

Possibilities of Remote Neuropsychological Work with Children: a Case Analysis

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Возможности дистанционной нейрокоррекционной работы с детьми: анализ случая

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Abstract. In the current realities of the pandemic and self-isolation, we are forced to make adjustments to the usual way of living and adapt to existing conditions. The number of children requiring neuropsychological support is not decreasing, and they have no time to wait for conditions in society to return to normal. In addition, many locations within our country have no qualified neuropsychological specialists, which many children desperately need. Therefore, an online method of neuropsychological work is the only possible way to overcome these challenges. However, in certain situations even online support is not always suitable. Some factors which influence this include; the age of the child, the severity of his/her violations, his/her emotional state and so on.

Within this article is an example of a case whereby the specialist does not participate in the remediation process by herself, but at the same time completely controls it. The format was "experimental," after neither offline nor online methods of work previously were showing significant results. Together with the mother of the child we decided to go beyond the usual interaction with the child and began to look for alternative solutions. A new method was agreed, which required huge discipline and full inclusion of the parents into the remediation process.

A study was completed that qualitatively and quantitatively estimated the effect of this format of remediation work through the dynamics of longitudinal neuropsychological observation. The obtained results indicated strong positive dynamics in the formation of cognitive, regulatory and neurodynamic functions.

The article raises an important topic of accessibility of neuropsychological support for each child who needs it. The results underline the importance of a more detailed study of remote neuropsychological work with children in the near future.

Keywords: *distance learning; online format; neuropsychological remediation; learning difficulties; longitudinal observation; parents' involvement; case study analysis*

Аннотация. В нынешних реалиях пандемии и самоизоляции мы вынуждены вносить коррективы в привычный ход вещей и приспосабливаться к имеющимся условиям. Детей, которым нужна нейропсихологическая помощь, меньше не становится, и у них нет времени ждать, когда условия вернутся к прежним. Помимо этого во многих населенных пунктах нашей страны нет квалифицированной нейропсихологической помощи, в которой многие дети так нуждаются. Поэтому онлайн-вариант нейропсихологической работы является для них единственным возможным способом преодоления трудностей. Однако и онлайн-формат работы подходит не для всех детей, что может быть обусловлено возрастом ребенка, тяжестью его нарушений, его эмоциональным состоянием и т. д.

В статье на примере конкретного ребенка описывается один из возможных вариантов дистанционной работы, при которой сам специалист не участвует в коррекционном процессе, но при этом полностью контролирует его. Формат оказался своего рода «экспериментальным», поскольку ни очный, ни онлайн-вариант работы до этого не показали значимой динамики. Совместно с мамой ребенка мы приняли решение выйти за рамки привычного взаимодействия с ребенком и начали искать другой путь. Решение было найдено, при этом требовало огромной дисциплины и полного включения родителей в процесс. Было проведено исследование, которое качественно и количественно оценило эффект такого формата коррекционной работы в динамике лонгитюдного нейропсихологического наблюдения. Полученные результаты указали на стойкую положительную динамику в формировании когнитивных, регуляторных и нейродинамических функций.

Статья поднимает важную тему доступности нейропсихологического сопровождения для каждого ребенка, нуждающегося в нем. Полученные результаты подчеркивают важность более детального изучения удаленной нейропсихологической работы с детьми в ближайшей перспективе.

Ключевые слова: *дистанционное обучение; онлайн-формат; нейропсихологическая коррекция; трудности обучения; лонгитюдное наблюдение; вовлечение родителей; анализ случая*

Introduction

Due to the circumstances of the current epidemiological situation, we have to live and work in a new way. Despite the relaxation of numerous rules in cities, some parents prefer not to put their children at risk by undertaking offline classes with specialists if there is an opportunity to study online. Others, on the contrary, categorically dismiss the option to work by using technological devices and consider the format ineffective. Many experts also

continue to argue about the effectiveness of online neuropsychological and psychological practice.

Aside from the features associated with the pandemic and post-pandemic, we should seriously consider the importance of online neuropsychological remediation for the following reason: in our country, many locations simply don't have access to certain specialists, such as neuropsychologists. Besides, many families do not have the opportunity to visit larger cities for long remediation courses, even if their child requires such assistance.

The pandemic has become a catalyst to expand the previously perceived working borders of specialist services, including neuropsychological assistance.

However, an online format is most likely not suitable for all children. This may be due to the age of the child, the severity of his/her violations, his/her emotional state and so on. The situation seems hopeless as, on the one hand, the child doesn't have an opportunity to study with a neuropsychologist in person. On the other hand, he/she is not suitable to study online. In my practice, there was one case that demonstrated the successful integration of a bespoke approach for such child — it is a focal point of the article.

Description of the Case

In November of 2019 a mother visited me with her son (8 years and 8 months) for an examination with the following complaints: "My son is restless, inattentive, impulsive and has highly chaotic actions. He also practices onanism, holds in his stool, struggles academically, has poor behavior at home/school and often argues/protests."

Anamnesis

The boy is the only son in the family, age of the mother at the time of pregnancy — 25 years, age of the father — 24 years. The parents still live together. Contraction of pyelonephritis during pregnancy. Due to an increase in leukocytes the mother received treatment in hospital. She notes one occasion of acute respiratory disease in the first half of pregnancy and constant irritability during the entire pregnancy. The child was born in the 39th week, the birth was natural with external stimulation and mechanical manipulation of the fetus. In the first year of the child's development the following was observed: motor anxiety, disruptive sleep patterns, functional immaturity of the gastrointestinal system, multiple acute viral respiratory diseases (up to 12 times per year) and angina. At 2 years old he received a mild head trauma by falling down and hitting his occipital area on the edge of the stairs. There was no apparent injury, so they did not visit the hospital.

It was difficult to estimate the early motor and speech development of the child because the mother did not remember the majority of details. From the available data on motor development: head held at 6 months, at 9 months began crawling, crawled a lot, at 12 months started to walk. Details of speech development: at 6 months basic sounds such as "ba-ba-ba," at 10 months — "mom," 2.7 years — phrases of two words, at 3.6 years "already spoke."

The mother notes that since early childhood until now her son has been left-handed.

When he was 3.6 years old, he started kindergarten, slept poorly during the day or did not sleep at all. At this time there were no signs of aggression and only hyperactivity was observed. During this period, he never visited a neurologist.

His first neurologist's appointment was at the age of 8. He was diagnosed with ADHD, encopresis and behavior disturbance (protest and defiance).

EEG results: general-volume changes of bioelectric brain activity were observed, bilaterally synchronous flashes of slow wave activity in the frontal areas, sometimes with the inclusion of sharp waves. Signs of dysfunction of the middle structures were noted. Typical epileptic activity was not registered. A further EEG examination was recommended 2–3 months later.

Ultrasound of neck and head had normal indicators.

After visiting the neurologist, the following treatment was recommended: consultation and classes with psychologist and neuropsychologist, medication: Magne B6, Fevarin, Teralijen, Picamilon, Mexidol.

According to his mother's feedback, Teralijen and Fevarin led to the following side effects: inadequate reactions and responses from the child, stubbornness, aggression and general degradation of behavior. With the help of the doctor the treatment was adjusted but his behavior did not change. Then it was decided to gradually reduce dosages, and soon the use of all medications was stopped.

After visiting the neurologist and after his recommendations they came to me for the first appointment. A full neuropsychological assessment was carried out.

Methods

While exploring the level of the formation of higher mental functions (HMF) of the child, firstly I conducted a neuropsychological examination using samples offered by A. R. Luria (1969) and adapted for children's population by J. M. Glozman (Glozman, Potanina, & Soboleva, 2008; Glozman & Soboleva, 2013) to identify the difficulties in learning and behavior caused by functional immaturity (delay in development) of certain brain structures.

Conners' scale (Conners, 1997) helped to identify the presence or absence, as well as the degree of attention deficit and hyperactivity disorder.

In the primary assessment a questionnaire of early child development (for parents) (Glozman et al., 2008) was used to identify the features of pre-, perinatal and early child development including possible problems in the family and among other children. From the assessment it was possible to reveal socio-biological risk factors of the existing disturbances of the child.

To determine the profile of the lateral organization of the child, I applied a questionnaire M. Annette and samples "clock," "telescope" (Homskaya, 2005).

The analysis of the child's medical documents was also made.

I will explain each method in more detail.

Luria's Methods of Neuropsychological Examination

In accordance with the neuropsychological test battery (Luria, 1973) for children of different ages (developed by A. R. Luria (1969) and adapted by J. M. Glozman (Glozman et al., 2008; Glozman & Soboleva, 2013), I conducted a comprehensive neuropsychological examination of children in seven areas (general characteristics of the child, neurodynamic indicators of mental activity, movements and actions, gnosis, memory, speech functions, intelligence) of mental functioning with qualitative and quantitative processing of the results of the examination (Glozman, 2012).

For quantitative evaluation, a penalty point system was used. It was based on a qualitative analysis of defects and the possibility of their correction in the conditions of Luria's dialogue interaction with the surveyed, which had the following indicators:

- 0 — error-free sample realization;
- 0.5 — single errors with self-correction or slow entry into the task;
- 1 — non-significant errors with self-correction or light stimulation by the examiner;
- 1.5 — numerous errors corrected in the external organization of the child's attention;
- 2 — multiple errors with incomplete correction even after expanded tips;
- 3 — it is not possible to perform the test with any kind of help from the researcher.

Because a different number of tests are used to study each of the functions, in order to get a penalty point for each of the studied higher mental functions, I summarized the penalty points for each test and divided the resulting sum by the number of tests. To obtain a total penalty neuropsychological score of severity of deficiency in all areas, I summarized the results for all functions. When conducting neuropsychological examinations, in addition to the quantitative penalty score evaluation, the presence/absence of symptoms of deficiency of each higher mental function was fixed in percentage of the maximum possible number of symptoms (qualitative analysis). On repeated diagnostics, I evaluated both changes in the neuropsychological pattern (decrease of percentage of detected symptoms) and decrease in their severity (penalty points).

The obtained results allow us to reveal the nature of disturbances of mental functions (neuropsychological symptoms), and not just their presence, to establish the primary disorders directly related to the disturbed factor, as well as to identify the intact links for further remediation work with the child.

Before conducting Luria's neuropsychological examination, with the help of M. Annette questionnaire (Homskaya, 2005) and additional samples "clock," "telescope" I identified lateral organization in children on hand, leg, eye and ear. The child was asked to depict with a pencil and ball various actions: "brush the hair," "brush the teeth," write something on paper, bounce the ball with one hand, cross the arms, lock fingers, jump on one leg, lean on the seat of the chair by one knee, look into the "telescope," listen how the wrist watch is ticking and answer the "ringing" phone. I will explain in a more detailed way the mental areas I have studied.

The general characteristic of the child. The assessment began by talking with the child to establish contact with him and obtain data into the sphere of his common knowledge (orientation), awareness of his problems, adequate attitude to them and

adequate behavior during the examination (surname and name, age, birthday, time of the year, place of living, with whom the child lives, names of parents, current year, month, date and day of week, what year in school the child is, names and places of parents' work, child's location at current moment, problems with which the child led to assessment — according the child's opinions). Thus, the conditions of three areas of mental functioning were estimated:

- orientation;
- adequacy;
- criticality.

Research of neurodynamic parameters of mental activity. The child performs the test by finding the numbers from 1 to 25 of the Schulte Tables as fast as possible. This test is repeated 3 times and the average time is calculated.

Research of movements and actions. In the study of motor functions in neuropsychological examination I used and evaluated the implementation of the following tests from the Luria's battery:

- Reciprocal coordination test.
- Praxis finger pose test.
- Dynamic praxis test.
- Copying of three-dimensional image of a house with two fences and a tree.
- Self-drawing and copying the table.
- Tests for the conditional choice reactions.
- Test for reproduction of rhythmic structures.

Research of gnosis. The study of gnostic functions included the following:

- Samples for subject gnosis (recognition of real and noisy images).
- Samples for acoustic gnosis.
- Recognition of spatially oriented simple shapes (Benton test).
- Test for identification of emotions.
- Test for letter gnosis.
- Test for tactile gnosis.
- Test for stereognosis.

Research of speech functions. The study of speech functions covered the following:

- Evaluation of spontaneous speech (smoothness, expansion, grammatical, and lexical correctness).
- Studying of automated (ordinary) speech.
- Studying of phonematic hearing.
- Samples for naming.
- Tests for understanding of the words (correlation with pictures).
- Tests for understanding logical and grammatical structures.
- Studying of writing of the words, phrases and text (correlation with pictures).
- Studying of the process of reading words, phrases, and text.

Research of memory. The study of amnesic functions included the following:

- Tests on auditory memory (memorization of series of unrelated words and their subsequent reproduction after heterogeneous interference).
- Test for motor memory (memorization of series of movements and their transfer to the other hand).
- Visual memory test: memorizing a series of real images in a given sequence.

Research of intellect. In the study of intellectual functions, the following tests and tasks were offered:

- Test to understand the meaning of the story.
- Test for understanding of the meaning of storyline pictures and series of storyline pictures.
- Derivation of analogies.
- Generalization and exclusion of concepts: verbal test «5th extra».
- Series counting.
- Resolving arithmetic tasks.

The Conners' Scale

Conners' scale was created to assess the presence and degree of severity of attention deficit hyperactivity disorder. This questionnaire is widely used in Russia and other countries to supplement the overall picture of the child's disease. It helps in the evaluation process; identifies children with difficulties, determines the degree of severity and it is used to create special training programs for children with ADHD; helps in the development of treatment plans, as well as assess its effectiveness.

In the assessment I used the parents' version of the scale in a short form consisting of 10 questions (*Table*), according to which parents indicate the frequency of the occurrence of a certain behavior of their child within the previous 6 months.

Table

Conners' scale, short version (for parents)

Surname, Name _____ Age _____

Below is a table displaying problems which commonly appear in children. Please rate how often they have occurred in your child over the last 6 months by placing a tick in the corresponding cell.

Observed features	Degree of feature manifestation			
	absent (0)	low (1)	quite high (2)	very high (3)
1. Motor anxiety (constantly being in movement)				
2. Irritability, impulsiveness				
3. Interference in other children's activities				
4. Frequent and quick attention switching				

End of Table

Observed features	Degree of feature manifestation			
	absent (0)	low (1)	quite high (2)	very high (3)
5. Constant fidgeting				
6. Inattention, distraction				
7. Impatience and rapid disappointment				
8. Tearfulness				
9. Fast and sharp change of mood				
10. Tendency for explosive or unpredictable behavior, other manifestations of rage				
Total amount				

Evaluation criteria of attention deficit and hyperactivity/impulsivity are supplemented by a psychometric scale: absent, low, quite high, very high. The maximum score on the scale is 30 points. A diagnostic value is the result of more than 15 points. A score from 16 to 19 indicates a mild degree of ADHD, from 20 to 24 — an average, and from 25 to 30 — a strong severity of ADHD (Conners, 1997; Passolt, 2004).

These completed forms help to identify emotional, behavioral and academic disorders. Together they help to make an exhaustive list of characteristics of the child's behavior.

Questionnaire of Early Child Development

Additional information about the child is provided by a questionnaire filled out by parents (Glozman et al., 2008). The questionnaire provides information about the structure of the family, about the features of peri-, pre-, and postnatal development of the child (that is, how was the pregnancy, childbirth and the first year of life of the child), their problems in the family and amongst other children, injuries and chronic diseases, etc.

The complaints of parents of the child's behavior and development are investigated in detail. The data reveals at what age pathological manifestations appeared first, their nature and changes in the course of the disease in the process of growth, features of development, behavior of the child, their relationship with coevals and adults, propensity to certain activities and the actual level of readiness of children for school. A separate section of the questionnaire is devoted to the peculiarities of neurological and somatic manifestations.

Since biological and social factors play an important role in the development of the child, it can be assumed that these factors become even more important in the development of problem children.

Results

These Results of Primary Neuropsychological Examination of the Child

The boy finds it difficult to adapt to the situation of the assessment, not always answering to neuropsychological questions. During the implementation of all tests the following peculiarities are revealed: a motor uncontrolled activity and constant movement, inability to hold the work posture, increased distraction from tasks, poor spatial awareness, lack of boundaries, uncontrolled behavior, provocative, inadequate emotional reactions to the situation of examination, negativity (sometimes with manifestations of aggression), low mental brain activity and its fluctuations, and rapid exhaustion were revealed. In the Schulte Tables it was advised to make only one table out of three because the fulfillment time was significantly bigger than the normative one: 207 seconds compared to the time of this age 45 (40–60) seconds (Glozman & Soboleva, 2013). From the child's perspective there is no interest in the assessment results. The process of understanding and following the instructions is very difficult, each task requires multiple explanations. The total amount of points for the Conners' scale to determine the hyperactivity is 19, which is the indicator of the presence of ADHD. Lateralization of functions is mainly performed on the right hemisphere type (the boy is left-handed), but tests to cross the fingers reveals the domination of the right hand.

Objectively revealed:

In the motor sphere — tension, symptoms of inertia inside one motor program and when switching to the second series of movements, stereotypes in dynamic praxis tests. In the graphic test there are severe disturbances of kinetic melody, dissymmetry and stable perseverations of elements, as well as the inability to hold a straight line in writing. The praxis finger poses test was not fully performed due to the refusal to fulfill it and boy's negative attitude. However, in performed tasks light search movements and synkinesis in the second hand are revealed. Strong synkinesis of the face is noticeable. Reciprocal coordination test is performed with tension, with the tendency to alter execution and/or failures in program execution. Tests for the conditional choice reactions are accompanied by a single echopraxias, corrected by the child. Reproduction of rhythmic structures according to the sample is carried out with extra impulses.

Visual gnosis is formed according to age norm. In the study of *acoustic gnosis* multiple overestimations in perception of rhythmic structures are revealed. In *literal gnosis* tests there are multiple spatial errors.

The volume of *auditory memory* of the child is significantly lower than the age norm (5 of 10 words remembered after five repetitions). Difficulties of inclusion to the amnesic process (2 reproduced words of 10 after the first presentation) were identified as well as exhaustion during memorization. The test also revealed low productivity of memorization in the process of learning words, multiple confabulations and sound and semantic substitutions during reproduction. The stability of memory traces to interference is sufficient. There are difficulties in memorization of the meaning elements of the text, even when the text is repeated.

In the study of *visual memory* there was a lack of perseverance, perceptive substitutions, difficulties in holding the stimulus sequence and the general difficulty in the following of instructions.

In the study of *motor memory* all situations of examination revealed difficulties in assimilating of motor programs (only pairing execution). Remembering of the second series of movements is carried out only with the hint of the first element.

In the *expressive oral speech* of the child, errors in the grammatical formation of statements are observed and nominative function is not formed sufficiently. Reading is by syllables, it is monotonous, without intonation, slow with guessing in some places. The handwriting is uneven. The writing contains multiple kinesthetic errors, phonemic and regulatory types, absence of highlighting the start of a sentence start, as well as a disparity in letter sizing and the inability to write in a straight line. The study of the *impressive speech* was not available fully due to the strong exhaustion of the boy, elements of negativity and his challenging behavior. It was revealed that the phonemic hearing is not fully formed.

In the *sphere of intellect* an understanding of the meaning of separated plot pictures and a series of story pictures is available. Generalization function is formed. However, the quality of tasks suffers due to the manifestations of impulsiveness. Significant difficulties are noted in operations that require calculations. The working is not automated, requires compensatory visual mediation (fingers, pencils, ruler, etc.).

Thus, the child has insufficient formation of a number of mental functions — motor sphere (kinetic, kinetic and spatial factors), literal and acoustic gnosis, auditory, visual and motor memory, as well as some speech-thinking functions — based on the neurodynamic, regulatory difficulties and psycho-emotional problems.

Figure 1 shows how the office looked like after the assessment.



Figure 1. The office after the primary neuropsychological assessment with the child

According to the results of neuropsychological examination the following *recommendations* were given to the mother:

- Consultation with a child psychiatrist.
- Remediation with a neuropsychologist.
- Individual sessions with a teacher.
- Course of family psychotherapy (parents together with a child) aimed at resolving problems of child-parent relationships.
- Sessions with child psychotherapist, aimed to work on emotional and personal problems of the child.
- Observation of neurologist.
- Systematic general-strengthening procedures aimed to stabilize the level of neurodynamics (massaging of neck area, water procedures — under the control of a neurologist).
- A favorable emotional climate and emotional support in the family and at school.
- Study — rest balance.

According to my recommendations the child with his mother visited a child psychiatrist. The child was diagnosed: “F92.9. Mixed disorder behavior and emotions not refined.” The doctor recommended hospitalization to specify diagnosis and treatment (recommendations of medications: Strattera, Fevarin, Rispolept in fluid) or the psychiatrist’s observation at the place of residence. Additional medication recommended was Driptane and Atarax. The parents refused to put the boy into the hospital, they did not accept anything from prescribed medications and they never pursued the neurologists recommendation of a control EEG.

The boy began to study with a psychotherapist to correct behavior and working on emotional and personal problems. Sessions lasted for about a month, then the parents decided to have a 10-month break before the sessions with the child resumed again. At the same time the mother worked individually with a psychologist during the year.

From the age of 9 the parents used their own initiative and the child started classes with a speech therapist regarding dyslexia (in mother’s words).

Remediation Work

58 lessons have been conducted with the child so far (20 offline sessions, 10 online sessions and 28 sessions in a special format, described below).

Work with the child began with offline neuropsychological sessions. The sessions included the methods of motor (sensomotor), cognitive, and respiratory remediation (Kurdyukova, Glozman, & Chibisova, 2010; Kurdyukova, Glozman, Shevchenko, & Konina, 2016; Pechak, Savkina, Rotar’, & Shevchenko, 2014, 2020).

The work was not easy due to the pronounced negativity of the boy and the instability of his emotional background. There was no special positive dynamics. Recommended homework was seldom performed without arguments/fights and a persistent refusal from the child to study.

Because of the pandemic and self-isolation we were forced to modify our sessions from offline into an online format. Remediation process became even more complicated. Hysterics, negativity and refusal from the sessions had not disappeared but at the same time the child got opportunity to run away from the studying room and hide somewhere in the house. We were limited with the session timing and very often at this time the boy was not in a good condition and was not ready for the remediation process. Thus, we had to look for other options of work and derived the following plan:

- a specialist writes a detailed lesson plan, makes a video of exercises if necessary and sends it to the mother;
- the mother and child perform these tasks when it is convenient for them, making a video as well, and send it to the specialist to receive feedback.

Initially the mother received such plans twice per week, then we changed this routine to once per week, and then once per fortnight, at the same time increasing the volume of tasks. According to the video reports provided by the mother the first sessions were not too different from the previous offline and online classes with the specialist. With the course of time positive work dynamics became more obvious. The child began to perform tasks with less screaming and hysterics, and then they disappeared almost all together, and appeared only in rare cases. Due to a calmer emotional background, the results of remediation work were clearly visible.

After 28 sessions in such format, we carried out a control neuropsychological assessment. The dynamics was revealed in all shown areas (*Fig. 2*).

At the same time a number of defects in each sphere has also decreased (*Fig. 3*).

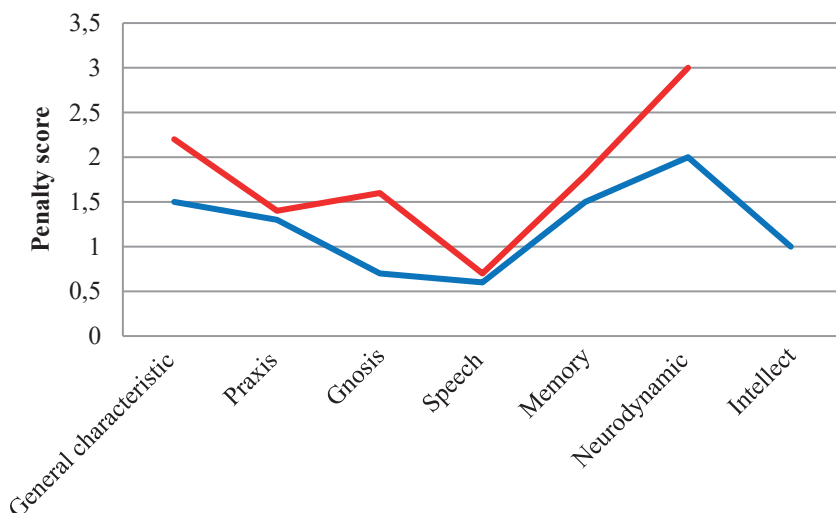


Figure 2. Comparative data of neuropsychological evaluation of the child before remediation course and after 58 sessions with him.

Note. The red line is primary assessment (average), the blue line is secondary assessment (average)

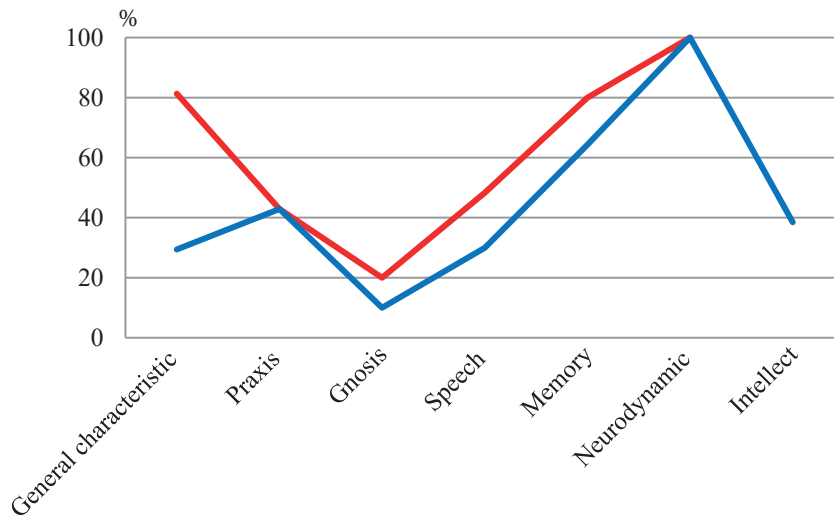


Figure 3. Representation of defects of neuropsychological evaluation of the child before remediation course and after 58 sessions with him.

Note. The red line is primary assessment (average), the blue line is secondary assessment (average)

Comparative Data of Neuropsychological Evaluation of the Child Before Remediation Course and After 58 Sessions with him

During the control neuropsychological assessment in comparison with the primary evaluation the child is completely oriented in time, is confident in telling the year, month, current date, his date of birth; as well as current time of the year and day of the week. He can objectively list some of his learning difficulties in school. During the implementation of all tests at primary evaluation the following was revealed: uncontrolled motor activity and constant movement, inability to hold the work posture, increased distraction from tasks, poor spatial awareness, lack of boundaries, uncontrolled behavior, provocative, inadequate emotional reactions to examination, negativity, sometimes with manifestations of aggression, low mental brain activity, its fluctuations and rapid exhaustion. In the control assessment all the above-described features were reduced. In addition, the efficiency of the child and activity productivity have significantly increased.

Objectively revealed:

In the *motor sphere* there is a positive dynamic in the formation of switching functions (Fig. 4) and in the development of interhemispheric interactions processes. Synkinesis became less pronounced. Yet, spatial defects can be observed but the severity of symptoms decreased.

Positive changes are visible in samples of *acoustic gnosis*. Study of the *literal gnosis* still revealed significant spatial errors and insufficient form of the image of the letter.

In *visual memory* the child could hold better the sequence of given information, there were a reduced number of perceptive substitutions.

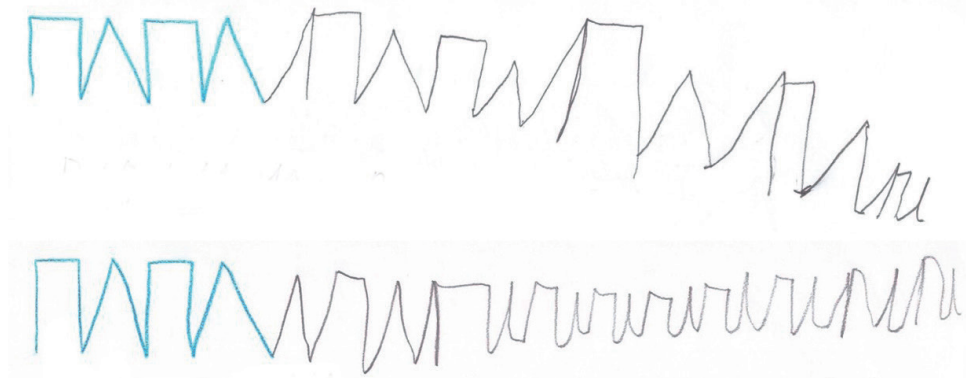


Figure 4. Dynamics of the execution of the graphical test at primary (above) and control (below) evaluations

The volume of *auditory memory* of the child is still lower than the age norm, but there was increased productivity in memorization of the process of learning and the volume of memorized information compared to primary evaluation. Repeating of the text was possible without any significant difficulties.

In *expressive oral speech* difficulties of nomination still exist. The reading is difficult in all situations of assessments — it is by syllables, monotonous, insufficiently intonated and sometimes with replacement of letters. The writing contains multiple kinesthetic errors, phonemic and regulatory types. The handwriting became smoother and clearer, the child managed to hold a straight line in writing (Fig. 4). In the *impressive speech* there still exists insufficient formation of phonematic hearing and there are still difficulties to understand logic-grammatical relations.

Mental operations are generally formed. Difficulties to interpret the meaning of plot pictures and difficulties in the categorizing of groups is connected with speech defects and pronounced symptoms of impulsiveness, which increases because of exhaustion to the end of assessment. However, compared to primary evaluation, the child managed to perform the entire proposed number of tasks, including laborious samples for thinking. Significant difficulties are still being noted in the implementation of the counting tasks. Mental calculations are automated, requires compensatory visual mediation.

Thus, we can state a *strong and persistent positive dynamics* in the formation of a number of mental functions. Due to increasing neurodynamic parameters of mental activity there is positive dynamics in the development of voluntary regulation and control processes, switching functions and inter-hemispheric interactions. We can also speak about improving spatial and kinesthetic organization of movements and actions, auditory memory and speech-thinking functions. At the same time, the process of neuropsychological remediation is not finished. The difficulties in the mental functioning of the child described above allow us to clearly identify the strategy for further work with the child.

The mother also observes a considerable progress of her son. Her opinions are the following:

- During the lessons my child became more stable with his usual movements; does not disrupt a lesson and has fewer behavioral complaints from his teacher; he became better with the multiplication table.
- He is doing well in extra classes (speech therapist, defectologist, psychologist), the specialists praise him.
- In games with other children, he has become quieter and more focused. Less impulsiveness, although still can break out sometimes. Began to talk more about life in general, not only about narrow interests like computer games. Began to express sympathy.
- Can keep the conversation going, doesn't run away. Likes to talk with adults. Asks questions, reasons. It became easier to explain something to him — he understands and memorizes.
- Learned to tie shoelaces. Can embroider a little.
- He became more responsible, remembers what and where he put things, he looks for/collects his things by himself without help from someone, feeds animals, better memorization of requests and performs orders — remembers the instructions for longer.
- He wants to do a lot of things by himself: lessons, getting ready to go somewhere and so on.
- He is more mentally stable and demonstrates patience and perseverance even when something is wrong. Except for lessons.
- Became more interested in everything around. Goes fishing with the father — before it was difficult because the boy was running around and interfered.
- Became excited to complete hobbies such as swimming, motocross and skiing.
- Became more resilient, does not get tired as he used to. Completes greater volume of homework compared to last years and quicker.

Therefore, according to the control neuropsychological assessment results and from subjective evaluation by his mother we have achieved good results and significant progress working in such “special” remote format of work.

Conclusion

Without any doubts the obtained results are based not only on neuropsychological work with the child, but also from a complex approach to the resolving of his difficulties. Neuropsychological remediation, pedagogical support, medical support, parents' work with psychotherapist on child-parent relationships, child's work with child psychotherapist on emotional-volitional personality sphere — all together allowed the child to progress.

The format of neuropsychological remediation work was kind of experimental for all participants in the process. At the time we were in the hopeless situation, when, on

the one hand, the child could not study online, and, on the other hand, he needed qualified neuropsychological assistance. “Thinking outside the box” from typical interactions with the child for remediation process allowed us to develop and successfully implement another way of work.

The results of the work showed us that the complex neuropsychological remediation in this format reveals a clear positive dynamics, and this option of work should be developed and studied, as it could be a good solution for many groups of children. An additional benefit to this format of work is that the work with the child can be completed at any time (that is comfortable for them), not only at a strictly specified time of offline/online sessions. From my point of view there is one very important nuance: the parent must have a high degree of responsibility and inclusion to the process to provide such type of work.

This article does not claim to provide a comprehensive analysis of the new work format. The obtained results mark the importance of a more detailed study of remote neuropsychological work with children in the near future.

Limitation

The limitations of the study are related to the novelty and insufficient study of this format of work and absence of sufficient sample of the subjects.

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References

- Conners, K. C. (1997). *Conners' Rating Scales-Revised: Technical manual*. North Tonawanda, NY: Multi-Health Systems.
- Glozman, J. (2012). *Neuropsychological assessment: Qualitative and quantitative evaluation of data*. Moscow: Smysl. [In Russian]
- Glozman, J., Potanina, A., & Soboleva, A. (2008). *Neuropsychological evaluation in preschool age*. St. Petersburg: Peter. [In Russian]
- Glozman, J., & Soboleva, A. (2013). *Neuropsychological assessment of school-children*. Moscow: Smysl. [In Russian]
- Homskey, E. D. (2005). *Neuropsychology* (4th ed.). St. Petersburg: Peter. [In Russian]
- Kurdyukova, S., Glozman, J., & Chibisova, M. (2010). The formation of the indicative framework and control actions as a method of remediating ADHD. In J. M. Glozman (Ed.), *Practical neuropsychology: A help to learning disable students* (pp. 207–222). Moscow: EKSMO. [In Russian]
- Kurdyukova, S., Glozman, J., Shevchenko, I., & Konina, S. (2016). The formation of the indicative framework and control actions in ADHD remediation. In J. M. Glozman (Ed.), *Practical neuropsychology: Experience of work with children having learning difficulties* (pp. 210–225). Moscow: Genesis. [In Russian]

- Luria, A. (1969). *Higher cortical functions in man and their disturbances after local brain lesions* (2nd ed.). Moscow: Moscow University Press. [In Russian]
- Luria, A. (Ed.). (1973). *Outlines of the neuropsychological assessment*. Moscow: Moscow University Press. [In Russian]
- Passolt, M. (Ed.). (2004). *Hyperactive children: Remediation of psychomotor development* (2nd ed.). Moscow: Academia. [In Russian]
- Pechak, E., Savkina, O., Rotar', M., & Shevchenko, I. (2014). Set of exercises to develop programming, regulatory, and verification functions. In J. M. Glozman & A. E. Soboleva (Eds.), *Complex remediation of learning difficulties at school* (pp. 64–91). Moscow: Smysl. [In Russian]
- Pechak, E. E., Savkina, O. M., Rotar', M. A., & Shevchenko, I. A. (2020). Developing programming, regulatory, and control functions. *Journal of Russian & East European Psychology*, 57(1), 10–14. <https://doi.org/10.1080/10610405.2020.1717847>

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