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# NEUROPSYCHOLOGICAL METHODS IN PEDIATRICS

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## ABSTRACT

The article is devoted to neuropsychology — a science that studies dysfunctions, the degree of formation of higher mental functions, and allows not only to describe the symptoms of their impairment, but also to identify mechanisms and develop adequate tactics for patient management. The authors emphasize that in recent years, the interest of psychologists, teachers, and pathopsychologists in this area has increased due to the increase in the number of children with adaptation difficulties and poor academic performance. The article covers in detail the features of a child's neuropsychological examination, which should be structural and dynamic in nature. Clarification of the child's individual characteristics and the formation of the necessary motivation by the doctor will allow for effective correctional work.

**Keywords:** Neuropsychology, founders, higher mental functions, neuropsychological examination, correctional work.

## INTRODUCTION

Neuropsychology is a branch of psychology aimed at studying the brain mechanisms of higher mental functions. Within the framework of clinical psychology, along with neuropsychology, a number of other areas are distinguished: pathopsychology, psychosomatics, psychology of abnormal development, psychotherapy. Neuropsychology as a field of psychological science began to take shape at the beginning of the 20th century. It was formed at the junction of several scientific disciplines, each of which made its contribution to its conceptual apparatus - psychology, medicine, physiology. The founder of domestic neuropsychology is an outstanding scientist of the 20th century, Doctor of Psychological and Medical Sciences A. R. Luria. Largely thanks to him, domestic neuropsychology is known throughout the world and occupies one of the first places among other neuropsychological schools in foreign countries. The works of A. R. Luria are presented in all modern foreign medical publications on learning and behavioral disorders [1].

## MATERIALS AND METHODS

According to this theory, the brain as a substrate of mental processes functions as a highly differentiated whole, and each mental function has a dynamic, changeable brain organization, different at different periods of a person's life. Disorders of the same function proceed differently depending on which link is affected. That is why the main task of neuropsychological research is to conduct a qualitative analysis of the disorder, and not just to state the fact of a disorder of a particular function [2].

## RESULTS AND DISCUSSION

In general, standardized quantitative methods for assessing individual functions are used to examine patients with local brain damage. Quite often (for example, in the USA),

neuropsychological examination is conducted without preliminary analysis of clinical data: the neuropsychologist, without observing the patient, works only with the results of the examination (the examination is conducted by an assistant). In the domestic approach, much attention is paid to the characteristics of contact, the patient's behavior in the examination situation, as well as the process of completing tasks. A preliminary interview conducted during the patient's examination allows the neuropsychologist to form a general idea of the patient's state of consciousness, the level and characteristics of his personality, his attitude towards himself and the situation in which he finds himself [3]. The data obtained during the preliminary interview and observation represent important material for making a diagnosis.

Neuropsychological diagnostic examination, developed by A. R. Luria and his students, is a system of scientifically based methods, which is aimed at establishing a functional, topical diagnosis by means of not quantitative, but qualitative analysis of the defect.

The neuropsychological approach considers mental function at different levels of its implementation: morphological, psychophysiological, psychological [4]. It allows not only to describe the symptoms of violation (lack of formation) of higher mental functions, but also to identify their mechanisms, which is of key importance for establishing an accurate diagnosis, for establishing the cause of the disorder of mental activity, as well as for choosing a correction strategy.

In the process of formation of domestic neuropsychology, the objects of neuropsychological research, along with adults, have always been children with organic local brain lesions (tumors, injuries, etc.). Diagnostic and rehabilitation work was carried out with them, as well as with adults [5]. In the late 90s, such branches of science as pedagogy, defectology, child neurology, special psychology, etc. showed increased interest in neuropsychology and its methods. The reason for the interest was the increase in the number of children with various health problems, the growth in the percentage of those failing in their studies, as well as the increase in the number of children with difficulties adapting to new school conditions. These circumstances contributed to the active development of child neuropsychology. Childhood neuropsychology is a field of neuropsychology that studies the relationship between the social functioning (behavior and learning) of a child with the formation of his mental functions and personality, with the development of the brain in norm and pathology, and also explores the possibilities of using the acquired knowledge for correctional and developmental education [6]. The main task of childhood neuropsychology is to identify dysfunctions and the underdevelopment of higher mental functions that arise due to the immaturity of certain parts of the brain.

When conducting neuropsychological diagnostics in childhood, it is necessary to take into account the complexity of the overall picture of disorders of higher mental functions that have age specificity. This is due to the plasticity of the child's brain, with the degree of formation of mental functions at different stages of ontogenesis. As is known, during ontogenesis, the child's brain matures unevenly. The complication of the levels of functional organization of the brain occurs in a certain chronological sequence, subject to the law of heterochrony [4]. The most significant difference in the manifestation of neuropsychological symptoms in children and adults with focal brain lesions is the high rate of regression of disorders of higher mental functions in childhood.

The manifestation of specific disorders of higher mental functions in focal lesions of the brain in children depends not only on the localization, but also on the nature of the pathological process. In adults, inter- and intrahemispheric connections are well developed, which contribute to the occurrence of specific disorders and the widespread effect of focal lesions and are difficult to reverse. In children, these connections are not fully formed, the effect of focal lesions is more limited, the frequency of specific disorders is lower, and the possibilities for restoring impaired functions are significantly higher [2].

During a neuropsychological examination, motor functions, perception, speech functions, memory and intelligence are studied. According to the procedure, a neuropsychological study is structural and dynamic: it is not so much the result of the tests that is important, but the features of the process of their implementation. For example, in a test it is required to count sequentially from 103 to 7. The result of subtraction may be the same in patients with different CNS lesions, but the nature of the errors is important, the neuropsychological analysis of which allows us to indicate the topic of the lesion. If a patient with a deficit in the frontal lobes of the brain will experience perseverations*, inertia during subtraction, then patients with an interest in the parietal-occipital lobes of the brain may have defects in spatial perception of numbers and operations with numbers.

Currently, a significant spectrum of disorders of higher cortical functions detected by neuropsychologists in children remains undetected using traditional neuroimaging methods (MRI, CT, ultrasound of the brain). This is due to the fact that mild cognitive impairments (the most numerous and sensitive to neuropsychological correction methods) are usually based on unexpressed anatomical and structural damage to the brain - the disorders are largely functional in nature, and structural damage is minimal. With generally accepted neuroimaging methods, such disorders remain "invisible".

## CONCLUSION

In recent years, neuropsychological studies have already begun to be conducted abroad using functional MRI in children with mild cognitive impairment. Neuropsychology as a science that studies the patterns of development of the cognitive sphere based on scientific concepts of neuroanatomy, neurophysiology and psychology has a wide and not fully realized potential for use in medicine, and in pediatrics in particular. The implementation of this potential and the immediate scientific prospects of this area of clinical psychology are associated with the improvement of the integration of neuropsychological methods of diagnosis and correction in pediatric, neurological clinics using new instrumental methods of medical diagnostics in neuropsychological studies.

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