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Diagnosis of sensory and sensorimotor alalia: An integrated interdisciplinary approach

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Abstract

The article describes the new interdisciplinary research launched at Kazan Federal University by the laboratory of clinical linguistics via interdisciplinary methodological basis. As a result, in Russian clinical practice there are no batteries of tests for speech evaluation containing linguistically validated materials, which will make it possible to objectify the results qualitatively and quantitatively. In conclusion, it is necessary to develop a consistent system of diagnosis and differential diagnosis, new Russian-language diagnostic psychometric instruments for children and questionnaires for their parents in order to identify specific markers of sensory alalia.

Keywords: impressive, speech, developmental, disorders, alalia.

Diagnóstico de la alalia sensorial y sensoriomotora: Un enfoque interdisciplinario integrado

Resumen

El artículo describe la nueva investigación interdisciplinaria lanzada en la Universidad Federal de Kazan por el laboratorio de lingüística clínica a través de una base metodológica interdisciplinaria. Como resultado, en la práctica clínica rusa, no hay baterías de pruebas para la evaluación del habla que contengan materiales lingüísticamente validados, lo que permitirá objetivar los resultados cualitativa y cuantitativamente. En conclusión, es necesario desarrollar un sistema consistente de diagnóstico y diagnóstico diferencial, nuevos instrumentos psicométricos de diagnóstico en ruso para niños y cuestionarios para sus padres a fin de identificar marcadores específicos de alalia sensorial.

Palabras clave: impresionante, habla, desarrollo, trastornos, alalia.

1. INTRODUCTION

Sensory alalia is the least studied (and most severe) type of speech disorder in children. The motor component of alalia is h can be conditionally generalized in the following way: the causes are not revealed, the habilitation is slow and complicated, the prognosis is unfavorable (SADEGHI ET AL, 2017).

Sensory alalia separately does not occur as often as sensorimotor, so the subject of our study is presented by both types, with the strongest emphasis on the study of speech perception.

There are cases of alalia, which appear as a result of organic brain damage, which can be detected at an early age with the help of neurosonography, later – with the help of MRI and EEG. Sensory alalia manifests in disorders of speech understanding caused by the dysfunction of auditory speech analyzer, which occurs in damage of temporal lobe in the dominant hemisphere. A child does not correlate the sounds of speech with semantics (the mechanism looks like the same in Wernicke's aphasia) (GOROBETS ET AL., 2015; Gorobets et al., 2018), perceives them as noises and “background”. The absence of auditory differentiation in this case extends to sounds of human speech, there are usually no problems with hearing and with recognition of non-speech sounds: the child correlates non-speech sounds with sources and understands the meaning of what is happening, reacts to barking dogs, croaking crows, phone calls etc.

A child with specific sensory alalia can repeat the words and sentences after the adults, and often it looks like psychiatric disorders because a child answers the questions inadequately (he/she can only repeat without understanding). Sensory alalia without motor component is often accompanied by echolalia (repetition of phrases like the echo) – the same symptomatology is characteristic of autistic children – and logorrhea (uttering a meaningless set of sounds and pseudowords).

However, most often in the last decade neurologists, psychiatrists, speech therapists and neuropsychologists face with such type of alalia, which is associated not with brain damage, but with the

low level (or absence) of development of the cortex in brain areas responsible for speech. MRI and EEG do not reveal abnormalities, organic lesions, neoplasms and atrophies are not recorded, the neurological examination does not reveal pathologies, nevertheless, a child does not understand speech (KRASNIQI & FILIPI, 2019).

In some cases, absence of speech is accompanied by behavioral disorders (disinhibition, aggression, autoaggression), autistic behavior; eating behavior can be disturbed; the skills of self-care may be not developed or regress; but in a significant number of children speech problems are specific (see Figure 2).

2. MATERIALS AND METHODS

The materials for research were processed in the laboratory "Clinical Linguistics" (Kazan Federal University) in the frame of the project connected with speech and developmental disorders in children. The study of sensory and sensorimotor alalia is complex and based on an interdisciplinary approach, including, in addition to traditional neuropsychological, neurological and speech therapy methods, a new interdisciplinary methodological basis. This basis includes the usage of the achievements of cognitive and applied linguistics, which opens new ways for studying speech and language in their multiple connections with the intellect and with all cognitive processes, in interdisciplinary areas and their introduction into clinical practice.

The working group which consists of 25 specialists assessed impressive speech, expressive speech; functions of programming, regulation and control, visual gnosis; visual-spatial gnosis, functions of auditory analyzer, functions of kinesthetic analyzer, general adaptive skills; development of motor skills and hand motor skills; executive functions; emotional sphere and the specificity of behavior in 316 patients from 1.8 till 14.5 years old with speech problems.

The study is conducted by the laboratory of clinical linguistics (Kazan Federal University), the clinical base is A.Yu. Ratner's Pediatric Hospital №8 (Kazan, Russia).

3. RESULTS

At the moment the working group includes neurologists, clinical linguists, neuropsychologists, psychiatrists, speech therapists, specialists in functional diagnostics and radiologists, who work with children with sensory and sensorimotor alalia. The cabinets for diagnostics and correction of speech disorders are equipped; a register of patients with sensory and sensorimotor alalia (including those with autistic spectra, mental retardation and cognitive epileptiform disintegration) is being conducted. At the moment (MAY, 2018) it includes 316 patients from 1.8 to 14.5 years old. The distribution of age groups is presented in Figure 1.

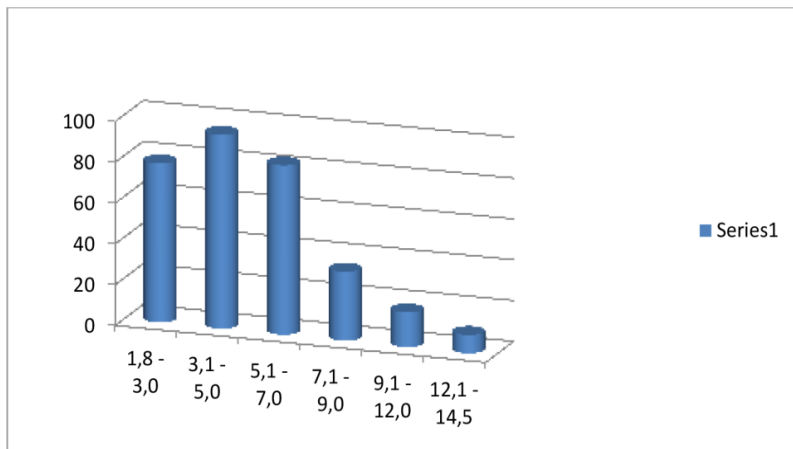


Figure 1: Distribution of children by the age

As it is shown in Figure 1, we meet the highest percent of alalia and other cognitive developmental problems at the period from 3,1 to 5,0. It does not mean that the situation in children from 1.8 to 3.0 is much easier because their parents usually begin to trouble only when their 3-year-old children do not begin to talk and start their visits to the doctor only from 3 to 4.

The children were divided into 4 groups according to the type of their disease.

As it is shown in Figure 2, the largest group is presented by children with sensorimotor alalia accompanied by other developmental disorders (147 children). The group of children in which sensorimotor alalia is a specific disorder includes 129 children. Children with

sensory alalia accompanied by other developmental disorders form the third group (27 children), and sensory alalia as a specific disorder was registered in 13 children.

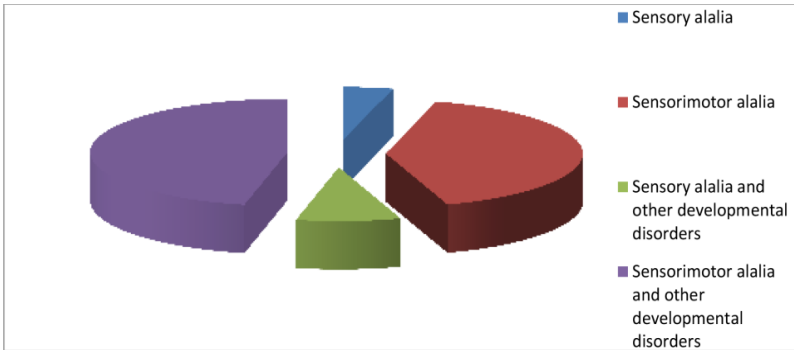


Figure 2: Distribution of children by the type of disease

As it is shown in the figure, sensory alalia is not very frequent in children (8,5% from the whole group with impressive speech disorders), but it occurs, and the process of habilitation is rather long.

4. DISCUSSION

Nowadays in Russia, there is no complex interdisciplinary scientific description of sensory alalia. The available data are disparate; the diagnosis is often regionally and locally specific, highly dependent on the subjective interpretation of the specialist and his/pyk experience. There are problems with the terminological apparatus

(Bobylova et al., 2017). In addition, the terminology data do not correlate with foreign studies in the field of specific language impairment (SLI) (GRILL, 2019), disorders of language comprehension (BISHOP, 2014), language delay (WANG ET AL., 2018) or developmental dysphasia (ECHENNE, 1992; DUVELLEROY, HOMMET ET AL., 1995), which makes it difficult to universalize the diagnosis and correction of this severe type of speech disorders in early childhood. As the analysis of foreign scientific databases shows, the term alalia is present only in Russian-language journals (KHRAKOVSKAYA & SUMCHENKO, 2018; ALEKSANDROVA & ALEKSANDROVA 2016; ZAVADENKO ET AL., 2013).

In Russia, there is no universal database of diagnostic materials and tests created jointly by specialists of different profiles (linguists, speech therapists, neuropsychologists, neurologists, psychiatrists) which pass approbation and validation in children without speech and developmental disorders. There is no universal model for diagnosis of speech disorders in non-speaking young children (up to 4 years) and speech disorders in children after four years at different stages of compensation. In Russian clinical practice, there are no batteries of tests for speech evaluation containing linguistically validated materials, which will make it possible to objectify the results qualitatively and quantitatively. Since in Russia linguists, as a rule, do not participate in the diagnosis and differential diagnosis of sensory and sensorimotor alalia, available tests contain language materials not approbated among

children without speech disorders and, therefore, are not linguistically valid.

In the laboratory "Clinical Linguistics" (Kazan Federal University) at the very moment two batteries of tests are being worked out:

1) The Russian adaptation of the "Batteria per la Valutazione del Linguaggio in bambini dai 4 ai 12 anni" (BVL_4-12 (MARINI ET AL., 2015, ELISEEVA ET AL., 2017). This is a comprehensive battery of tests with solid theoretical and psychometric properties that have been designed to assess comprehension, oral production, and repetition skills in children aged 4 through to 12.

2) The express-test on speech and cognitive development for children with epilepsy within the project "Development of higher cortical functions in children with epilepsy: evaluation of speech status in dynamics with antiepileptic therapy" (GAMIROVA ET AL., 2018).

5. CONCLUSIONS

For adequate and timely assistance, it is necessary to develop a consistent system of diagnosis and differential diagnosis, new Russian-language diagnostic psychometric instruments for children and

questionnaires for their parents in order to identify specific markers of sensory alalia. Often, non-speaking children are diagnosed and treated as children with sensorimotor alalia, whereas in reality, it is the only motor, or as children with autism, whereas it is sensory alalia (the behavioral features are alike in several positions). Sometimes they are habilitated as children with mental retardation (because of complete ignorance of verbal instructions and lack of response to speech), sometimes they are treated as deaf or hard-of-hearing children (whereas in sensory alalia hearing is usually normal or reduced slightly). The principles of habilitation in these situations are not the same, they are different for children with autism, sensory alalia, hard-of-hearing and mental retardation. Thus, receiving ineffective therapy, the child loses precious time, during which it is still possible to partially or (in some cases, with an early and timely treatment of specialists) completely habilitate him/her.

The multidisciplinary research in this field helps to establish a system of habilitation for children with sensory and sensorimotor alalia, which certainly has a high social value and is an important contribution to public health and to the development of personalized medicine.

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