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The Features of Speech Dysfunction in Children: A Neuropsycholinguistic Approach.

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ABSTRACT

The authors substantiate the necessity of applying a neuropsychological approach to the study of the verbal activity of children with different speech dysfunctions. The urgency of the indicated problem is determined, on the one hand, by the extreme complexity of diagnostic activities in early childhood and, on the other hand, by the value orientations of the state that guarantee persons with disabilities the possibility of social adaptation, active participation in society and the fullest realization of their individuality.Children of preschool age, born with PPCNS, have a high incidence of neurologic syndromes, deviations from the CCC, allergic diseases, disorders of the musculoskeletal system, diseases of ENT-organs, GIT and urination, are characterized by frequent incidence of ARVI. Speech dysfunctions were most prevalent in the last decade according to our results of screening studies. The authors determine the principles and conditions for conducting diagnostic study and correction of speech disorders in children of this category, which ensures maximum results in speech correction in children with mental development features. The modern rhythm of life aggravates the entropic processes, as a result of which we observe an increase in the number of children with a systemic underdevelopment of linguistic means. Comparative results of the study of the perception of sounds in normal and disturbed hearing are associated with the patterns of development of phonemic hearing and the formation of the pronunciation side of speech in the norm and pathology. The problems of the pathogenesis of speech dysfunctions are controversial, since they have a wide range of pathogenic influences. The materials of the article are of practical value for specialists studying speech processes.

Keywords: pathogenesis, speech dysfunctions, intrauterine growth retardation, cognitive impairment, residual encephalopathy, neuropsycholinguistic approach.

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INTRODUCTION

Speech acts as an indicator of the formation of higher cortical functions. The problem of localization of higher mental functions belongs to a number of interdisciplinary problems that are developed by a number of disciplines: neuropsychology, neurolinguistics, neuropathology, neurophysiology, etc. In domestic neuropsychology, the "localization" of mental functions is viewed as a systemic process. In other words, the psychic function, like the physiological function, correlates with the brain as a multicomponent system, the links of which are related to the work of certain brain structures. But the diagnosis of the level of mental development of children with speech pathology is very often formal, superficial, which greatly complicates the definition of etiopathogenetic mechanisms of verbal disturbance and an adequate correction strategy.

Traditionally, the diagnostic approach is especially popular when studying the verbal activity of children with speech pathology, since this approach involves the study of various aspects of speech. A significant disadvantage of this approach is the evaluation of the state of language facilities without taking into account the specific features of the deficiency of higher mental functions, while verbal violations never occur in isolation, and lead to a violation of mental processes. Unfortunately, it should be noted that in the study of speech functions in children with systemic underdevelopment of linguistic means, in most cases, extremely important for obtaining complete and reliable diagnostic data, patterns of brain function are not taken into account. They include, first of all, the interdependence of the language and the brain, the dynamic changes in higher mental functions in childhood. Modern psychological and pedagogical studies on the problem of speech dysontogenesis of children are mostly specialized in nature and suggest the creation of original author's, or the modification of traditional speech therapy technologies, which are aimed at the formation of certain speech competencies. It is important to realize that the choice of the strategy for the formation of language functions of children with speech dysfunctions is not possible without resorting to physiological and neuropsychological mechanisms of speech, psycholinguistic aspects of language analysis, Analyzing the essence, organization of prerequisites and conditions of oral and written speech, first of all, we rely on scientific data Psycholinguistics, neurolinguistics, neuropsychology and pathophysiology. In connection with the above, solving the problem of competent diagnosis of children's speech development presupposes radical changes in scientific views on approaches and the very structure of the diagnostic research methodology.

MATERIALS AND METHODS

We examined 250 children of 4-6 years of age (experimental group (EG) who applied to the Tyumen Center for Speech and Speech Development for the violation of speech and mental development and who had a history of the first grade of the HBI in the history of the anemia (main group) and 250 children (comparison group (CG)) .In the main group, 46.05% of children were examined in dynamics: clinical examination, questionnaire survey of parents on a specially developed map, copying of data from outpatient cards a traditional logopedic examination. The evaluation of the neurological status and mental development was carried out jointly with the neurologist, psychiatrist and psychologist.

We analyzed the structure of the deviations in the health status of children who had an EHEP at birth (Table 1). With the greatest frequency in both groups the neurologic symptomatology presented by syndromes of residual encephalopathy and minimal brain dysfunction (MMD) was recorded. In children born with ESRD, neurologic pathology was 2 times more common than in the comparison group (94.68% and 46.67%, respectively, $p < 0.001$, respectively). All children of the EG (100% of cases) had speech dysfunctions in the form of delay in the formation of expressive speech by the type of motor alalia with secondary deficiency of cognitive processes.

RESULTS

Programming and realization of a speech utterance is a complex, multilevel process, the normal functioning of which can be violated at one of the levels - the level of perception, cognitive-linguistic planning, implementation level (phonetic-motor programming).

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Table 1: Structure of the deviations in the state of health in children aged 4-6 years with motor alalia(with a delay in intrauterine development in the anamnesis (in%)

Deviations State of health	4 years		5 years		6 years		4-6 years	
	IGR p=22	CG p=14	IGR p=36	CG p=13	IGR p=36	CG p=18	IGR p=94	CG p=45
Neurological symptoms	95,45*	50	94,44*	61,54	94,44*	33,33	94,68*	46,67
Functional violations in cardiovascular system	63,64*	21,43	69,44*	30,77	75*	33,33	70,21*	28,89
Pathology Musculoskeletal system	22,73	14,29	33,33	15,38	41,67*	16,67	34,04*	15,56
Diseases ENT-organs	50	21,43	27,78	15,38	23,08	16,67	31,91*	17,78
Manifestallergic reactions	13,64	-	41,67*	15,38	27,78	-	29,79*	4,44
Diseases of the digestive system	13,64	-	22,22	7,69	33,33	16,67	24,47*	8,89
Pathology of the urinary system	18,18	7,14	22,22	7,69	33,33	16,67	25,53*	11,11

* Significant differences with the comparison group. IGR – intrauterine growth retardation CG - comparison group

The diagnosis of residual encephalopathy was established in 37.23% of children with a history of ESRD and only in 20% of children in the comparison group (p <0.05). Among the syndromes of residual encephalopathy in the main group, hypertension-hydrocephalic (42.86%) and astheno-neurotic (42.86%) were detected with equal frequency and convulsive syndrome occurred in 14.28% of children. In the comparison group, residual encephalopathy was manifested by hypertension-hydrocephalic syndrome at 44.44% and astheno-neurotic syndrome in 55.56% of cases, and by 8 years, unlike the main group, this symptomatology was leveled. More than half of the children of the main group (57.45%) had attention deficit disorder (ADD). In most cases, attention deficit was registered with hyperactivity (94.45%), and in isolated cases with hypoactivity (5.55%). Among the children of the comparison group, MMD was significantly less likely (26.67%, p <0.001), and only ADD with hyperactivity was detected. The greatest frequency of MMD symptoms in the children surveyed coincides with the beginning of preparation for schooling (6 years).

On the second place among the deviations in the state of health of children who have had an EHF at birth, are functional abnormalities on the part of the CAS. These deviations were observed in 2/3 of the children of the main group and were represented by cardiac syndrome (23.4% of children), palpitations (7.45% of children), functional systolic murmur (53.19% of children), lability of blood pressure values (51 , 06% of children). Cardiovascular disorders were registered in children of the comparison group only in 1/4 of cases (p <0.001).

On the third place in the main group, abnormalities of the locomotor apparatus (34.04%) were more reliably detected, and in the comparison group (15.56%, p <0.05). Pathology is represented by flat feet, impaired posture, scoliosis, instability of the cervical spine. The incidence of diseases of the musculoskeletal system in children with an AECD in the anamnesis from 6 to 8 years increases almost 2-fold. Approximately with the same frequency, allergic manifestations (27.29%) and pathology of ENT-organs (31.91%) are encountered in children with ESRD in the anamnesis. Manifestal allergic manifestations in the children of the comparison group were detected significantly less often (4.44%, p <0.001). Atopic dermatitis was the main nosological form in the study group. When analyzing the dynamics of allergic manifestations in children with

ZVUR in the anamnesis, an increase in the incidence of this pathology at the age of six was revealed. The pathology of the ENT-organs in the children of the comparison group was registered significantly less often (17.78%, p <0.05). An increase in the incidence of diseases of the ENT-organs (chronic tonsillitis and sinusitis, adenoids) in the children of the main group was noted at the beginning of schooling. Further, the frequency of occurrence of diseases of the ENT-organs in children with an ESRD in the anamnesis is close to that of children in the comparison group. Almost the same frequency in children with ESRD at birth, revealed gastrointestinal tract diseases (biliary dyskinesia, chronic gastroduodenitis) and the urinary system (urinary tract infection, dysmetabolic nephropathy, pyelonephritis), significantly less common in the comparison group (p <0.05) . When analyzing the incidence of morbidity in a group of children with ESRD, a history of 24.47% of frequently ill children was found, while in the comparison group only 2.22% (p <0.05). Acute illnesses had a protracted character and were often detected in the form of combined forms with lesions of ENT-organs. The peak of frequent morbidity in children of the main group was observed at the age of six (36.36%). Such violations of physical health are much more common in the main group than in the comparison group, so we regard them as clinical manifestations of maladaptation.

According to SemagoN.Ya., Semago M.M[2000], the combination of these deviations in the state of health can be explained by a wide zone of innervation of the vagus nerve, a lesion which often occurs in children with a low birth weight. The authors emphasize that the reflected reactions from the internal organs and vessels are not manifested in isolation, but, as a rule, they are combined. Diagnosis of children of the first year of life is often based on the scale of psychomotor development, based on the development of Griffiths, Gesella. Using the Griffiths scale allows you to study the state of motor skills, social adaptation, hearing, speech and the child's ability to play. The presence of a scoring system of assessments and norms of the child's psychomotor development up to a year makes it possible to identify the conformity (or inconsistency) of the state of the mental and motor speech bases with age criteria. More detailed results of the survey with revealing the structure of the defect and planning of stimulating activities can be obtained with the help of O.V. Bazhenova and Yu.A. Lisichkina, M.L. Dunaikin. But the results of the early survey of pediatric and neurological services, as a rule, do not have further continuity with speech therapists, defectologists and psychologists. Parents are given recommendations for a wait-and-see attitude in terms of verbal and mental development. In practice, specialists with defectologists come to children with an already formed pronounced clinical picture and often on the initiative of the parents themselves.

Logopedic diagnosis in the early stages of child development should be presented in three blocks. The anamnestic unit includes the study of medical documentation, analysis of information obtained from a conversation with parents about the conditions of upbringing, social and speech environment. The second, diagnosed

This block is represented by a comprehensive logopedic examination aimed at studying the anatomical and physiological features of the peripheryand an in-depth study of the components of the speech-language system. The third, psychological and pedagogical block, contains material for the study of sensory, motor functions, higher mental functions, objective activity and social skills.

DISCUSSION

The causal relationship between articulation defects and developmental abnormalities, phonemic processes is established in the studies of many scientists [Aksenova 2002; Christelle R., Liliana 2016;Polivara 2012; Yakup et al 2016; SemagoN.Ya., Semago M.M. 2000].

We assume that a more detailed analysis of the results of the survey and screening in all age groups will allow us to identify the most important diagnostic criteria and help predict the further development of each child's speech development [Polivara 2014]. The organization of care for children with speech dysfunctions goes beyond speech therapy onlybecause it acquires a medico-social, psychological-pedagogical significance, which requires further scientific and practical permission.

Great importance in the implementation of the principle of dynamic learning of the child is acquired by the concept of LS. Vygotsky about the zones of actual and immediate development of the child [1994]. Of course, effective correctional help is correlated with an adequate prediction of the child's subsequent

development, which is possible under the condition of interconnection of systemic study, qualitative analysis of data and taking into account the patterns of normal ontogeny.

Analysis of abnormal manifestations, carried out taking into account the laws of development, makes it possible to assess the role of the main defect in the development of the child's speech, to separate the cause from the effect.

It is important to remember that the development of all mental spheres is represented by the consistent formation of interdependent structures, the non-judgmental nature of mental functions (perception, attention, memory, speech, thinking) and evaluation of mental processes should be carried out as the study of inseparable whole structures. In addition, the diagnostic research technique should not only identify the mechanisms of the violation, but also predict the nearest actual level of development [Karabulatova 2013].

Based on the modern synergetic approach, the basic component of diagnostics is the study of regulatory, spatial and affective factors. Regulatory factor determines the formation of arbitrary regulation of the child's mental activity, the spatial factor, in turn, determines the level of development of cognitions and spatial-temporal representations. The affective factor is the basis of the affective regulation system [Karabulatova, Kim et al 2015]. Particular attention should be paid to the evaluation of the formation of the spatially-functional organization of brain systems, the study of the features of the functioning of the cerebral hemispheres in the conditions of their interaction, including with functional asymmetry [Simernitskaya 1985].

The approaches of researchers to early diagnosis and early correction are similar: the authors either consider the issue of speech development in the context of holistic stimulation of all functions and systems of a child with developmental abnormalities (L.I.Aksenova, Yu.A. Razenkova, etc.), or try to solve this problem in the narrow-speech aspect (R.E.Levina, E.F.Arkhipova, N.S.Zhukova, V.A.Kovshikov, E.M.Mastyukova, S.A.Mironova, O.G.Prikhod'ko, Z. Repina, E.S. Smirnova, G.V.Chirkina, E.V.Shremet'ev, and others).

CONCLUSION

The role of the kinesthetic component in the development of phonemic perception is emphasized in the studies of linguists. Even in the period of the origin of the phonological theory, the largest linguist of the second half of the nineteenth and early twentieth centuries I.A. Baudouin de Courtenay pointed out that the structure of the phoneme is determined by both acoustic and proprioceptive components. This means that the process of phonemic analysis of words is carried out with the participation not only of the auditory, but also of the motor analyzer.

The organization of care for children with speech dysfunctions goes beyond only logopedic correction, as it acquires medical, social, psychological and pedagogical significance, which requires further scientific and practical solutions.

We assume that a more detailed analysis of the results of the survey and screening in all age groups will allow us to identify the most important diagnostic criteria and help predict the further development of each child's speech development.

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