

Efficiency of Microcurrent Reflexotherapy in Children with Autism Spectrum Disorders

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SUMMARY

Purpose of the study: to study the effectiveness of microcurrent reflexology in children with ASD.

Research materials and methods: The study is based on survey data from 100 children with autism. The diagnosis of ASD in the study groups was determined using the DSM-IV criteria for the diagnosis of autistic disorder. The age of the children ranged from 2 to 18 years old. The main group consisted of 50 children with autism who received MTTR sessions. The comparison group consisted of 50 children with autism who received standard pharmacotherapy.

Conclusion: in the treatment of ASD in children, the appointment of MTRT in combination treatment with pharmacotherapy and ABA therapy improves the functioning of those parts of the brain that are responsible for speech and the desire to make contact. Improvement is characterized by the following: vocabulary expands, phrases and sentences appear, diction improves, learning ability increases. In children with more pronounced developmental delays and autism, at first, a desire to make contact gradually appears, they begin to understand speech and fulfill simple requests, and develop social skills.

KEYWORDS: autism spectrum disorders, autism, children, neurological status, treatment, microcurrent reflexotherapy

INTRODUCTION

Childhood autism is one of the pressing health problems in the world, which is determined not so much by the frequency of childhood autism (DA) in the child population - from 4 to 26 per 10,000 children [3, 8, 15], but by the social significance and also insufficient knowledge of the etiology and pathogenesis this disease [2, 9, 10]. Today, autism spectrum disorders (ASD) are widely regarded as neurodevelopmental disorders, implying a sharply disharmonious development of the brain and the formation of neural connections [6, 13]. Despite the increase in the incidence of these types of disorders, the awareness of the public and specialists about the problem is extremely low [5, 11].

The diagnosis "ASD" refers to a group of conditions associated with the development of the nervous system and characterized by disorders in three areas: social interaction, communication (use of verbal and non-verbal language), as well as limited and repetitive patterns in behavior, interests and activities [1, 9] ... Symptoms usually begin before the age

of three, and these conditions have not been diagnosed until recently in most parts of the world. The increasing recognition of disorders, the emotional impact they have on families and the financial burden associated with treatment and social care, each year make ASD an important disease in terms of science, public health and human rights [4, 5, 12]. Thanks to the methods of therapy available today, it is possible to achieve a higher level of quality of life for such patients, compared with previous years, but it should be recognized that it is impossible to achieve a complete cure in people suffering from these disorders. Most patients, especially in developing countries (with rare exceptions), do not receive any treatment at all, let alone specialized care [7, 14].

The treatment of ASD depends on factors that may negate the very concept of “treatment”. The difference in age, the severity of impairments, concomitant diseases, the situation in the family and society, the availability of resources and the economic development of society, the provision of education (or lack thereof), medical and material assistance, the possibilities of protected employment and living without discrimination upon reaching adulthood can be huge [6, 11, 15].

Recent reviews of scientific publications indicate that few of the treatments meet the criteria for evaluating the effectiveness of interventions [8]. However, the quality of the evidence is improving, with a growing number of well-designed studies as well as randomized controlled trials [15]. However, even if the results are positive, most studies still focus on short-term goals and a limited number of outcome criteria. Few attempts are being made to find answers to questions such as: is treatment effective in the long term or does it really improve the quality of life of patients? Such problems may require very different research strategies such as audits and reviews, systematic problem analysis, and satisfaction assessments. It is also extremely important to accumulate information about the views and beliefs of the people with ASD themselves.

Recently, microcurrentreflesotherapy (MTRT) has been used in the treatment of children with ASD. MRI is an effective modern method of treating a wide range of diseases, including lesions of the central nervous system in children, in particular in ASD. MRI improves the functioning of those parts of the brain that are responsible for speech and the desire to make contact. However, there are few and controversial scientific studies evaluating the effectiveness of MTRI prescribing among children with ASD.

Purpose of the study:to study the effectiveness of microcurrent reflexology in children with ASD.

RESEARCH MATERIALS AND METHODS:

The study is based on survey data from 100 children with autism. The diagnosis of ASD in the study groups was determined using the DSM-IV criteria for the diagnosis of autistic disorder. The age of the children ranged from 2 to 14 years old. Most of the children with autism were between the ages of 2-3 and 4-6 (40% and 45%, respectively). According to the sex composition, a 2-fold predominance of boys over girls was established, which is reliable ($P < 0.05$).

The exclusion criteria from the study were: the presence of epileptic seizures at the present time, a history of epilepsy, hereditary metabolic disorders (phenylketonuria, tyrosinemia, hyperglyciuria, etc.) and chromosomal diseases.

Neurological examination was carried out, consistently assessing the state of higher cerebral functions, cranial nerves (CN), motor function (voluntary movements, coordination, involuntary movements), sensitivity, meningeal syndrome, vegetative-trophic functions. To determine the severity of autism, the Childhood Autism Rating Scale - CARS (Schopler E. et al., 1988) was used. To assess the dynamics of the state of children in the course of observation and treatment, the CARS scale was used in this study [Schopler E. et al., 1980, 1988; translation by Elina& Uri], which is a widely used rating scale in the United States to determine the severity of autistic manifestations in children from 3 to 15 years old. The scale includes 15 items characterizing all areas of the child's functioning that are significant for the survey. These include "the desire for contact with others", "the ability to imitate", "features of emotional reactions", "motor skills", "use of play and non-play objects", "adaptation to changes", "visual reactions", "auditory reactions", "Gustatory, olfactory and tactile reactions", "the presence of fears and anxiety", "speech features", "non-verbal interaction", "the degree and productivity of activity", "the level and characteristics of the development of intellectual activity", "assessment of the general impression of the clinician." In accordance with this scale, the severity of autism was measured in points. The final score in the range from 15 to 29 points corresponds to the absence of autism, mild / moderate autism - 30-36 points, severe - 37-60 points.

To assess the effectiveness of the treatment of autism used ATEC - a test consisting of 4 parts (speech and communication, socialization, sensing and cognitive abilities, health and behavior): 10-15 points - no autism; 15-30 - slight developmental delay; 30-40 - mild autism; 40-60 - medium degree; 60 and above - severe.

To analyze the results of the study on the effectiveness of the MRT method, we divided children with autism into two groups. The main group consisted of 50 children with autism who received MTTR sessions in complex pharmacological treatment and ABA therapy.

MRT was performed using a MERT device approved for use in the European Union (registration number MED 31494_1). The therapeutic effect was carried out sequentially on biologically active points (BAP) of the craniospinal region, on the speech zones of craniotherapy, on BAP over the muscles of the articulatory muscles. The exposure time for each BAP is 60 sec. During the MTTR sessions, the patients were awake, in a sitting position. During MRI, ultra-small electrical signals are used, which are fed to various biologically active points to restore the patient's own normal functioning of the brain and spinal cord. The full course of treatment is 3 weeks - 15 treatments. Treatment is carried out daily, the duration of the treatment procedure ranges from 30 minutes to 40 minutes.

The comparison group consisted of 50 children with autism who received standard pharmacotherapy and ABA therapy.

The data were statistically processed using the Excel 2017 software package, which includes traditional methods of variation statistics. The significance of the differences between the groups was assessed by the Student's t-test. Differences were considered statistically significant at $p < 0.05$.

RESEARCH RESULTS:

the structure of somatic pathology was characterized in most cases by the presence of diseases of the gastrointestinal tract (dyskinesia of the biliary tract, chronic diseases of the gastroduodenal zone), which accounted for 70% of children with ASD, as well as allergic and immunopathology, represented by bronchial asthma, atonic dermatitis, in a large percentage, allergic rhinitis, secondary immunodeficiency states (60% versus 9%, respectively; $P < 0.05$). ENT organ pathology (chronic tonsillitis, adenoiditis, curvature of the nasal septum) was diagnosed in 23% of children. Abnormalities in the cardiovascular system were mainly represented by dysfunctions of the sinus node - sinus tachy- and bradyarrhythmias, sinoatrial blockade of 2 tbsp. Type 1, which occurred in 23% of children with ASD.

A study of hereditary predisposition in 85% of children with ASD revealed a history of mental illness. These data are of some interest, since they once again prove that there are genetic factors of predisposition in the development of autism.

The neurological status at the time of examination of children was characterized by diffuse microsymptomatology in the form of dissociation of tone, changes in reflexes (slight asymmetry of tendon and periosteal reflexes), low speech production, and the presence of a defect in social communication.

From the side of the cranial nerves - insufficiency of cranial innervation in the form of asymmetry and flattening of the nasolabial folds, asymmetry of the palpebral fissures, deviation of the tongue from the midline, etc.; violation of convergence and accommodation was in 16% of children, smoothness and less mobility of the nasolabial fold: right - in 17% of children, left - 12% of children; deviation of the tongue from the midline in 2% (in most children, refusal to follow this instruction), bulbar and pseudobulbar symptoms were not detected, but in 14% of children prolonged retention of food in the mouth was noted with a preserved swallowing reflex.

Dissociation of tone, pathological reflexes, coordination disorders were in 35-41%. Neurological symptoms were more pronounced in children with autism in the age group 3-6 years old and smoothed out, but did not disappear, at the age of 7-10 years.

It was revealed that in children with ASD, the frequency of sleep disorders (dyssomnia, insomnia, somnolonia, somnambulism, nightmares) was recorded in 41%. The percentage of children who do not have pathological changes in the central nervous system was only 9%.

Neuropsychological examination complemented neurological examination, significantly increasing the efficiency of topical diagnosis of brain lesions and interhemispheric interactions. In order to clarify the mechanism of symptom formation, as well as to analyze the state and dynamics of the development of mental functions in various variants of speech development disorders, we conducted a neuropsychological study. The revealed neuropsychological disorders of higher cerebral functions in the examined children are shown in Fig. 1.

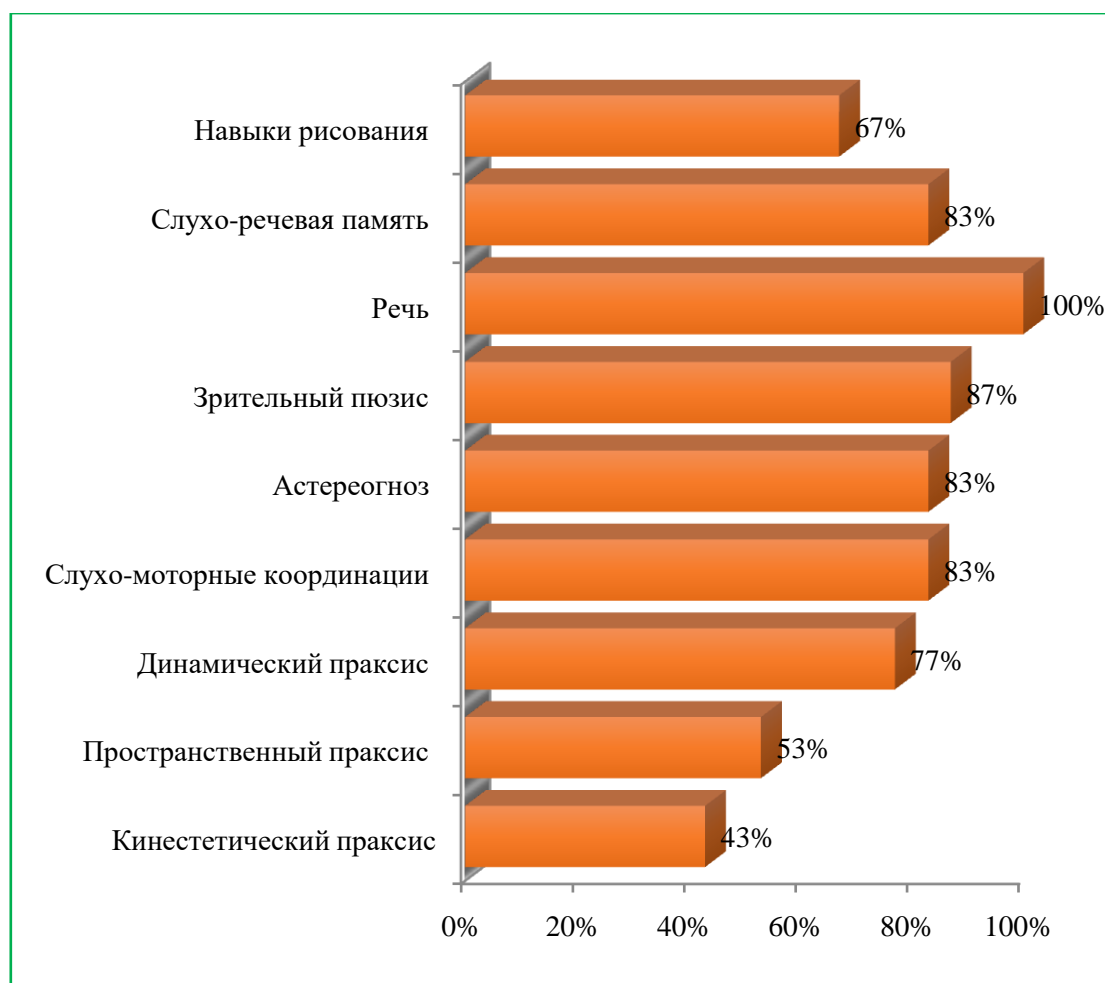


Fig 1. Impaired cognitive functions in the studied children with autism

The neuropsychological study included the assessment of kinesthetic, dynamic and spatial praxis, auditory-motor coordination, stereognosis, visual gnosis, speech, auditory-speech memory, drawing and visual memory.

Speech impairment occurred in 100% of cases in both groups. Drawing impairment and auditory-speech memory were found in 67% and 83%, respectively.

The highest average score on the CARS subscales in patients with ASD was on the “verbal communication” subscale (3 points), which indicates the difficulty of social communication of children with ASD. Also, in these children, fear and nervousness are often determined. The lowest average score was on the non-verbal communication and object use subscales of 2.12. Otherwise, there were average indicators among all studied children (Fig. 2).



Fig. 2. Assessment of the condition of children with ASD according to CARS subscales

In children with ASD, 80% of children had a moderate degree of autism and was in the range of 35-37 points, 6 children (20%) had a severe degree of autism, they were older.

As a result of the conducted studies, an improvement was found, which in some cases was significant, but with all indicators of the development of children with ASD, there was a tendency for improvement in the main group in relation to the comparison group (Table 1).

In the comparison group, with all indicators of the development of children, there was a positive trend in the treatment process, however, the reliability was registered only with the indicators "The absence of the pronoun "I" in the vocabulary.

Table 1
Development of the examined children with ASD

Development indicator	Main group (n = 50)		Comparison group (n = 50)	
	Before treatment	After treatment	Before treatment	After treatment
Echolalia	28%	16%	24%	20%
The absence of the pronoun "I" in the lexicon	20%	12% *	24%	14% *

Violation of the grammatical structure of speech	12%	6% *	12%	8%
Lack of neatness skills	12%	8% *	10%	8%
Inadequate emotional development	16%	8% *	12%	8%
Anxiety and phobias	12%	6% *	12%	8%
Difficulty in communicative functions	36%	16% *	40%	24%
Aggressiveness	20%	14%	16%	14%
Motor stereotypes	12%	8%	10%	8%
The need for the mother to be present before falling asleep	16%	8% *	16%	10%
Lack of play activity	28%	18%	28%	24%
Game stereotypes	64%	34%	60%	50%

Note: * - reliability of data between groups ($P < 0.05$)

The inclusion of MTTR in complex treatment helps to restore not only developmental skills in a child with ASD, but also to level the symptoms of anxiety and phobias - almost 2 times, in relation to the comparison group, where children received only pharmacotherapy. In addition, we carried out studies to study the data on the dynamics of indicators of visual and auditory-speech memory, attention, thought processes, and the emotional sphere (Table 2).

Table 2
Examination data of children with DA before and after treatment

Indicators	Main group		Comparison group	
	Before treatment	After treatment	Before treatment	After treatment
Data of the dynamics of indicators of visual and auditory-speech memory				
Visual memory (first presentation)	1,5 figures	2,9 figures	1,24 figures	1,7 figures
Volume of auditory-speech memory (first presentation)	2,1 the words	3,75 the words	2,2 the words	3,0 the words
Data of dynamics of indicators of attention				

Number of errors in 1 min	9,1	7,3	8,8	8,1
Data of dynamics of indicators of productivity of thinking				
Number of completed tasks	2,05	4,1*	2,3	3,4
Dynamics data of indicators of the emotional sphere				
Phobias	6,1	2,7*	6,9	4,9
Anxiety	7,3	3,6*	6,4	4,2
Aggressive reactions	7,6	3,3*	7,7	6,1
Depressive reactions	5,4	1,9*	5,8	4,2

Note: * - reliability of data before and after treatment ($P < 0.05$)

As can be seen from the data presented in the table, in children with ASD, when MRT is switched on, there is a recovery in the indicators of visual and auditory memory in the dynamics of treatment, however, the figures were not reliable, but had a more pronounced trend in relation to the comparison group.

A similar picture is observed in the analysis of attention indicators in the dynamics of treatment; in the main group, children made mistakes 1.5 times less often, while in the comparison group - 1.1 times. According to the data obtained, the reliability of the data was not significant, but it had a pronounced trend in the main group of children with ASD.

With the appointment of MTRT in the complex treatment in children of the main group, there is a 2-fold increase in productive attention, while in the comparison group, by 1.5 times ($P < 0.05$).

In the emotional sphere, there was also a significant leveling of indicators in children with ASD in the main group in relation to the data before and after treatment, as well as to the indicators of children from the main group ($P < 0.05$).

Parents of children with ASD complained of a lack of speech contact, instability of attention, difficulty concentrating, lack of interest in communication, selective interest in games with a predominance of a manipulative nature of the game, high non-purposeful motor activity, episodes of excitement in situations of prohibition, stereotypical movements.

By the end of the treatment, positive dynamics were noted: the cognitive interest in the environment increased, fatigue, excitability, and manifestations of aggressiveness decreased.

The amount of working memory in the visual modality increased by 1.93 times; in the auditory-speech modality - 1.76 times. Arbitrary attention became more stable, the number of errors decreased by 1.28 times.

After completing the course of treatment, the child was able to complete on average 2.95 tasks more, the productivity of thinking increased 3.57 times.

After the course of treatment, phobias decreased, anxiety decreased, aggressive and depressive reactions also decreased.

In 52% of cases, the children of the main group showed a positive dynamics of cognitive activity of a moderate and pronounced degree; in 40% of children, a weakly positive dynamics was observed, and only in 8% of cases there was a lack of dynamics. 8% of children showed positive dynamics of a pronounced degree, these children showed a significant improvement in the emotional state, the appearance of voluntary activity, a decrease in motor stereotypes, the appearance of the communicative function of speech.

In children who received treatment according to the standard method, positive dynamics of a pronounced degree was noted only in 8%, the dynamics of cognitive activity was moderate in 28% of children, in 36% - a weak degree, in 28% of cases there was a lack of dynamics, i.e. lack of dynamics and weak dynamics in 64% of cases; only 36% of children have moderate and pronounced dynamics.

The average ATEC score - the test in the main group decreased from 61.94 to 42.21 points (almost 20 points), while in the comparison group, this indicator decreased from 61.86 points to 48.1 points (about 14 points). This trend was also observed in the remaining subscales, which indicates the effectiveness of the use of MRT in children with ASD (Fig. 3).

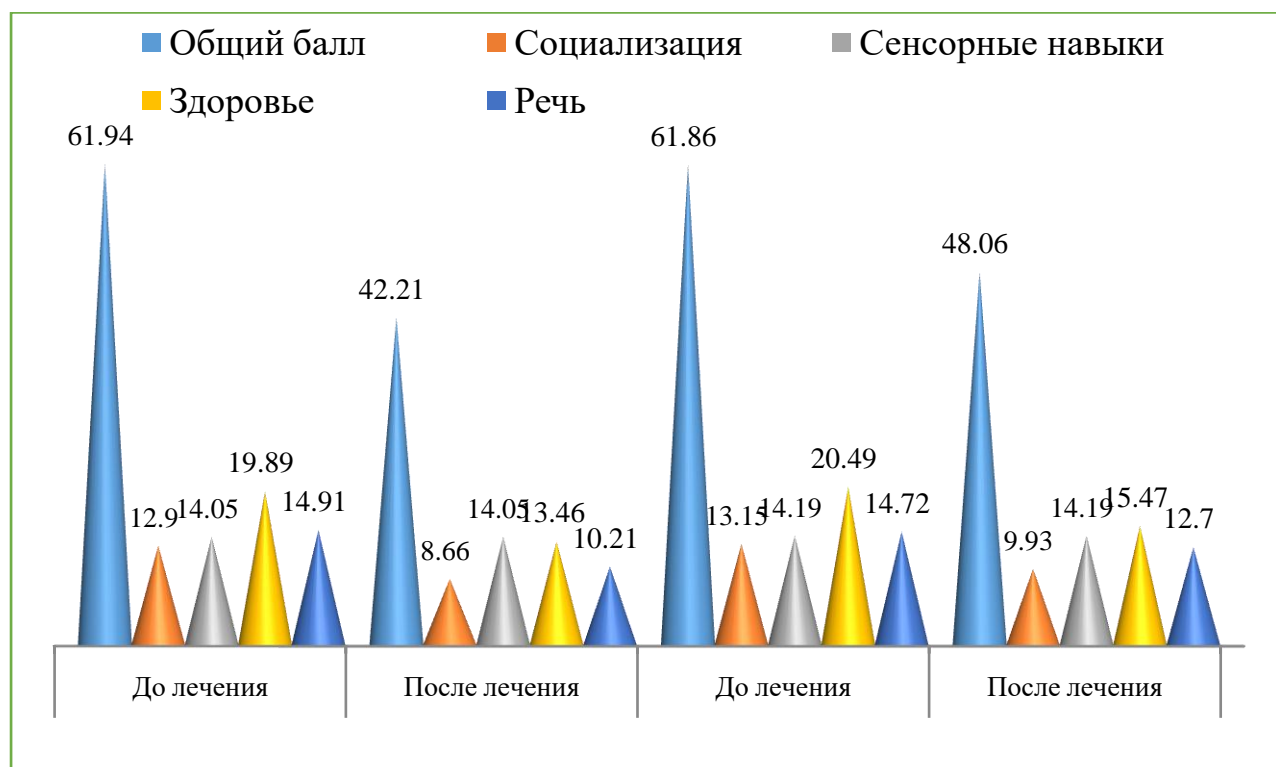


Fig. 3. Evaluation of the effectiveness of treatment according to the ATEK test (points)

As a result of the data obtained, it was found that reliably significant improvements in the social adaptation of children with ASD were recorded after inclusion in the MTTI treatment program.

DISCUSSION:

Neurological disorders are typical comorbidities in autism [6, 9]. Following the delayed and disharmonious early psychomotor development in children with autism, a peculiar spectrum of movement disorders and disorders in the formation of higher mental functions is formed, expressed in varying degrees. Their identification is of great importance in determining the tactics of providing comprehensive care for patients with autism spectrum disorders [5, 10, 14].

In the world clinical practice, there are more than 70 different approaches to the correction of autism [15]. Various approaches and methods are used to correct autism - medication, modern hardware technologies, psychological and psychotherapeutic correction, etc. [4, 11, 13]. In world practice, MTTR has established itself as an effective method used in neurology.

Our experience shows that in the treatment of ASD in children, MRI is effective, which improves the functioning of those parts of the brain that are responsible for speech and the desire to make contact. Improvement is characterized by the following: vocabulary expands, phrases and sentences appear, diction improves, and learning ability increases. In children with more severe developmental delays and autism, the desire to make contact first gradually appears, they begin to understand speech and fulfill simple requests, and social skills develop.

CONCLUSIONS:

1. Neurological symptoms in children with autism depend on age and are characterized by the presence of diffuse microsymptomatics in the form of dissociation of tone, changes in reflexes (slight asymmetry of tendon and periosteal reflexes), low speech production and the presence of a defect in social communication.
2. Revealed neurological syndromes (pyramidal, extrapyramidal insufficiency syndrome, muscular dystonia syndrome, enuresis and others) in children with ASD may result from a rather high frequency of subclinical forms of central nervous system lesions in the perinatal period.
3. In children with autism in 91% of cases, somatic pathology is detected, which in most cases is characterized by the identification of allergic pathology and gastrointestinal disorders.
4. Significantly significant improvements in social adaptation and increased communication skills in patients with early childhood autism were identified after inclusion in the MTTR treatment complex. An increase in average scores in the main group indicates that children with autism have improved speech and social interaction skills, as well as the acquisition of communication skills by an average of 45.3%.

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