

Editorial

On Psychophysiological, Biological and Ethnocultural aspects of the Kobyzotherapy Method Application in the Programs of Musical Psychocorrection and Rehabilitation

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Due to the modern stressful rhythm of life, ecological, economic and social problems there is an alarming tendency of general growth of mental morbidity and psychological disorders [1]. Therefore the search for new non-drug methods of psychological correction and recovery is the most actual modern task. Recently the methods of music therapy have become more and more widespread.

The novelty of this research consists in studying the psychological, physiological and ethno-cultural aspects of the use of the ancient Kazakh musical instrument kobyz for health purposes.

Purpose of research

In this article for a deep and comprehensive understanding of the mechanisms of music impact on the human body is necessary to actively use the knowledge accumulated by acoustics, that area of physics, which studies the properties of sound, elastic vibrations and waves arising and propagating in gases, liquids and solids, perceived by the human ear. The frequency limit of sound perception has been established - from 16 to 20,000 Hz.

Sound vibrations with a frequency of less than 16 Hz, which are not perceived by the hearing organ, are called infrasound. Infrasound has an adverse effect on the human body, causing headaches, fatigue, fear, increased irritability.

It is believed that the negative impact of infrasound is of resonance nature. It was found that the purity of natural vibrations of the human body in prone position is 3-4 Hz, standing - 5-12 Hz, chest - 5-8 Hz, abdomen - 3-4 Hz [2].

Thus, the frequency range of infrasound, which is a forcing force in relation to the body, has close values to the frequency of natural vibrations of individual systems and the body as a whole 132. Fluctuations and waves with a frequency greater than 20,000 Hz, which are also not perceived by the human ear, are called ultrasounds. The upper limit of ultrasonic frequencies can be conventionally considered as 109 - 1010. The limit is determined by intermolecular distances and therefore depends on the aggregate state of the substance in which the ultrasonic wave propagates. Ultrasound is widely used in medicine for diagnostic and therapeutic purposes. Frequency spectrum of sounds used in music and reproduced by an ancient musical instrument - kobyz - as the main instrument of influence

on the body, lies in the zone of frequencies, not perceived by the human ear and therefore is the subject of primary interest in this study.

Infrasound is a mechanical vibration in the frequency range below 20 Hz. A characteristic feature of infrasound, unlike other mechanical vibrations, is the large wavelength and low frequency of oscillation. Due to the small absorption of energy, infrasound propagates long distances from the source [3]. Of the many spectra of industrial and transport noise, containing infrasound components, we can distinguish three main types:

- Infrasound - the highest sound pressure levels (SPLs) occur in the octave bands of the mid-geometric frequencies - 2-26 Hz;
- infra-low-frequency - the highest SPL fall within the mid-geometric frequency bands - 2-125 Hz;
- Low-frequency - the maximum SPL are in octave bands of 31,5-125 Hz. In production conditions, infrasound is usually combined with low-frequency noise, and sometimes with low-frequency vibration.

By the nature of the spectrum of infrasound differ broadband infrasound, with a continuous spectrum of width over an octave, and harmonic, in the spectrum of which there are marked discrete components. Harmonic infrasound character is established in the octave frequency bands by the excess level in one band compared to the neighboring by at least 10 dB.

According to the time characteristics, there are permanent infrasound, the sound pressure level of which according to the scale "linear" on the characteristic "slowly" changes by no more than 10 dB during the observation period of 1 minute; non-permanent, which sound pressure level according to the scale "linear" on the characteristic "slowly" changes by no less than 10 dB during the observation period of at least 1 minute:

- For infrasound characteristic - octave sound pressure levels;
- For non-permanent infrasound - the total sound pressure level on the "linear" scale of the noise meter [4].

Bioresonance effect of musical influence on the human body is due to the phenomenon of resonance as a general physical law of nature, according to which the external force, changing according to a periodic law and leading to the occurrence of forced vibrations of the body, and the amplitude of forced vibrations is directly proportional to the amplitude of the forcing force.

At a certain certain frequency of the forcing force, called resonance, the amplitude of the forced oscillations acquires a maximum value, which is called resonance.

Materials and Methods

Infrasound was measured with a noise meter - "Noise meter integrating Ecophysics No. 100226", certified No. VA 12-05-3280 of 21.06.12. The study was conducted by P.F. Kuznetsov, a laboratory technician of the EMF and other physical factors department.

Measurement of infrasound was performed at the workplace of a music therapist. The measurement points were chosen at a distance of not more than 1 meter between the music therapist performing musical compositions and the microphone. The microphone was placed at a height of 1 meter from the floor and at a distance of at least 0.5 m from the music therapist performing the measurement.

Musical compositions were performed by a music therapist on four types of kobyz. These are "kobyz small", "nar kobyz", "kyl kobyz" and "prima kobyz".

Then infrasound from acoustic system (computer speakers) was measured, in this case the author's composition of kobyzotherapy method: Forces of Nature "Steppe Freedom" was used, conditions of acoustic system measurement were similar to those of musical instruments.

Measurement results

The sound pressure levels in dB 1/3 octave bands are as follows in Hz.

Discussion

According to the nature of the infrasound spectrum in this case is a broadband infrasound with a continuous spectrum, 1/3 octave wide; harmonic. Harmonic nature of infrasound is established in the octave frequency bands by the excess of the level in one band, compared with the neighboring by at least 10 dB.

The sound pressure levels in dB 1/3 octave bands are as follows in Hz:

“Kobyz small” - 67 Hz at a sound pressure level of 1.6 dB.

“Nar kobyz” - 84, “kyl kobyz” - 66, “prima kobyz” - 87, acoustic system measurements in the composition “Freedom of Steppe” - 62.

Conclusions

The results of measuring infrasound of kobyz as well as acoustic system in the author’s composition of the Force of Nature “Steppe Freedom”, showed complete absence of discrete components. Harmonic vibrations and low level of intensity have beneficial effect on the human organism as a whole.

Sound reproducing devices, in this case the acoustic system in the author’s composition of the Forces of Nature “Freedom of the Steppe”, directly affect the skin and the projection of vital organs. Sound signals, in full compliance with physical laws, hitting the resonance frequencies, cause maximum vibration, having a direct kobyzotherapeutic effect on the organs.

Thus, the results of the study confirm that the author’s methodology of kobyzotherapy corresponds to hygienic standards of noise and infrasound levels approved by the Order of the Minister of Health of the Republic of Kazakhstan [5].

This study has shown that the method of kobyzotherapy can be successfully applied in preventive, experimental and clinical medicine as a new method of corrective directed action on the functional activity of vital organs and therapeutic action on pathological changed organs and tissues.

That is why the author’s method Kobyzotherapy is offered for introduction into practice of medical preventive institutions as one of effective methods of mobilization of natural resources and adaptation possibilities of a human organism.

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