

## **Features of Applying Neuropsychological Methods in the Correctional Activities of a Speech Therapy Teacher for Prevention of Written Speech Disorders in Children with Disabilities**

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**Abstract:** This study reveals the actual problem of correctional pedagogy, concerning the development and implementation of modern comprehensive neuropsychological techniques that will help professionals to reveal the structure of the mechanism and the leading core of the speech defect and can be used in the Lekotek structure. In this study, Lekotek is considered as a variable form of psychological support and pedagogical education of children with disabilities. There is a statement in this study that the priority task of the speech therapy teacher in the Lekotek is to determine the structure and the severity of a speech defect in a child to study nature of verbal communication between the parents and their child and if possible to correct deviations in the development of children's speech. This study deals with a constructive analysis of the results of empirical research which allowed the researchers to identify weak components in the development of three blocks of the brain that require completion. The researchers note that these disorders may further lead to difficulties in studying at school such as impairment in reading and writing and suggest that the most effective form of work will be neuropsychological correction which is based on a set of special neuropsychological methods aimed at restructuring of the defective brain functions and the creation of compensating tools for the child to be able to study on his/her own in the future and to control his/her behavior. Findings presented in this study prove the effectiveness of the application of the above methods in correctional work with children of senior preschool age with disabilities.

**Key words:** Correctional pedagogy, inclusive education, neuropsychological diagnostic and correction methods, Lekotek, children with disabilities

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### **INTRODUCTION**

The problem of development and use of innovative forms and methods for providing timely assistance to the children with disabilities becomes urgent at the present stage of restructuring the system of correctional activities carried out with this group of children. Currently, one of the most relevant and important forms is Lekotek (Fajzrahmanova, 2014).

In addition, due to global development of information technologies, specialists in pedagogical and correctional support of children with disabilities have actively applied neuropsychological diagnosis and correction methods to children with various developmental disorders which combine psychological, neuropsychological and corrective approaches that allow comprehensively and systematically organizing the child's education, considering zone of his/her proximal development (Nigmatullina and Artemyeva, 2013). Currently, the method of neuropsychological impact has won wide popularity as an innovative method both in rehabilitation

medicine which helps the body to recover its lost functions and enhance the existing ones and in diagnosis and correction not only in the work structure of the psychologist but also the speech therapy teacher as one of Lekotek professionals.

### **LEKOTEK AS EARLY SUPPORT SERVICE FOR CHILDREN WITH DISABILITIES**

We consider Lekotek within the framework of our study as a service of psychological support and special educational assistance to parents of children with severe disabilities and developmental problems and at the same time as the structural and functional unit that can operate both independently and as part of educational institutions such as pre-school educational institutions for children requiring psychological and educational as well as medical and social assistance; institutions of special education; orphanages and boarding schools; infant orphanages; rehabilitation centers and other organizations that provide psychological and educational

assistance for children with disabilities (from 2 months to 7 years) and special educational needs (Akhmetzyanova and Tvardovskaya, 2013).

Lekotek is for children with developmental disabilities or severe psychogenic disorders as well as their family members or teachers. There are different type and nature of child's development disorders: motor, mental, sensory, communicative, emotional, behavioral or combined. An important factor is the minimum educational perspective for the child, the possibility of any training (Akhmetzyanova, 2014a, b).

Based on the foregoing, we should note that the main tasks of Lekotek are clinical, psychological and pedagogical investigation of children, provision of information to parents on the development and education of their children on the results of clinical, psychological and pedagogical investigation, on the features of the disorder identified and on the child's resources and parental involvement in the investigation and stimulation of the development of their children as well as psychoprophylaxis and therapy and adjustment of optimal methods for teaching a child.

Lekotek solves these problems in the forms of work such as Consultation (C), a Diagnostic Game Session (DGS), a Therapeutic Game Session (TGS) and a Parent Group Training (PGT). Structure of these forms involves a family-centered play used by the Lekotek professionals as a key to the integration of children with disabilities and developmental problems into family and social life. For this purpose, the Lekotek professionals develop individually oriented, correctional and educational programs, including special correctional and educational technologies aimed at all family members and carry out work on psychological support of family, mainly in the process of play (Akhmetzyanova, 2014a, b).

#### **SPECIFICITY OF CORRECTIONAL ACTIVITIES OF A SPEECH THERAPY TEACHER IN THE FRAMEWORK OF LEKOTEK**

Speech therapy teacher is one of the leading Lekotek professionals. Speech therapy teacher provides early speech therapy assistance which involves determining the structure and severity of a speech defect in a child, studying nature of verbal communication between the parents and their child and if possible correcting deviations in the development of children's speech (Nigmatullina, 2014). The main activities of correctional work of a speech therapy teacher in the framework of Lekotek are as follows:

- Psycho-pedagogical investigation of children with speech abnormalities

- Diagnosing deviations in their speech, mental and physical development
- Determining the adaptation abilities of the child and his/her readiness to attend pre-school institutions and learn a program for children of senior preschool age
- Planning the course of individual work with children
- Preparing the external educational course
- Individual correctional and developmental work with children
- Modeling the optimal correctional and pedagogical system
- Carrying out correctional and pedagogical and correctional and educational work with children with different types of speech disorders
- Participation in the psychological and educational commission
- Carrying out preventive examinations
- Advising parents about the features of their child's upbringing in the family, teaching them some accessible practices of speech therapy to work with children of different age
- Advising parents of junior children at risk in order to prevent speech disorders (Nigmatullina, 2014)

A speech therapy teacher conducts the correctional activities in Lekotek in the form of individual developmental lessons with children and their parents when the latter take part in the general play activities as well as group lessons with children, aimed at their socialization and cognitive development.

The main objective of these lessons is the implementation of the individual program of a child's rehabilitation. This objective is achieved either through a specially organized lesson implementing an individual course of a child or when the form, intensity and duration of the interaction are chosen by a child himself/herself or in the presence and with the active participation of parent or through maintaining the positive style of interaction between the parent and their children or through enhancing the proactive qualities of a child. Individual developmental lessons enable a speech therapy teacher to take into account the gaming preferences of a child, develop his/her cognitive skills and knowledge about the world (Nigmatullina and Boltakova, 2014). Another effective form of work is the group activity which complement the individual playing lessons. They partially implement the goals and objectives of the individual family support program. In addition, group activity promotes interaction and communication between a child and his/her parents, between children, between parents of different children, between adult and another child,

increases the activity of a child, develops motor and sensory systems, this/her communication, social and emotional areas and cognitive and self-care skills.

The analysis of both conditions and content of organization of Lekotek operation has shown that since the key focus of Lekotek is activation of playing and cognitive activity of the child and development of his/her motor and interaction skills, then the speech therapy teacher must use both traditional and diverse methods for diagnosing and correcting various developmental defects and abnormalities in children, one of which is a neuropsychological method, in order to improve the effectiveness of his/her correctional work with children (Nigmatullina and Boltakova, 2014).

### **NEUROPSYCHOLOGICAL METHOD FOR DIAGNOSING DEVELOPMENTAL DISORDERS**

Problem of application of neuropsychological techniques in correctional pedagogy has been studied by scholars such as L.S. Vygotsky, A.R. Luria, V.I. Lubovsky, A.V. Semenovich, Zh.M. Glozman, L.S. Tsvetkova, I.Yu. Levchenko and T.V. Ahutina. It becomes quite important today to create modern integrated neuropsychological and neurolinguistic techniques that will help revealing the true mechanisms and the major core of a speech defect. We shall take a detailed look at the use of neuropsychological methods in the correctional activities of a speech therapy teacher for prevention of impairments in reading and writing in children with learning difficulties.

Methodological background to the Neuro psychological Method is fundamental theoretical concepts by L.S. Vygotsky and A.R. Luria about the systemic structure of higher mental functions. Neuropsychological Methods focus on the investigation of structural components which make a part of the mental functions as complex functional systems. According to T.V. Akhutina, L.S. Tsvetkova and L.V. Semenovich, an impairment of any functional component of speech as a higher mental function leads to dysgraphia and dyslexia in children.

A.R. Luria states that writing and some other higher mental functions (or rather functional systems) have common components, i.e., carried out due to common elements. Writing and oral speech for example, include a multiple production organization of movements which impairment will affect both mental functions in a special way. Similarly, the initial impairment of any of these components of writing affects naturally both the writing function and a number of other mental functions which do

not include the above component. This means that reading and writing impairments are not isolated and accompanied by disorders of oral speech and nonverbal mental functions. Moreover, these disturbances have their specificity, depending on which one of the structural component is insufficiently formed. Thus, neuropsychological methods allow detecting the relation between specific reading and writing impairments in children and other mental functions and identifying the pathogenesis of both dysgraphia and dyslexia and learning difficulties in general. This is what determines the recently increased interest of speech therapists in neuropsychology (Nigmatullina, 2015).

Unlike pedagogical study, neuropsychological investigations pay great attention to learning difficulties caused by functional weakness of the three blocks of the brain described by A.R. Luria. To understand the actual mechanism of reading and writing impairments, we need the following conditions: firstly, the ratio analysis of various types of specific errors; secondly, the study of the relation between impairments of writing, oral speech and other mental functions. It is possible to fulfill the first condition by using psycho-pedagogical methods of reading and writing investigation because the correctional pedagogy has accumulated a great knowledge about the symptoms of these disorders. The second condition can be fulfilled only when using neuropsychological diagnostic methods together with psychological and pedagogical ones. Psychology and pedagogy have quite sensitive instruments for studying various mental functions, however, only neuropsychological methods can reveal their systemic relation.

In September 2014, we examined 12 preschool-age children attending Lekotek and having a diagnosis such as "General speech underdevelopment of the 3rd level" (Level III GSU) in order to study the features of mental functioning of three blocks of the brain in this category of children by applying the age-adjusted technique "Neuropsychological examination of 6-9 years old children" by T.V. Ahutina and O.B. Inshakova. To assess the level of mental functioning of three blocks of the brain, we used a grading system (number of errors were counted and penalty points were accrued). The evaluation criteria reflected the correctness of the task and characteristics of the task process (acceptance and understanding of the instructions, acceptance and use of assistance, possibility of error correction). Summing up the results of neuropsychological examination, we used an integral (generalized) index of the general level of mental functioning of three blocks with levels defined. High level (0-69.5 points) three blocks of the brain have enough developed functions, tests are performed without

errors, the instruction is immediately assimilated, the program is timely assimilated and performed, there are a fast rate, high productivity and normal tone. Average level (70-139.5 points) three blocks of the brain have underdeveloped functions, errors can occur when doing tests, self-correction is possible, instructions need to be repeated sometimes, fast or normal temp of working, assimilation and performance of the program is not always timely, moderate productivity, tone is sometimes disturbed. Low level (140-176.5 points) three blocks of the brain have weak mental functioning, there are multiple errors, the program can be neither assimilated nor performed and there is a refusal to perform the program in some cases, disturbed tone, sharply reduced productivity and slow rate of testing (Nigmatullina, 2015).

Constructive analysis of the results has shown that 67% of children typically have low mental functioning level of three blocks of the brain. This means that children were doing tasks with multiple mistakes, they could not assimilate and perform the programs, sometimes they refused to perform tests, their tone was disturbed, there was a tendency to micro- and macro-graphy, the productivity was dramatically reduced. Other 33% of children typically have average mental functioning level of three blocks of the brain. This means that children were doing most of tasks with single self-corrected mistakes, they sometimes required repetition of instructions while keeping fast or normal working rate; they not always were able to assimilate and perform the programs immediately; moderate productivity, tone was sometimes disturbed. We have not revealed any child with a high mental functioning level of three blocks of the brain among the investigated children of senior preschool age with level III GSU. In addition, the examinations helped us to determine a strong variation of individual performances of children within each level of mental functioning of three blocks of the brain.

Qualitative analysis of the study has shown that most of the children investigated have difficulty in both mastering motor program following the illustrative model and shifting from one movement to another during graphical presentation of the model; the children have the insufficiently developed mechanisms of multiple movement organization and hemispheric interaction; the children have difficulties in performing the verbal instructions, may have inhibition of simple direct movements; there is a tendency to micro- and macro-graphy; kinesthetic organization of hand movements and articulation apparatus as well as visual-spatial representations and hand-eye coordination are underdeveloped; verbal and logical thinking, the ability to allocate the categories and make verbal

generalizations, the orientation activity and decision-making process as well as the ability to build a coherent speech are underdeveloped. They have difficulties in self-retelling. This category of children has underdeveloped ability to assimilate both simple and "parallel" programs to switch from one program to another; there are fluctuations in their attention and performance.

Qualitative analysis of samples allowed us to both identify weak components in the development of three brain blocks that must be completed which may further lead to difficulties in studying at school such as impairment in reading and writing and suggest that the most effective form of work will be neuropsychological correction which is based on a set of special neuropsychological methods aimed at restructuring of the defective brain functions and the creation of compensating tools for the child to be able to study on his/her own in the future and to control his/her behavior.

#### **NEUROPSYCHOLOGICAL METHODS FOR CORRECTING DEVELOPMENTAL DISORDERS**

We consider neuropsychological correction in the framework of this study as a set of special neuropsychological methods aimed at restructuring of the defective brain functions and the creation of compensating tools for the child to be able to study on his/her own in the future and to control his/her behavior.

Our analysis of the psychological and pedagogical literature has shown that the preventive neuropsychological correction of reading and writing impairments in children of senior preschool age with level III GSU should be organized considering the following: the principle of bilateral interaction between the brain morphogenesis and the psyche formation: the emergence of mental function requires a certain maturity of brain structures and nervous system while the active functioning and the correction affect the maturation of brain structures and nervous system; systemic principle: neurocorrection is intended for the harmonization of mental functioning and personality of the child in general rather than to eliminate a single defect; principle of reliance on the safe forms of activity: neuropsychological approach in the correction involves the development of weak components with relying on the key strengths of the psyche; principle of reliance on individual and personal characteristics of the child: the neurocorrection program takes into account personal and emotional characteristics of the child, his/her family condition and other factors affecting the formation of higher mental functions; the principle of engagement: the speech therapy teacher has

to create a situation of emotional engagement of the child in the process of correction as well as motivate the child; the principle of “substitute ontogenesis”: a sequential reproduction of impaired stages of development, starting from the earliest one which is the principle of complexity: the integral impact is made on the emotional, cognitive and sensorimotor areas; the “simple-to-complex” principle: must be considered in organizing the correctional program for a child (Nigmatullina, 2015).

Neuropsychological correctional activity must include cognitive methods and methods of motor correction. Cognitive methods are usually focused on overcoming of difficulties in mastering school knowledge and the formation of various mental functions. For example, speaking, audio-verbal memory, calculating operations, writing, etc. Methods of motor correction and body-oriented psychological testing that have proved themselves to be an effective tool for overcoming psychological problems. The purpose of their implementation is to restore or form in a person the contact with his/her own body, relieve bodily tension, help to realize the problems in the form of bodily analogues and develop non-verbal components of communication for improving mental well-being and interactions with other people.

Given that the speech therapy teacher conducts the correctional activity within the framework of Lekotek during the therapeutic playing session where family-centered game is the main instrument of influence on the child, the integrated neuropsychological correction shall be carried out in three ways:

Maintaining an optimal level of activity. This can be done using games intended for development of attention, memory, thinking and maintenance of the operating condition. Developing the functions of auditory, kinesthetic, visual and visual-spatial information processing. Implementation of this way involves using the games aimed at the perception of the letter images, such as “Lacers” (“Shmurovki”), “Wizards” (“Volshebnyki”), “Craftsmen” (“Umeltsy”), “Painters” (“Hudozhniki”), “Funny mosaic” (“Veselaya mozaika”), “Connect-the-dots” (“Soedini tochki”), “Bookworm” (“Bukvoed”), “Continue-the-series” (“Prodolzhi ryad”), “Shading” (“Zashtrihui”), “Transformation” (“Prevrashchenie”), “Cheery Rubber” (“Prokaznitsa Rezinka”), etc. In addition to these games, there are a variety of tactile simulators helping the children to develop significantly their tactile memory and fine motor skills due to both sensations from touching various objects, materials and more associative bonds which prevents reading and writing impairments.

Developing functions of programming and monitoring of activities. We consider that one of the effective neuropsychological methods used in the implementation of this activity aimed at prevention of reading and writing impairments in children of senior preschool age with level III GSU is the method of visual modeling. Background for this method is the reliance on a safe visual analyzer which facilitates the memorizing process, helps the child to visualize abstract concepts (i.e., sound, word, sentence and text) and learn to work with them.

### **SUMMARY**

Based on the above stated we can conclude that using the neuropsychological methods by speech therapy teacher to identify, firstly, the relation of specific disorders in children with other mental functions, secondly, the pathogenesis of development and learning difficulties, thirdly, the restructuring of the impaired brain functions and the creation of compensative tools for the child to further learn and manage his/her behavior by him/herself, enhances the effectiveness of correctional work with children with disabilities within the structure of variable forms of education, including Lekotek.

### **CONCLUSION**

Thus, the performances resulting from this study allow us to evaluate objectively the potential use of neuropsychological methods by speech therapy teachers within the framework of Lekotek. Based on the above stated we can conclude that this activity is quite perspective and can be used in different areas of correctional pedagogy.

### **ACKNOWLEDGEMENTS**

The research is performed at the expense of the grant allocated to Kazan Federal University to perform the state task in the sphere of scientific activity.

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