ПСИХОФИЗИОЛОГИЯ, ПСИХОДИАГНОСТИКА И ПСИХОТЕРАПИЯ В ВОССТАНОВИТЕЛЬНОЙ МЕДИЦИНЕ И МЕДИЦИНСКОЙ РЕАБИЛИТАЦИИ

Psychophysiology, Psychodiagnostics and Psychotherapy in Restorative Medicine and Medical Rehabilitation

Оригинальная статья / Original article
УДК: 616–009/615.8/534.7/004.3
DOI: https://doi.org/10.38025/2078-1962-2022-21-1-79-85

Meso-Forte — Innovative Method for Musical-Acoustic Psychotherapy and Neurohormonal Correction with Anti-Aging Effect: Clinical Study

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Abstract

This article is devoted to Meso-Forte therapy (MFT) — the innovative scientific method of music therapy. In a long time of clinical studies, music therapy has identified various therapeutic and health-improving effects. Our team also studied regenerative possibilities of musical acoustic impacts on different cell cultures in vitro, including blood cells. Authors found an exciting phenomenon that specific acoustic parameters can intensify the activity of various cell cultures while others inhibit this activity. That data brought us to join healing factors in one technology. As a result, authors have developed MFT, which uses Digital algorithmic music therapy for stress-related mental disorders treatment and anti-aging; as well as local impacts of acoustic vibrations magnetic energy for skin rejuvenation.

Aim. To learn the Meso-forte therapy effectiveness in treating stress-related neurosis with a concomitant skin disorder in the form of accelerated aging.

Material and methods. The study involved 52 women aged 30 to 60 years with various signs of stress-related neurosis combined with accelerating face skin aging. All examined patients were randomly divided into two groups. The Leading group of 27 persons underwent MFT with the cosmetic masks: 10 procedures, 20–25 minutes each day. The Control group of 25 persons experienced listening to usual background music with the same cosmetic masks. The comprehensive research program included tests carried out before and after ten interventions. Psychological tests: WAM (Well-Being, Activity, Mood), Taylor's anxiety questionnaire. Medical tests: enzyme immunoassay method to measure cortisol and serotonin blood levels, laser doppler flowmetry to study blood flow in subcutaneous vessels, an objective device assessment of the skin condition.

Results and discussion. In the Leading group, authors found reliable signs of mental-emotional improvement, optimization of the hormonal system, skin rejuvenation with the augmentation of the subcutaneous blood flow. In the Control group, there were no significant dynamics.

Conclusion. Clinical study shows that MFT provides complex effects on the organism. Due to the integration of science, art, medicine, and modern technology, authors managed to create an effective high-tech tool for psychotherapy, healing, and rejuvenation that will be helpful to a doctor of any specialty or a psychologist.

Keywords: psychotherapy, neurohormonal, correction, anti-aging, digital, algorithm, music therapy
Acknowledgments: The study had no sponsorship.
Conflict of interest: The authors declare no apparent or potential conflicts of interest related to the publication of this article.
For citation: Shushardzhan S. V., Allik T. L., Eremina N. I. Meso-Forte — Innovative Method for Musical-Acoustic Psychotherapy and Neurohormonal Correction with Anti-Aging Effect: Clinical Study. *Bulletin of Rehabilitation Medicine. 2022; 21 (1):79-85.* https://doi.org/10.38025/2078-1962-2022-21-1-79-85
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Received: Dec 23, 2021
Revised: Feb 03, 2022
Accepted: Feb 10, 2022

Мезо-Форте –инновационный метод музыкально-акустической психотерапии и нейрогормональной коррекции с омолаживающим эффектом: клиническое исследование

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Резюме

Данная статья посвящена Мезо-Форте терапии (МФТ) — инновационному методу научной музыкотерапии. За долгое время клинических исследований выявлены различные терапевтические и оздоровительные эффекты музыкальной терапии. Наша команда также изучала регенеративные возможности музыкально-акустических воздействий на различные культуры клеток в лабораторных условиях, включая клетки крови. Авторы выявили захватывающее явление, заключающееся в том, что определенные параметры акустических воздействий могут усиливать активность различных клеточных культур in Vitro, в то время как другие подавляют эту активность. Эти данные привели нас к соединению нескольких лечебных факторов в одной технологии. В результате авторы разработали МФТ терапию, которая использует цифровую алгоритмическую музыкотерапию для лечения психических расстройств, связанных со стрессом, и антивозрастной терапией в комбинации с локальными воздействиями акустическими вибрациями и магнитной энергией для омоложения кожи.

Цель. Изучить эффективность терапии МФТ в лечении стрессогенных невротических расстройств, с сопутствующими признаками ускоренного старения кожи.

Материал и методы. В исследовании приняли участие 52 женщины в возрасте от 30 до 60 лет с различными проявлениями невроза, связанного со стрессом, в сочетании с признаками ускоренного старения кожи лица. Все обследованные пациенты были случайным образом разделены на две группы. Основная группа из 27 человек прошла МФТ с применением косметических масок: 10 процедур по 20–25 минут каждый день. Контрольная группа из 25 человек слушала обычную фоновую музыку с теми же косметическими масками. Комплексная исследовательская программа включала тесты, проведенные до и после десяти вмешательств. Психологические тесты: САН (Самочувствие, Активность, Настроение), опросник тревожности Тейлора. Медицинские тесты: Метод иммунологического анализа для определения уровня кортизола и серотонина в крови. Лазерная доплеровская флоуметрия для исследования кровотока в подкожных капиллярах. Объективная оценка состояния кожи с помощью аппаратного метода исследования.

Результаты и обсуждение. В основной группе авторы обнаружили достоверные признаки улучшения психоэмоционального состояния, оптимизации гормональной системы, омоложения кожи с активизацией подкожного кровотока. В контрольной группе достоверной динамики не наблюдалось.

Заключение. Клинические исследования показывают, что МФТ оказывает комплексное воздействие на организм. Благодаря интеграции науки, искусства, медицины и современных технологий авторам удалось создать эффективный высокотехнологичный инструмент для психотерапии, восстановительного лечения и антивозрастной терапии, который будет полезен в практической деятельности врачу любой специальности или психологу.

Ключевые слова: психотерапия, нейрогормональная, коррекция, омолаживающая, цифровая, алгоритм, музыкальная терапия

Источник финансирования: Авторы заявляют об отсутствии финансирования при проведении исследования.

Конфликт интересов: Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

Для цитирования: Шушарджан С. В., Аллик Т. Л., Еремина Н. И. Мезо-Форте –инновационный метод музыкально-акустической психотерапии и нейрогормональной коррекции с омолаживающим эффектом: клиническое исследование. Вестник восстановительной медицины. 2022; 21 (1): 79-85. https://doi.org/10.38025/2078-1962-2022-21-1-79-85

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Статья получена: 23.12.2021

Поступила после рецензирования: 03.02.2022

Статья принята к печати: 10.03.2022

Introduction

Psychological stress is an urgent problem of our time, which creates real risks for the occurrence of various disorders and diseases. The situation resembles a two-way road. Stress can lead a person to illness, and vice versa; any sickness can become a waste source of nervous stress.

Long-lived psychological stress reduces the quality of life, negatively affects human health, and accelerates the aging process [1–3]. Therefore, mental health care is the global interdisciplinary task solved by various psychological, medical, pedagogical, and high technological methods [4–8]. The tactical team approach in clinical and rehabilitation practice requires the presence of a psychologist or a psychotherapist in the treatment team. However, it requires a lot of resources. To improve the prevention and treatment of mental stress, it is necessary to create high-tech methods that have a complex effect, including psychotherapeutic. In this regard, we have developed Meso-Forte therapy (MFT) — the innovative method for Musical-acoustic

psychotherapy & neurohormonal correction with anti-aging effect.

Scientific music therapy features

One of the popular methods of stress treatment is Music therapy. The healing use of music has a long history. Hippocrates, Aristotle, Confucius, and other ancient sages a thousand years ago were trying to treat by music nervous and mental patients. There are a lot of documentary mentions. They refer to different periods and civilizations and give a clear idea that doctors used music empirically to explain therapeutic effects based on myths, metaphysical theories, or religious views.

In the XX century, music therapy was widely practiced in various European countries and the USA. Currently, more than 100 universities and colleges all over the world offer educational programs. Scientific music therapy (SMT) is a new interdisciplinary direction that prefers studying the characteristics of the body complex reactions to music: psychological, physiological, and biophysical, with the subsequent application of the found patterns in rehabilitation and clinical medicine. In clinical studies, music therapy has identified various therapeutic and health effects: neurohumoral, psychotherapeutic, analgesic, adaptogenic, regenerative, hypotensive, etc. [4–8].

We have developed several innovative technologies thanks to the multi-method research of music influence on the body. Today there are more than 50 methods. There are receptive methods of music therapy, where the patient passively receives the procedure, and active ones, where the patient takes part in it directly, for example, singing or learning to play the elementary musical instruments. High-tech methods use digital technologies and artificial intelligence [14]. Fundamentals of SMT were developed in Russia by the first author of this article in the early nineties of the last century.

Psycho-physiological studies of auditory perception of music

We studied the mechanisms and patterns of auditory perception of various types of music by psychological tests, EEG, MRI, etc. As a result, our team developed n*ew methods and programs of musical psychotherapy.*

Musical-Acoustic Algorithms and Neurohormonal System

In studying acoustic influences on the human organism, our team discovered three main musical-acoustic algorithms (S-, HR-, T-) that cause neurohormonal system characteristic changes.

S-algorithms cause inhibition of the nervous system and sedation. They also reduce the level of stress hormones (cortisol, adrenaline, noradrenaline).

T-algorithms act in the opposite way, tone up the nervous system and smooth increase the level of stress hormones.

HR algorithms — stabilize the nervous system and optimize hormonal status.

Using musical-acoustic algorithms-regulators in Music therapy for neurohormonal optimization is the key to **healing the body and inhibiting aging processes** [15]**.**

Study of the regenerative possibilities of acoustic energy on in vitro cell models

From 1996, our team studied regenerative possibilities of musical acoustic impacts on experimental different cell cultures in vitro, including blood cells.

As a result, we found that specific acoustic parameters can intensify the activity of various cell cultures, while others can inhibit this activity.

Fig. 1. *An acoustic experiment with blood cells in vitro*

These experiments proved for the first time in the world that music can affect the psyche and emotions and directly on the cells.

In one of such experiments, we have detected unique activating algorithms of acoustic musical impact. During only one hour, the use of which allowed to increase the total number of leukocytes on average 4.7 times, and the number of immature granulocytes increased 18.3 times! [16]**.**

The emergence of a significant number of immature cells indicates the participation of hematopoietic stem cells in the process.

Those results brought us to the idea to use acoustic impacts in the range of hearing frequencies direct on the skin to activate the skin regeneration process.

Study of the influence of acoustic energy on the skin

In our researches, we paid significant attention to study direct acoustic influences on human skin with its reflex zones. We learned the following parameters: capillary circulation, temperature, pain sensitivity, electrical conductivity, physiological reactions, clinical effects.

Due to the received data, we could develop new technology for psychotherapy and neurohormonal correction with anti-aging effect called Meso-forte therapy (MFT).

Technological aspects of Meso-Forte therapy

To provide MFT, we use the patented hardware, magnetic mask-converter, headphones, and software, including 38 Algorithmic digital music therapy (MT) programs (Fig. 2).

The primary idea of Meso-forte therapy is the synergy of the internal recovering process caused by listening to innovative digital music therapy programs and regenerative skin reactions produced by local acoustic magnetic energy impact in combination with reparative cosmetics.

Steps of Meso-Forte therapy:

1. The patient takes a comfortable position, lying or sitting (Fig.3). After that, the face skin shall be thoroughly cleaned (washed or rubbed with lotion).

2. The mask-converter «Bonny-Grand» shall be superimposed above the mask with reparative cosmetics with headphones put on top [18].

3. Chosen music therapy programs start to sound and act via mask-converter and headphones simultaneously. The procedure lasts 20–25 minutes.

Fig. 2 *The patented hardware-software complex for Meso-forte therapy [17, 18]*

Fig. 3. *Meso-forte therapy procedure*

We determined the effectiveness of the developed technology in comparative studies.

Clinical study of Meso-Forte therapy

The research goal: a clinical study of Meso-Forte therapy's effectiveness in treating stress-related neurosis with a concomitant skin disorder in the form of accelerated aging.

Material and methods

The study involved 52 women aged 30 to 60 with various signs of stress-related neurosis combined with rapid aging face skin. All examined patients were randomly divided into two groups.

The Leading group of 27 persons underwent MFT with cosmetic masks applications: 10 procedures, 20–25 minutes each every other day. The Control group of 25 persons underwent usual listening of radio background music with the same masks procedures.

The comprehensive research program included different tests carried out before the procedures and after the course of 10 interventions.

1) Psychological tests:
- WAM (well-being, activity, mood),
- The Taylor's anxiety questionnaire.

2) Medical tests:
- Enzyme immunoassay method (Stat Fax 2100) was used to measure cortisol and serotonin blood levels.
- Study of blood flow in subcutaneous vessels by laser Doppler flowmetry (BLF-21 device from Transonic Systems): threefold blood flow measurements 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 whole cycle of courses.
- An objective assessment of the skin condition was carried out using the SkinXPro computer program (Aramo SG device).

The methods of variation statistics processed the results of all studies. When comparing the distributions of various indicators for different groups, the Mann-Whitney U test was used.

Results and discussion

The following prevailed in the structure of neurotic complaints in both groups: increased fatigue, mood instability, fears, and sleep disturbances. The amount of 88.8% of the surveyed persons associated their existing skin problems with emotional stress and chronic nervous overstrain.

After the MPT course, the patients of the Leading group experienced a significant decrease in the level of psychological complaints.

The number of complaints about increased fatigue decreased 5.4 times, lousy mood — 6.8 times, fears — 4.5 times, and insomnia — 9 times. In the control group, no significant dynamics were found.

Positive subjective feelings coincided with the data of psychological testing (Tab. 1).

Following the results of the WAM test in the Leading group, we found a statistically significant (U <0.05) increase in the mean values for all scales.

The average value of the anxiety index in the Leading group before the procedures was 25.5 ± 7.2 points, and in the Control group — 27 ± 7.7.

At the end of observations, the average value of the anxiety index in the leading group decreased by 21.6% (U <0.05) and in the control group — by 3.7% (U> 0.05).

Comparative dynamics of the hormones level in the blood in the Leading and Control groups are presented in table 2.

After the MFT course in the Leading group, the average value of cortisol in the blood decreased by 33.5% (U≤0.05), and the level of serotonin increased by 68.2% (U≤0.05).

Thus, we see a tendency to shift the studied hormones to the average values of the norm, optimizing the hormonal

Table 1. *Results of the WAM test in the Leading Group*

Psychological scales	Value before the MFT course (in points)	Value after the MFT course (in points)
Well-Being	3.9 ± 0,2	5.6 ± 0,3
Activity	4,1 ± 0,3	5,9 ± 0,8
Mood	4,8 ± 0,8	6,5 ± 0,4

Table 2. *Comparative dynamics of the hormones level in the blood*

Hormones	Leading group			Control group		
	Blood test before intervention	Blood test after intervention	Difference (%)	Blood test before intervention	Blood test after intervention	Difference (%)
Cortisol *(Norm 3,7–19,4 mcg/dl)*	17,3±2,34	11,5±1,81 U<0,05	-33,5%	15,32±1,96	14,2±2,16	-4,6%
Serotonin *(Norm 0,22–2,05 µmol \ l)*	0,35±0,15	1,1±0,23 U<0,01	+68,2%	0,78±0,18	0,84±0,09	+7,7%

background and homeostasis. There were no find significant changes in the Control group.

Before starting the procedures, we have found a decrease in subcutaneous blood flow in both groups. In the Leading group, the value of this indicator was 8.5 ± 2.31, in the control group — 7.9 ± 1.8 (with a norm of 15.6 ± 4.1 ml / 100g / min.).

In the Leading group, after the first procedure, the subcutaneous blood flow indicator significantly increased 2.3 times from the baseline level at the level of the value (Fig. 4).

It stably returned to normal after 10 procedures, reaching a value of 16.5 ± 3.0 ml / 100 g / min (U <0.01). In the Control group, the subcutaneous blood flow index insignificantly increased by 1.4 while remaining at the level of values below the norm after five cosmetic masks (Fig. 1).

The Leading and Control groups determined approximately equally noticeable signs of skin disorders by clinical examination — revealed pallor, dryness, reduced smoothness of the skin pattern. An indicators improvement in the physical skin condition was found in both groups, but we see more pronounced positive dynamics in all parameters in the Leading group.

Studies of MFT effectiveness show that visible improvements in skin condition occur after the first procedure (Fig. 5).

The following clinical case gives a good illustration of the multilevel effectiveness of Meso-forte therapy. A woman S.F. of 60 years old with reduced vitality, neurosis and aging problems after a stroke came for rehabilitation in our Institution.

There was asymmetry of the face, depressed look, wrinkles, sparse hair (Fig. 6).

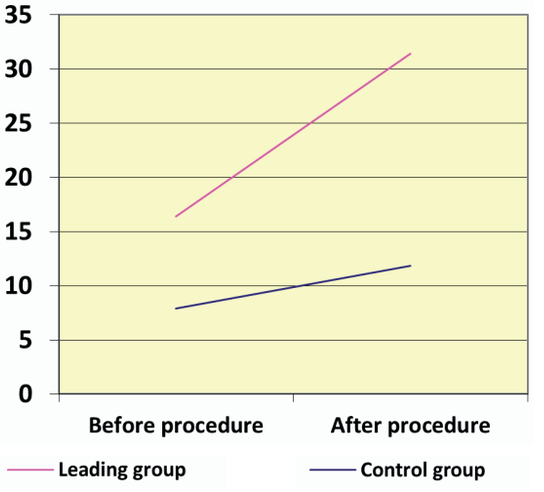
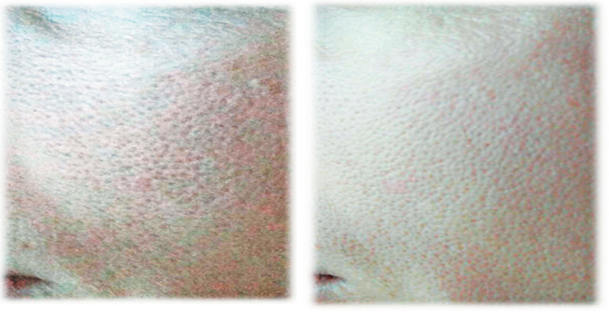


Fig. 4. *Dynamics of the subcutaneous blood flow rate after 5 MFT procedures*



Before MFT **After the 1st intervention**

Fig. 5. *Skin before and after MFT intervention*

Before MFT **After the 10 intervention** **After the 20 intervention**

Fig. 6. *Results of 10 MFT interventions*

The facial symmetry has fully recovered after 10 MFT interventions, the skin has become smooth, and the emotional state has stabilized. In addition, hair growth has been restored.

The nature of behavior has changed significantly. The patient has become more confident — increased efficiency and interest in life. There were no cases of complications in general during the clinical study of Meso-forte therapy. In addition, patients attended the procedures with satisfaction, noting an improvement in their mood, general well-being, and appearance. Those effects after 10 MFT interventions remain almost for one year. The technology we have developed allows us to act on several targets simultaneously. The most important target is the neurohormonal system that is the basement of homeostasis and well-being.

We can regulate it by the Algorithmic organized digital music therapy programs [19]. Another target is the skin. Direct acoustic magnetic energy impact improves the subcutaneous blood flow and activates regenerative cell reactions [20].

Together they give a super-cumulative effect.

Conclusion

1) Clinical study shows that Meso-forte therapy provides complex effects on the organism: the psychotherapeutic, wellness and anti-aging.

2) We found reliable signs of mental-emotional improvement, optimization of the hormonal system, skin rejuvenation with the betterment of the subcutaneous blood flow in the Leading group. In the Control croup, there was no significant dynamic. It was proved by psychological and medical tests.

Due to the integration of science, art, medicine, and modern technology, we managed to create an effective high-tech tool for psychotherapy, healing, and rejuvenation, which will be helpful to a doctor of any specialty or a psychologist.

Positive experience of using MFT in clinics of different countries for the treatment of stress, psychosomatic disorders, decreased vitality, age-related changes, skin aging, etc. confirms the validity of the conclusions drawn.

Meso-forte technology opens up new opportunities in medicine, psychology, beauty and health industries.

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