There are serious reasons for the successful use of MT in dermatocosmetology.

It is known that stress plays the role of a triggering mechanism in the etiopathogenesis of various dermatological diseases in more than 50% of cases, including early skin aging. It was revealed that one of the negative consequences of emotional stress is tissue microcirculation disorders and hypoxia. In the phase of preclinical manifestations, disorders of skin microcirculation may be accompanied by a sensation of cold, minor paresthesias in the corresponding areas. Later, visual signs of trophic disorders may appear. If at this stage the problem is more of a cosmetic nature, then at later stages persistent trophic skin disorders, inflammatory lesions, etc. appear. Lack of oxygen in the skin leads to an unhealthy yellowish tint, a decrease in elasticity. Stress can also disrupt digestive processes, which in turn leads to general intoxication of the body, which negatively affects skin health. In this regard, the development of new technologies, psychosomatic orientation, capable of comprehensively influencing the main links of pathological processes that cause various dermatological disorders, including early skin aging, becomes urgent.



We have invented a new way of healing and rejuvenating the skin, the technical result of which is the ability to cause activation of microcirculation and skin regeneration, musical and acoustic effects, including in combination with cosmetic or drugs [4].

As a musical impact, specially developed musical and acoustic programs are used, broadcast through a system of several speakers (from 2 and higher). Before the procedure, problem areas of the skin of the face and the psychophysiological state of the patient are determined, according to the results obtained, a program of musical influence is formed, encoded by various combinations of elements of the musical language and acoustic signals in the frequency range of 20–20,000 Hz. The technology is implemented by three main methodological approaches (Fig. 1, 2):

1) Simultaneously act on the auditory analyzer and directly on problem areas of the skin, on which cosmetic or medicinal products are previously applied, then the areas themselves are covered with a dry paper or cloth napkin (from any material permitted for use in hygienic or medical purposes), on top of which acoustic speakers are attached.

2) Simultaneously act on the auditory analyzer and directly on problem areas of the skin, which are covered with a cloth napkin (made of any material approved for use in hygienic or medical purposes), which is damp or soaked in cosmetic or medicinal preparations, on top of which acoustic speakers are attached.

3) Simultaneously affect the auditory analyzer, problem areas of the skin and acupuncture points through earpieces fixed in the corresponding zones.

	
<p>Rice. one. Musical impact through the auditory analyzer.</p>	<p>Rice. 2. Simultaneous exposure through the auditory analyzer, problem areas of the skin and acupuncture points.</p>

The effectiveness of the developed technology was determined in comparative studies.

#### Materials and methods

The study involved 30 women aged 20 to 40 years with various signs of microcirculation disorders and facial skin trophism. All examined patients were randomly divided into 2 groups.

The main group of 20 people underwent music-field mesotherapy: 5 procedures, 15 minutes each every other day. To carry out the procedures, we used the "Software and hardware complex MMT-PROFI" ([www.doctor-art.ru](http://www.doctor-art.ru)), developed at the Research Center for Musical Therapy and Recovery Technologies. A tissue mask impregnated with a complex bioactive mixture was applied to the surface of the face, which included: distilled water, shark oil, extracts of olive leaves, seaweed, placenta hydrolyzate, vitamins A, C, E. The free ends of the tissue mask on both sides were brought to a projection auricles and covered them. Next, studio stereo headphones were put on top and for 15 minutes. at each procedure one of the music therapy programs was broadcast: Antistress & Insomnia, Depression & Overwork, Fear and Anxiety Therapy, Hypertension & Overstrain, Breath of Life & Neurasthenia from the Music of Health series. Thus, acoustic signals acted in two ways: on the auditory analyzer and directly on skin cells through tissue,

The control group of 10 people underwent mask procedures of the same chemical composition, frequency and duration, but without musical influence.

The comprehensive research program included medical and psychological tests.

1) Questioning of complaints and clinical observation was carried out permanently along the programs.

2) The level of anxiety before the start of the procedures and at the end of them was measured according to the data Taylor questionnaire.

3) Comprehensive study of blood flow in subcutaneous vessels by laser Doppler flowmetry was performed using a contact skin probe on a BLF-21 device from Transonic Systems (USA). Threefold measurements of blood flow were carried out with their subsequent averaging: 5 minutes before the beginning of the 1st procedure, after the end of the 1st procedure, and after the end of the entire cycle of procedures.

4) An objective assessment of the condition of the skin was carried out using a computer SkinXPro program, which determines the degree of moisture, sebum secretion, smoothness and pigmentation.

The results of all studies were processed by the methods of variation statistics. When comparing the distributions of various indicators for different groups, U-

Mann-Whitney test. Mathematical processing of the material under study was carried out using the Statist software.

### results

By clinical examination, approximately equally pronounced signs of skin microcirculation disorders were determined in the main and control groups. Revealed pallor, dryness, smoothness of the skin pattern. 83.3% of the surveyed persons associated the existing them skin problems with emotional stress and chronic nervousness, the main group overvoltage. 75% and 80% of the control group showed various characters, among complaints of neurotic which the most frequent were: fears, sleep disturbances and low mood.

It was revealed that in the main group there was a significant decrease in the number of neurotic complaints by 50% ( $U < 0.01$ ). In the control group, a 10% decrease in complaints was not significant ( $U > 0.05$ ). The average value of the anxiety index in the main group before the procedures was  $25.5 \pm 7.2$  points, and in the control group -  $27 \pm 7.7$ . At the end of observations, the average value of the anxiety index in the main group decreased by 21.6% ( $U < 0.05$ ), and in the control group - by 3.7% ( $U > 0.05$ ).

When assessing the physiological state of the skin, it was found that before the start of the procedures, a decrease in subcutaneous blood flow was observed in both groups. In the main group, the value of this indicator was  $8.5 \pm 2.31$ , in the control group -  $7.9 \pm 1.8$  (with a norm of  $15.6 \pm 4.1$  ml / 100 g / min.). In the main group, after the first procedure, the subcutaneous blood flow indicator significantly increased 2.3 times from the initial level at the level of the value, and after 5 procedures it steadily returned to normal, reaching a value of  $16.5 \pm 3.0$  ml / 100 g / min. ( $U < 0.01$ ). In the control group, after 5 cosmetic masks, the subcutaneous blood flow index insignificantly increased by 1.4, while remaining at the level of values below normal.

An improvement in the indicators of the physical condition of the skin was revealed in both groups, but in all parameters more pronounced positive dynamics was determined in the main group.

### Discussion

The relatively young age and social status of the patients, as well as their own self-assessments, suggest that the cosmetic problems that prompted them to seek help are mainly due to stress.

Adrenaline, released in the 1st stage of stress, leads to redistribution of blood and a deficiency of cutaneous blood flow, which manifests itself in changes in skin color and turgor. Stage 2 stress increases the production of the hormone cortisol, which suppresses the immune system. In the skin, glucocorticoids in high concentration inhibit the growth and division of fibroblasts, which leads to thinning of the skin, its easy damage, and poor wound healing. The skin becomes susceptible to infections. Therefore, the fight against stress and its consequences is an indispensable condition for the successful healing of the skin or the treatment of dermatological patients.

The proposed technology for healing and rejuvenating the skin provides for both auditory and contact versions of acoustic exposure.

The perception of pleasant melodies by ear has an anti-stress effect, due to changes in the neurohormonal background. As our recent studies have shown, the receptive effects of music therapy programs significantly affect the level of various hormones in the blood. For example, the concentration of serotonin increases and the level of cortisol decreases, which has a beneficial effect on the mental state of patients, calms, improves mood (quantitative characteristics, details and conclusions of these studies will be published additionally in a separate work after the final processing of the results obtained). A positive change in the emotional background, in turn, relieves spasms of peripheral vessels, including capillaries

Parallel to auditory, direct impact of acoustic signals on the surface

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skin, leads to weak vibrational disturbances of skin cells, activating their activity. In addition, an important factor enhancing the effect of the action is the significant water content (70%) in the skin. The electromagnetic fields and super-weak electric currents resulting from the transformation of acoustic energy activate the processes of microcirculation and regeneration of skin cells.

The simultaneous application of biologically active cosmetic or medicinal substances to the skin provides biochemical replenishment of skin cells, and their absorption is enhanced due to the activation of regional blood flow. The application of moist or soaked with a complex bioactive mixture of tissues to problem areas of the skin, which are at the same time under the earmuffs, leads to a significant potentiation of the healing and health effects, because the tissue, along with the function of a bioactive mask, simultaneously plays the role of an acoustic membrane that propagates sound signals to the skin surface to be covered, as well as re-emerging fields. This is confirmed by the subjective sensations of patients, who note light tingling sensations in the affected areas, characteristic of some physiotherapy procedures, for example, using modulated currents.

### Conclusion

The use of integrative approaches and non-standard technical solutions in music-field mesotherapy made it possible to achieve complex results: skin rejuvenation and healing against the background of psychoemotional correction. The developed "Software and hardware complex MMT-PROFI" has become an accessible and convenient tool for the practical implementation of technology at the modern level. This gives every reason to consider the musical-field mesotherapy promising for widespread use in the practice of cosmetology and treatment-and-prophylactic institutions.

### Literature

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