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Logopedic Technologies in Work with Children with Special Educational Needs

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Abstract: The scientific substantiation of motor sphere examination as one of the important components of complex pedagogical examination of children with speech disorders is considered.

The article considers the problem of application of speech therapy technologies for preschool children with special educational needs. On the basis of theoretical analysis of sources of the problem, as well as practical experience of work with such children the necessity of multidisciplinary approach to the organization of their speech therapy support. Algorithms of variant technologies of speech therapy support of preschool children with delayed speech development and developmental disorders are given.

The importance of involving parents of preschool children with special educational needs in joint activities with a speech therapist is given. Particular attention is paid to the need for diagnostics of the child's speech development.

The problem of organization of joint work of a speech therapist and parents bringing up a child with special educational needs is revealed. The ways of solving problems arising in such families are shown. The necessity of timely and systematic correctional and speech therapy work is pointed out.

Keywords: *Speech Therapy, Children with Special Developmental Needs, Speech Disorder, Correctional Technologies, Motor Functions*

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Introduction

Speech is a process resulting from the interaction of the brain and other important parts of the central nervous system. The auditory, visual, motor and kinesthetic analyzers are involved in the process of speech. During the pronunciation of a sound, a complex set of movements is normally involved. In this case, articulation, phonation and breathing must be sufficiently coordinated in their work. On the other hand, the complex of movements must be in correlation with the corresponding auditory sensations. To understand the meaning of a word, the child must merge the auditory and visual sensations into a single image of a particular object.

Speech and language development must be coordinated with the child's overall development and can be monitored using typical markers. Differential diagnosis is critical to the development of appropriate intervention, which should be tailored to the parents' goals along with the child's clinical and educational needs. Early identification and intervention help with educational planning and is often associated with better long-term outcomes. Any speech therapy plan should be designed with measurable goals and consistent monitoring of progress toward those goals, Sharp, Hillenbrand (2008).

The process of vocabulary activation in preschool children develops successfully if the knowledge of age and individual mental, physiological indicators of development of each child is combined, Vasylieva & Drozd (2023). One of the main tasks of a speech therapist is to have more information about the child's personal life, relationships with family and other relatives. In addition, the specialist needs to determine the needs and interests of each child with a speech impairment. Also diagnose her aptitudes, abilities, attitude to other children and what shortcomings the child himself has.

Logopedic work with children with special educational needs is carried out in two stages. The first stage is aimed at enriching the passive vocabulary of children. The task of the second stage is to transfer words from the passive vocabulary to the active vocabulary, and activation is carried out: consolidation of new words learned by the child with the help of special speech exercises and didactic speech games that help the child to use the new word in his/her speech.

The problem of activating the vocabulary of preschoolers with special educational needs is actual, especially in the present conditions. Vocabulary is an acceptable option for the realization of speech activity in

the process of solving the tasks of speech communication. Defective speech activity, which is observed in children with developmental disorders, has a negative impact on all spheres of the child's personality. Many specialists note that the development of the child's cognitive activity is hampered. In addition, it is noted that the performance of attention and memory is reduced, logical and semantic memory is disturbed, etc. It is difficult for children to master the mental operations that are disturbed, i.e. comparison, generalizing analysis, classification. Many forms of communication and interpersonal interaction hinder the development of play activity, which is a leading value in terms of the overall development of the psyche of preschoolers.

In a child, the development of active vocabulary is closely connected with the development of thinking and other mental processes. In addition, on the other hand, this process is connected with the development of all components of speech: phonetic-phonemic and grammatical aspects of speech. At the same time, it is well known that the cognitive and intellectual development of a child is impossible without the assimilation of new words and the formation of an active vocabulary. Clarification, expansion and activation of vocabulary play an important role in the development of logical thinking. That is, the richer the child's vocabulary, the more logical he thinks, the better his speech develops. The activation of the vocabulary of preschoolers with special educational needs is understood as the process of consolidating and popularizing the use of new words in speech, the development of the semantic side of children's vocabulary.

Compton, Tucker & Flynn, (2009) show that speech therapists are teaching speech to school-aged children with cochlear implants. This approach needs additional speech therapy technology and specialist training. General underdevelopment of speech in children with special educational needs should be understood as a form of speech anomaly, when the formation of all components of the speech system relating to both the sound and semantic sides. The causes of this condition lie in unfavorable influences on the body. This is the influence of negative environmental factors in the intrauterine period of development and during childbirth, as well as in the first years of life of the child. Incompleteness of non-verbal mental functions in children with developmental disorders, determines a number of features of the child's speech development, affects the development of vocabulary, determines its specificity.

The study by Surayyo, Shoakhmedova (2022) states that "the speech therapist's activity is aimed not only at eliminating speech disorders in

children with special needs, but also at their successful adaptation in the educational sphere". The condition for the successful implementation of this approach is the creation of conditions for the successful implementation of special education, which is one of the decisive and effective mechanisms for the development of society for each individual.

Logopedic technologies in the examination of children's motor functions: a neuropedagogical aspect

In correctional pedagogy at the present stage in the examination of the child is relevant complex approach. When planning a program of speech therapy and treatment work and determining its effectiveness requires a comprehensive examination. Such an examination involves the coordinated work of different specialists. The examination includes psychological and pedagogical, speech therapy study of the child and analysis of the results of medical and pedagogical research.

In the studies of Vasylieva, Drozd (2023) indicated that motor function disorders are manifested in children with autism and need restoration, rehabilitation, correction and developmental influence on children, including the participation of a speech therapist. See also Gillon et al. (2017) show that there are international practices of speech therapists in working with children with autism spectrum disorder.

Khusniddinova (2022) points out in her work that the interaction of speech therapist with other specialists is quite effective and necessary. Doctors of different profiles of medical institution determine the somatic, neurological and mental state of the child, Teacher-logopedist and pedagogical psychologist examines the state of his speech, personality traits, motor skills. Speech therapist in the examination of a child with a speech disorder carefully studies medical and psychological-pedagogical documentation. Such a comprehensive examination usually has three stages: 1) collection of anamnestic data; 2) examination of the functional state of the general and fine motor skills of the fingers, mimic and articulation muscles; 3) study of personal characteristics of the child.

Fine motor skills are motor activities that are conditioned by the coordinated work of small muscles of the hand and eyes. The skills of fine motor skills help the child to study, compare, classify surrounding objects. It also allows the child to become more familiar with the environment. Fine motor skills help the child to maintain themselves independently. They also allow the child to express themselves through creativity - play, plasticity, and contribute to the child's self-esteem. They make it easier for the child to

participate in games and (at school age) in work, i.e. they enable the child to acquire social experience.

Articulation of speech sounds consists in the coordination of the muscles of the tongue, lips, mouth, larynx and respiratory movements. It is known from physiology that the motor projection of the speech organs is located in the lower part of the anterior central gyrus. Coordination of movements from the organs of broadcasting is carried out in the motor speech area of Broca's, located in the lower part of the frontal gyrus.

In the motor projection of different parts of the body in the precentral gyrus, more than 1/3 of the area is occupied by the projection of the hand. The projection of movements of the hand and the speech area are located anatomically close enough. This fact about the proximity of the hand projection to the motor speech zone indicates that the training of fine movements of the fingers influences the development of the child's active speech.

The process of individual development of a child's speech is closely connected with the movements of the fingers of the hands. It is known that children who make numerous lively movements with their fingers, the development of speech is faster than other peers.

The child's speech is directly related to his/her activity, to the situations in which communication takes place. The child begins to name those objects that she touches with her hands. At the same time, the details she touches are emphasized more often (for example, the handle of a cup compared to its bottom). A word - the name of an object, becomes a word - a concept only after a significant number of motor conditioned connections are made to it.

Table 1: *The interrelationship in motor and speech development*

Degree of development of finger movements	Degree of development of general motor skills	Degree of speech development
Norm	Norm	Norm
Norm	Below normal	Below the norm
Below the norm	Norm	Norm
Above normal	Norm	Norm
Below the norm	Above normal	Above the norm

Source: *the authors' own conception*

A special place is occupied by hand and finger praxis. It indicates a significant level of differentiated movements of the fingers of the hand. A small child very early (starting from 5-6 months) shows love for playing with

the fingers of the hand. During this period, a meaningful index gesture appears, which fundamentally distinguishes the child from all animals. At the same time, primates, can show something with the hand, but not with the finger. Even more complex than the finger, oral praxis. It is formed on the basis of less object, but abstract actions.

Involuntariness of practical actions is ensured by a high degree of their strengthening (automation). This is especially clearly seen in the example of oral praxis. Not arbitrarily, that is, in the form of a reflex, the above-mentioned oral movements are usually performed. For example, a patient who cannot blow according to the task, immediately blows out a lighted candle raised to his lips. Mastering oral praxis is a very important preparatory phase of the child's speech development.

Apraxia is the inability to arbitrary practical object activity strengthened earlier. An involuntary action that is unavailable to be performed on a given task can be easily performed. Since there are no paralyses or pareses in patients with apraxia, the failure in arbitrary activity may be due only to a disturbance in its control by the central mechanisms of the brain.

The study of speech motor skills is a mandatory component of a comprehensive examination of the child, its results are entered in detail by the teacher - speech therapist in the speech card, in whatever version it is used in practical work. Examination of speech motor skills is organized after the study of the state of the articulation apparatus.

When examining the articulation apparatus, it is taken into account that the correct pronunciation of sounds is largely determined by the safety of each of the parts of the peripheral speech apparatus: the mouth and nasal cavities, as well as the pharynx and nasopharynx. By checking the structure of the tongue, teeth, lips, palate, jaws, it is found out whether children have organic defects of the peripheral speech apparatus.

During the child's speech, the strength of speech movements (weak, strong), accuracy (inaccurate, accurate), volume (incomplete, complete) and switching (slow, fast) are evaluated. The presence of synkinesias, speech deviations, the speed of formation of articulatory speech, patterning, duration and retention of posture are noted.

Organization of speech therapy for children with special educational needs

Speech therapists utilize many aspects of technology in their practice, from telemedicine to tablet device applications (apps) that support intervention practice. Hersh (2022) discusses tools for designing, developing, and implementing such technologies.

Principles of speech therapy for the development of active vocabulary in preschool children with special educational needs:

1. The principle of activity means that the development of vocabulary is based on the activation of the child's cognitive activity.

2. The principle of consistency means that there is a close connection of vocabulary development with the development of cognitive processes (e.g., perception, attention, memory, thinking) and mental activity - logical operations such as comparison, analysis, synthesis, generalization, classification

3. The principle of sequence and gradual complication - all tasks are given to the child and performed by him/her in a certain sequence - from simple to complex.

It is possible to distinguish the following tasks of speech therapy technologies to activate vocabulary in preschool children with developmental disorders:

1. Studying words previously unknown to the child and replenishing the vocabulary of children with new words. Expansion of new meanings of a number of words already in the child's vocabulary.

2. Enrichment of the child's vocabulary mainly at the expense of words in the general vocabulary.

3. Consolidation and refinement of the vocabulary. For a preschool child with special educational needs, a word is not always connected with the idea of the subject or what it means. The child often does not know the exact name of objects and phenomena. The specialist should pay attention to clarify and deepen the understanding of the meaning of words already known to the child, filling them with concrete content.

4. Ability to reproduce/use the new word in speech. It is important that the new word is incorporated into the child's active vocabulary. This happens only if it is written down and reproduced in speech. The new word should be included in the vocabulary in combination with other words so that the child learns and becomes accustomed to using them in the correct instances of verbal communication.

In older preschoolers with special developmental needs in the activation of vocabulary special attention in speech therapy work is paid to the constant clarification of the meaning of the word. This is carried out in the work with synonyms and antonyms, when comparing the connotations of words, on the use of words in connected speech, in the speech practice of the child.

To activate the vocabulary of older preschool children with developmental disorders, the following methods are used in speech therapy work:

1) the method of constant accumulation and enrichment of the content of children's speech;

2) methods designed to consolidate new words and stimulate their use in speech.

3) methods of developing the semantic side of children's vocabulary.

That is, the first group of methods includes:

- methods of enriching the child's vocabulary through direct acquaintance of the child with the surrounding world and observation of objects, rooms in the kindergarten, purposeful walks and excursions;

- methods of indirect enrichment of the child's vocabulary by familiarizing the child with the world around him/her and through viewing photographs, slides, showing movies and videos, viewing images with unfamiliar content, reading works of art, watching television.

The second group of methods is used to consolidate and stimulate the use of words in the child's speech by considering toys, pictures with familiar content, didactic speech games and exercises. The means of activating the vocabulary of older preschool children with special educational needs are didactic speech games and speech exercises.

There are the following principles of using didactic games in speech therapy classes to activate the vocabulary of preschool children with developmental disorders:

- didactic game should be based on the program material;

- the didactic game promotes the involvement of visual and tactile analyzers in the correction process;

- the purpose of objects, pictures, aids, the content of questions, the conditions of the games should be understood by children;

- the advantages used by speech therapists during games should be attractive in appearance;

- the game should ensure the involvement of all children in the correction process.

Cianfanelli, Crescenzi, Goretti, Terenzi (2019) note that playful learning through digital systems offering "playful interaction" is quite effective. For children with special educational needs during learning, this approach is a very effective and flexible means of support and does not create additional psychological and social discomfort.

Du, Tekinbas (2020) point out that "the use of mobile technology for children enables new design methods to be found to facilitate communication and learning with disabilities". This is also reflected in the improvement of children's communicative interaction with the people around them.

Logopedic work in the process of correctional work to activate the vocabulary of senior preschool children with special educational needs is carried out in the following areas:

- work on recognizing the speech that the child hears. Also, work on distinguishing words that are close in sound and rhythmic design, but different in meaning. In this case, children develop phonemic perception and phonemic hearing.

- work on forming the ability to distinguish between correct and incorrect pronunciation of words;

- work on systematizing words already in the child's active and passive vocabulary. Work on forming the ability to group them into thematic groups according to different features, to single out generalizing words from them;

- work on different types of word meanings. Also work on the development of the ability to correlate the word with the object or phenomenon that it means (its subject meaning). Also on the development of the ability to establish a link between the word and the concept of the conceptual component of the meaning of the word. Directions of corrective speech therapy work should be carried out on the development of the conceptual component of the meaning of the word (i.e. the ability to relate the word to other lexical units (word combinations and sentences) within the lexical system of speech and mastery of additional nuances contained in the meaning of the word;

- work on comparing and contrasting words with their lexical meaning (work with synonyms, antonyms, polysemous words);

- work on the meaningful cohesion of words, i.e. the formation and development of the ability to coordinate adjectives, numerals with nouns.

The ability to use prepositions - simple and complex - to link words in word combinations and sentences and to use elementary conjunctions (and, but, that, because when, etc.) to link simple sentences into complex ones;

- work on activating the search for the word that the child would like to express in speech and that most accurately reflects the opinion.

Saz et al. (2009) showed that semi-automated systems exist to provide interactive speech therapy to the growing population of people with developmental disabilities and to assist professional speech therapists. These are interactive tools that are designed to facilitate language acquisition in the areas of basic phonatory skills, phonetic articulation and language comprehension primarily for children with neuromuscular disorders such as dysarthria.

Technologies of speech therapy assistance to families raising a child with special educational needs

Parents of children with special educational needs find it difficult to realize that their child has a developmental disability. This determines the difficulties of communication, education and interaction in the family. On the other hand, the family is a social institution where basic knowledge is laid down, the first experience of communication appears and an impression of the surrounding world is formed. Intra-family relations play one of the leading roles in the organization of effective correction and educational work.

Speech therapist at the initial meeting with parents and children conducts diagnostic examinations of the child's speech and motor sphere, collects anamnesis from the words of adults. On the basis of diagnostic research of relations in families with children with developmental disorders and speech problems there is a need to organize joint work of the speech therapist and parents to overcome the difficulties of upbringing, to establish contacts between children and parents. Inclusion of parents in the corrective-educational environment should be systematic.

A fairly recent approach is the use of telepractice in the speech-language pathologist's work with parents. This technology is an effective means of increasing access to high quality services that meet the unique needs of children and is a viable mechanism for providing language services for many purposes. Telepractice facilitates the implementation of practices used in direct speech and language therapy in parent training and coaching, Snodgrass et al. (2017).

In accordance with the characteristics of the child and family relationships, the specialist determines the form of work:

- demonstrating to parents the means and techniques of working with the child;
- parents attending classes conducted by the speech therapist and demonstrating his/her work with the child;
- children doing homework together with their parents, determined by the speech therapist;
- speech therapist's recommendations to parents about parents reading special literature on the upbringing and development of their children;
- realization by parents of creative ideas in the joint work of the speech therapist and the child.

At the main stage of work on speech correction, the joint work of the speech therapist and parents is determined by:

1. In the fulfillment of general home tasks, which are given to the child, and its subsequent verification by the specialist, the conversation between the specialist and parents about the difficulties in its fulfillment, the prospective work plan for further classes was determined.
2. In a conversation with parents on the results of each session, where successes and difficulties were discussed, educational situations formed at the session, educational recommendations were given.
3. Selection of additional literature and Internet resources in accordance with the peculiarities of the family environment and individual opportunities of the child for parents, selection of literature on the principles of family education.
4. Attendance by parents of open classes of a speech therapist with their child. Such classes create an opportunity for parents to get acquainted with the specifics of correctional and speech therapy work. Parents in this way can note those features of behavior during training, which they can use when doing homework.
5. Familiarizing parents with the specifics of the work of other specialists, explaining the importance of complex speech correction, as well as, if necessary, recommending attendance of classes of specialists of related professions.

The speech therapist uses the following forms of organizing joint work with parents in the course of correctional and speech therapy work:

1. Organization of creative drawing contests together of all family members.

2. Development of informational leaflets on preventive issues of the child's speech development.

3. Group and interfamily counseling and educational seminars.

4. Involvement of teachers or allied health professionals to provide comprehensive assistance to children with special educational needs.

5. Control diagnostic examination.

After the completion of correctional and educational work, the speech therapist conducts a repeated diagnostic examination, the results of which reveal improvement in the processes of formation and development of children's speech. In addition, determines positive trends in the development of motor skills, noted successes in the formation of higher mental functions and behavior of children. Parents, for their part, note the establishment of communicative interaction in the family, positive dynamics in the relationship with children on correction, the emergence in their families of new formats of communication and time spent in informal situations of communication of children.

Akamoglu et al. (2018) note that building relationships with families (fathers and children) is recognized as an important feature of effective intervention. In the provision of telepractice services, the activities and practices that form speech therapists' interactions with children and families can take many forms of interaction and engagement. This area of speech therapy activity is of a prolonged nature, which implies the continuation of the developed format already at the school stage. In turn, the data on the positive dynamics of speech, general development and interaction between children and parents in family conditions confirm the effectiveness of the applied technologies of speech therapy.

Conclusions

Consequently, the correct development of the motor apparatus is a factor that stimulates the development of speech and has a leading role in the formation of neuropsychic processes in children.

It is possible to distinguish the main directions of speech therapy work after activation of the vocabulary of older preschoolers with special educational needs:

- work on recognizing the word in the flow of the child's auditory speech;

- work on forming the ability to distinguish between correct and incorrect pronunciation of a word;

- work on systematization of words already present in the child's active and passive vocabulary;
- work on different types of word meanings;
- work with synonyms, antonyms, polysemous words;
- work on semantic compatibility of words;
- work on activating the search for words that most accurately reflect the idea that the child would like to express in speech;

The main means of vocabulary activation at speech therapy sessions with children of this category should be didactic speech games and speech exercises.

Thus, in preschool children with special educational needs the activation of vocabulary is quite successful when using a specially developed speech therapy technology. This technology is based on the principles and methods of speech therapy work and includes a set of didactic speech games and corrective exercises aimed at enriching and expanding the vocabulary of children, its consolidation and stimulating the use of new words in speech.

Communicative interaction in the family acts as a factor in overcoming the child's speech defect when organizing the interaction between the speech therapist and the family. It is also determined by timely speech therapy assistance, two-way activity, on the one hand, speech therapist, teachers, social-psychological specialists, and on the other hand - parents, other family members, the child with his full personal development.

References

Akamoglu, Y., Meadan, H., Pearson, J.N. *et al.* (2018). Getting connected: speech and language pathologists' perceptions of building rapport via telepractice. *J Dev Phys Disabil 30*, 569–585 https://doi.org/10.1007/s10882-018-9603-3

Cianfanelli, E., Crescenzi, P., Goretti, G., Terenzi, B. (2019). Playful learning for kids with special educational needs. *Advances in Intelligent Systems and Computing, 826*. Springer, Cham. https://doi.org/10.1007/978-3-319-96065-4_77

Compton, M. V., Tucker, D. A. & Flynn, P. F. (2009). Preparation and perceptions of speech-language pathologists working with children with cochlear implants. *Communication Disorders Quarterly*, *30*(3), 142–154. https://doi.org/10.1177/1525740108325554

Gillon, Gail, Hyter, Yvette, Dreux Fernandes, Fernanda, Ferman, Sara, Hus, Yvette, Petinou, Kakia, Segal, Osnat, Tumanova, Tatjana, Vogindroukas, Ioannis, Westby, Carol, Westerveld, Marleen (2017). International survey of

speech-language pathologists' practices in working with children with Autism Spectrum Disorder. **Folia Phoniatr Logop** ; *69*(1-2): 8–19. https://doi.org/10.1159/000479063

Hersh, Deborah (2022). Special issue: Qualitative research and innovation in speech-language pathology. *International Journal of Speech-Language Pathology*, *24*(5), 447–448.

Khusniddinova, B. Kh. (2022). Interaction of a speech therapist with other participants in the correctional process. *The American Journal of Social Science and Education Innovations, 4*(11), 01–05. https://doi.org/10.37547/tajssei/Volume04Issue11-01.

Saz, Oscar, Shou-Chun Yin, Lleida, Eduardo, Rose, Richard, Vaquero, Carlos, Rodríguez, William R. (2009). Tools and technologies for computer-aided speech and language therapy. *Speech communication, 51*(10), 948–967. https://doi.org/10.1016/j.specom.2009.04.006

Sharp, Helen M., Hillenbrand, Kathryn, (2008). Speech and language development and disorders in children. *Pediatric Clinics of North America*, *55*(5), 1159–1173, https://doi.org/10.1016/j.pcl.2008.07.007.

Snodgrass, M. R., Chung, M. Y., Biller, M. F., Appel, K. E., Meadan, H. & Halle, J. W. (2017). Telepractice in speech–language therapy: the use of online technologies for parent training and coaching. *Communication Disorders Quarterly*, *38*(4), 242–254. https://doi.org/10.1177/1525740116680424

Surayyo, K., Shoakhmedova (2022). Characteristics of the speech therapist's activity in the general education school in the conditions of inclusive education. *The American Journal of Social Science and Education Innovations, 4*(11), 17–22. https://doi.org/10.37547/tajssei/Volume04Issue11-04

Vasylieva, N. & Drozd, L. (2023). Aspects of the peculiarities of the formation of social and household skills in children with the disorders of the autistic spectrum. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience, 14*(4), 319–330. https://doi.org/10.18662/brain/14.1/422

Vasylieva, Nataliia, Drozd, Lidiia (2023). Restoration of motor and psychomotor spheres in children with autism. *Acta Balneol 2*(174), 87–93. DOI**:**10.36740/ABAL202302104

Yao Du, Tekinbas, Katie Salen (2020). Bridging the gap in mobile interaction design for children with disabilities: Perspectives from a pediatric speech language pathologist, *International Journal of Child-Computer Interaction, 23–24*. https://doi.org/10.1016/j.ijcci.2019.100152.