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**FUNCTIONAL AND TECHNICAL FEATURES
OF THE COMPUTERIZED COMPLEX «JEREMY»
FOR CHILDREN'S MUSIC-COLOR THERAPY**

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Abstract

The article presents an innovative technology for the correction of neuroses, developmental disorders and stress conditions in children using a computerized complex for Music-Color Therapy actualized through a special Interactive Healing Doll «Jeremy» with remote control. At the same time, a comparative analysis of the existing experience of the using musical toys in children's correctional practice with the technical features and advantages was carried out.

Key words: stress, neuroses, autism, doll, Bluetooth, computer, psychotherapy, music therapy.

The full version of the article in Russian will be published in the next issue of our journal!

Полная версия статьи на русском языке будет опубликована в следующем номере нашего журнала!

**ФУНКЦИОНАЛЬНЫЕ И ТЕХНИЧЕСКИЕ ОСОБЕННОСТИ
КОМПЬЮТЕРИЗИРОВАННОГО КОМПЛЕКСА ДЛЯ ДЕТСКОЙ
МУЗЫКАЛЬНО-ЦВЕТОВОЙ ТЕРАПИИ «ЕРЕМА»**

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Аннотация

В статье представлена инновационная технология коррекции неврозов, расстройств развития и стрессовых состояний у детей с помощью

компьютеризированного комплекса для музыкально-цветовой терапии, реализуемой через специальную интерактивную лечебную куклу «Ерема» с дистанционным управлением. При этом, проведен сравнительный анализ существующего опыта применения музыкальных игрушек в детской коррекционной практике с техническими особенностями и преимуществами, которые дает работа с компьютеризированной системой музыкально-цветовой психотерапии.

Ключевые слова: стресс, неврозы, аутизм, кукла, блютуз, компьютер, психотерапия, музыкальная терапия.

INTRODUCTION

The World Health Organization has defined health as a state of «complete physical, mental and social well-being and not as the absence of disease and physical defects» [1].

Strengthening the psychological and physical health of a child is the primary task of our society as far as knowledge goes that 75% of all human diseases are embedded in childhood.

At the same time neurosis is one of the most common child health disorders. Often the appearance of neuroses goes with the development disorders such as ADD, ADHD, autism, etc. and their number is growing.

It is known that a toy is an integral part of a child's life, its role in the process of his adequate development is great because often the toy is the mean of cognition of the outside world.

Over the last years children in the game are using more often emergent new items such as telephones and computers. However, a doll for a child which he can communicate with and even gain life experience still remains irreplaceable in its way. Particularly during the personal interaction with a doll the child often speaks out his inner experiences and works them out in various play situations.

Moreover, what this game will be depends largely on the personal appearance of the toy. Aggressive appearance of the doll provokes an aggressive, warlike type of play and more gentle facial features raise care, participation, etc.

According to a study conducted in Russia by members of Omsk State Pedagogical University the main aspects of the developmental pedagogical and educational value of a child's toy are found out.

The main psychological and pedagogical problems caused by the violation of the requirements for the development of children's toys have been determined.

Examples of toys that have a possible negative impact on child development and emotional well-being are given.

To analyze the main characteristics of modern children's toys the scientists considered the normative documents on the psychological and pedagogical expert examination of toys developed by the Ministry of Education in conjunction with the artistic and technical council of toys in 1995 [2].

According to the content of these documents criteria of two levels are distinguished. The first level criteria are associated with a possible negative impact on the child's mental health. The second level criteria are connected with the didactic value of the toy.

Also the study used the method of psychological and pedagogical expert examination of children's toys [3].

The subject matter of analysis was: 1) ethical and aesthetic characteristics; 2) operational and technical characteristics; 3) the developmental potential of the game action (focus, age range).

The psychological and pedagogical expert examination of modern toys made it possible to single out a number of problems in the children's toys industry.

Problem 1. Low developmental potential and didactic value of modern toys.

Problem 2. Monofunctionality of toys.

Toys from the animated series which are loved by children expect predetermined format of the game's plot. Such a toy cannot be flexibly used with the playful intention of the child himself. The monofunctionality of modern toys hinders the development of the sign-symbolic function of thinking children's imagination and creativity.

Problem 3. The negative effect of toys on mental health and emotional well-being of children.

First of all, it is important to note that many toys invoke aggression, anxiety and lead to neurotization of the child. Many researchers point to these problems.

Problem 4. The Formation of demands which are not inappropriate to the child's age.

The target audience of some children's toys goes far beyond preschool age. For example, the doll Barbie looks like a young beautiful girl / woman this doll has a beautiful figure it is fashionably dressed and it has bright makeup, etc. Identification of a child with such a doll will be untimely and difficult and in consequence of which it becomes difficult to develop social significant properties and qualities of a person.

V.V. Abramenkova notes that the modern children's toy shapes «the mercantilization of children's mentality» which leads to the transformation of the child's worldview and dependence on material wealth [6].

In the study of E.S. Ivanova which are devoted to the problem of changing the image of a doll is emphasized the following: «The appearance of dolls with genitals and also provocative overtly sexual outfits of modern dolls are one of the reasons of the early» sexualization of children's consciousness» [7].

THE EXPERIENCE OF USING MUSICAL TOYS TO STABILIZE THE EMOTIONAL STATE IN CHILDREN

It is known that the toys for regulating the emotional sphere have been created before.

Such a device as a doll with closing eyes gives psychotherapeutic relaxing effect.

It was considered that such a doll incline to feedback response of relaxation and falling asleep.

To this date there is an evidence about the using of musical toys to stabilize the psycho-emotional state in children. As an example it is a toy «baby calmer» (EP 0233266 B1, SAMSON, A 61 M 21/00, 1991) which is supplied with specially designed means to create a relaxing effect. This toy is a model of a sea shell with a built-in noise generator in the 10 kHz range simulating the noise of the surf. It is believed that the impact of «pink» or «white» noise has a beneficial effect on the human psyche.

An automatic child calmer is known (GB 2234840 A, WRIGHT, A 61 N 21/00, 1991). It is activated on a child's cry and contains a microphone, the control scheme of a relaxed sound generator (mother's noises, «white» noise, melodies) and the timers. More over there is a scheme that excludes false triggering of the device from extraneous sound (for example, door slamming). It is provided that one of the timers turns off the generator when the child is crying for a long time to attract the attention of the parents. When a child cries, the generator of the calming sound effect is switched on with a delay thus it allows to differentiate the cry into the noise.

However, this device contains a large number of structural units that are necessary for its operation.

An automatic device with remote control for calming and / or lulling to sleep a child is also known. This device contains the information processing unit from a

child including a sensor and a control device the inputs of which are connected to the timers and the outputs are connected to a source of soothing sound movement and lighting units (US 4777938, SIPOTA VL. A 61 M 21/00, 1988). However, this device is complex in design and the failure of one of the units excludes the possibility of its functioning.

Also a soft toy which creates intermittent rhythmic sound signals (EP 0218182, LEE, A 61 M 21/00, A 63 H 3/00, 1988) is known. A toylike teddy with a built-in loudspeaker which generates sounds of the mother's heart is described in known solution. The rhythm of the mother's heartbeat soothes the baby. It is possible to regulate the frequency of sound vibrations.

The disadvantage is that this special sound device performs the only function such as the generation of monotonous sound vibrations.

All of these devices are designated for calming and relaxation with the help of sound not music effect.

The current problem is the development of new and existent technologies that develop the personal potential and increase the reserve capabilities of the child's body.

Over the last years' innovative methods of music therapy have a special place in the line of health technologies [8].

Music therapy is a therapeutic and prophylactic direction that uses the music art for correction recovery and preservation of the psychosomatic person's health [9].

THE DEVICE AND TECHNICAL RESULT OF THE USE OF THE COMPUTERIZED COMPLEX «JEREMY»

The computerized complex «Jeremy» for Music-Color Therapy was developed for overcoming of existing deficiencies and enhancement. This complex consists of the following elements:

1. Doll named «Jeremy» with built-in acoustic wireless speaker and color music option.
2. Computer (smart phone).
3. Music Therapy programs in digital format.

The Doll «Jeremy» combines the classic characteristics of traditional toys with technical innovations that actually bring it to life. This doll has a good-looking positive appearance with the correct body proportions which is also important for children's psychological perception.

A portable wireless light speaker (1) is put into the transparent middle part of the

doll's body through a special pocket which becomes the base of the toy (2). Further, the assembled doll is connected via Bluetooth to a computer (3) with music therapy programs which are loaded into it (Fig. 1).

The Bluetooth speaker works as a regular speaker audio is transmitted from a laptop or smartphone, so it is possible to control tracks and sound volume remotely from a mobile device. The volume level should not exceed 45-50 dB.



Fig. 1. *Installation of the computerized complex «Jeremy» for Music-Color Therapy*

Рис. 1. *Сборка компьютеризированной системы музыкально-цветовой терапии «Ерема»*

The technical result of the use of the computerized system of Music-Color Therapy «Jeremy» is the creation of a psychotherapeutic acoustic and visual environment due to several synchronously working components:

- 1) A positive image of the Doll itself;
- 2) Music Therapy programs which consist of masterpieces of musical art which are unbuilt with reference to the optimal effect on the body of acoustic (T, HR and S) algorithms-regulators;
- 3) Impulse color effect due to a portable wireless speaker that has a color generation function synchronized with sound.

CLINICAL CASE

The mother of a three- years- old boy named Ivan applied to us for a help. The boy had complaints of anxiety, fears, panic attacks, poor sleep which were

observed for several months.

It has been discovered from the child's anamnesis that about 6 months ago the child being at summer home was caught in a thunderstorm and was scared by the peals of thunder. Since then he became afraid of loud noises, almost stopped talking, refused to go out and became afraid of everything. Recently he began to stutter.

The child is constantly crying he keeps his mother close by and wakes up at night and screams if she is gone (he is afraid to sleep in the dark).

They went to the doctors but no organic diseases were found. He was treated by a neurologist and psychologists with the diagnosis of neurotic disorder. There were only slight improvements.

Then music-color psychotherapy with the help of a computerized complex "Jeremy" was recommended to Ivan.

At once the boy perceived the doll as a friend and when wonderful melodies were sounded from "Jeremy" and fascinating light was appeared the child firstly began to smile calmed down and after a while he fell asleep.

When he woke up the boy asked his mother to take "Jeremy" home. Since then Ivan has got a best friend (Fig. 2).



Fig. 2. *A child with the interactive Doll «Jeremy»*

Рис. 2. *Ребенок с интерактивной лечебной куклой «Ерема»*

Now the boy feels well, his fears have been disappeared, his sleep has been improved. In addition to it, the boy's mother noted that the atmosphere in the family became calmer and more constructive when this «Jeremy» complex had

been appeared.

In the proposed model of music-color psychotherapy the combination of auditory and visual effects forms a special eco-environment that contributes to the mobilization of the body's internal reserves and the formation of stable positive emotional states which are necessary for getting out of stress and general recovery of the child.

CONCLUSION

It is known that the lack of positive emotions in person's life in psychology and medicine is considered as painful mental disorder. Pleasure deficit syndrome is often called. This phenomenon was described by its discoverer, Dr. Kenneth Bloom, as a reward deficiency syndrome [10, 11, 12, 13, 14].

This disorder is connected with the metabolic imbalance of neurotransmitters such as serotonin dopamine and also endorphins. If this state stays for a long time it leads to the development of chronic stress and depression and also it leads to the appearance of neuroses and then development disorders among children.

The effectiveness of music-color therapy technology with the help of the computerized complex «Jeremy» depends on several factors.

1. Musical therapy programs are arranged according to the principle of an optimal combination of acoustic control algorithms (S, HR, and T) that cause the stabilization of the neurohormonal system (patent RU 2518538, 03/26/2013). The scientific facts of the influence of music and acoustic signals on psychophysiological and cellular processes have been established [15]. Perhaps the explanation of the deep mechanisms of acoustic influences lies in the diagnosed analogy of the correlation of nucleotides in chromosomes with the quarto-fifth correlations of sounds in tempered musical lines. At the same time the influence of chromosomes on all structures and processes of the body's vital activity is known including neural networks biochemical processes and biometric identification characteristics of a person [16, 17, 18, 19]. Perhaps in this amazing interrelation there is the multifaceted music influence on living systems.

2. A positive image of the doll is a very important component. For example, it is known that a doll in China is not just a child's play but primarily a thing is for reverence and admiration because there is a belief that dolls are able to bring goodness peace and tranquility into the house.

3. Color influence has an effect on the state of the nervous system through the visual analyzer [20]. In that way the optimistic-looking doll «Jeremy» literally

fascinates the child who plunges into the zone of emotional and visual comfort as a result of which the level of anxiety decreases and a positive attitude to reality is formed [21].

It was found that the synchronized polysensory influence significantly increases the effectiveness of psychotherapeutic measures and simultaneously contributes to the aesthetic and personal development of the child's personality.

The computerized complex "Jeremy" intended for children's music-color psychotherapy is an extremely easy-to-use innovative technology. It helps to cope with stress neuroses and developmental disorders. This development will be extremely useful for the work of children's medical and preventive and educational institutions and also it will be good for family practice.

ADDITIONAL

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