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Research Article

# Mental and Movement Disorders in Young Children with Autism Spectrum Disorders

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## Abstract

Motor dysfunctions are commonly found in children with mental disabilities. These are deviations in the development of voluntary control of motor skills, including speed and coordination of movements, as well as individual symptoms attributed to the so-called "non-localized or neurological soft signs" (NSS). NSS are motor and sensory conditions that are not associated with specific cerebral lesions.

This article analyzes the prognostic significance of motor disorders at the initial stages of the disease in young children with autism spectrum disorders (ASD). For 3 years, 120 children with ASD were traced and neurological disorders and their dynamics characteristic of ASD were described. The specific types of motor-motor disorders in ASD have been identified.

***Keywords:*** *Autism; Early Childhood; Soft (Non-Localized) Neurological Signs*

## Introduction

As the literature data show, movement disorders, in particular catatonic symptoms, are currently considered as important prognostic signs of mental disorders [1,3,17,18]. Close to catatonic, but not identical to them, are «non-localized neurological or soft signs» (NSS).

The term «neurological mild symptoms» was first used in the 1940s to describe nondiagnostic abnormalities and neurological diseases when evaluating children with schizophrenia. NSS is defined as a minor abnormality on neurological examination in the absence of other fixed or transient signs of a neurological disorder. They reflect difficulties in coordination, motor, sensory and integrative functions.

These symptoms were considered predominantly characteristic of schizophrenia and schizophrenic spectrum disorders, and were found in the pre-neuroleptic era, although a number of researchers attributed them to the side effects of the use of antipsychotics. However, these symptoms are detected both in patients and their healthy relatives [10,12,19]. Most of the studies are devoted to the study of adult patients, while NSS is also detected in various mental disorders of childhood. NSS are motor and sensory conditions that are not associated with specific cerebral lesions. Persistence of NSS into later childhood and adolescence is associated with an increased risk of psychiatric disorders. This finding supports the NSS model of neural development, in which minor neurological abnormalities can be considered potential signs of deviant brain development and may be markers of signs of vulnerability to neurodevelopment abnormalities. They are often viewed as signs of the immaturity of the nervous system, the severity of which gradually decreases by adolescence [9].

One of the complex problems of modern psychiatry is the syndrome of childhood autism. Studies show that in addition to the main clinical manifestations in autism spectrum disorders (ASD), there are concomitant disorders, the main of which are neurological

symptoms [10-12,14-16]. These include disorders of motor skills and praxis, expressive motor skills, as well as tics, epilepsy. Often, the manifestations of autism, even in the absence of obvious behavioral disturbances, are preceded by the appearance of «non-localized» (soft) neurological signs (NSS). Researchers consider NSS as an insufficiency of the subcortical structures of the brain, described in the works of Fish V. (1978), Mednick S., *et al.* (1987), and the incompleteness of the processes of myelination of the nervous system [8,10,14]. According to V.V. Kolpakov [13], they refer to microcatatonic stigmas and are precursors of the disease, markers of schizophrenia. These motor disorders are also described in the works of G.V. Kozlovskaya. and Goryunova A. The. [1,4], Meyer-Lindenberg A. and other modern authors [7,11,12,16-18].

## Aim of the Study

The work studied of the prognostic value of «non-localized» neurological soft signs (NSS) for young children with autism spectrum disorders (ASD), and their dynamics, starting from an early age.

## Materials and Methods

120 children aged from 2 months to 3 years of age (90 boys and 30 girls) were under dynamic observation for three years, who applied for help to the scientific bases of the FSBSI MHRC RAMS.

Clinical methods were used in the examination: anamnestic, clinical psychopathology, neurological, vegetative, pediatric, as well as psychological and statistical methods For the purpose of differential diagnosis, EEG, CT scan, MRI of the brain, examination of the fundus were used.

The neurological status of the infant was studied according to the generally accepted method, which took into account the indicators of motor development and neurological symptoms characteristic of perinatal cerebral damage. Non-localized neurological signs were also noted [1,3,4].

The study of the child's mental sphere was carried out using the psychopathological method, in accordance with the diagnostic criteria presented in the ICD-10, the CARS scale. Due to the difficulty of diagnosis mental diseases in young children with their gradual development, and the blurring of the boundaries between premorbid and the initial period of the disease, the assessment of the conditions was carried out in each case in dynamics to clarify the qualification of the condition. Also, to assess mental ontogenesis, the original method «GNOM» (psychodiagnostic test of deviations in the mental development of young children [5,6]) was used. The methodology allows calculating deviations of the coefficient of mental development in points for five main psychophysical spheres (sensory, motor, emotional-volitional, cognitive and behavioral) (the norm is 90 - 110 points).

## Results

Analysis of anamnestic data showed that during pregnancy, 80.0% of mothers of children with ASD had toxicosis in the first half; in 30.0% of cases, toxicosis of the second half of pregnancy and the threat of termination of pregnancy were observed. In 20.0% of pregnant women, against the background of mental pathology, exacerbations of somatic diseases occurred: anemia, pyelonephritis, diseases of the cardiovascular, respiratory systems, gastrointestinal tract, VSD. Pathological child births, which included rapid and protracted delivery, stimulation of labor, provision of obstetric benefits, surgery requires, occurred in 25.0%. At the same time, despite gestosis, pathological childbirth complicated by fetal asphyxia was noted in only 10.0%, and low birth weight (from 2340 to 2900g) and morphofunctional immaturity were detected in 15.0% of cases.

The psychophysical status of children of the selected cohort in infancy was qualified within the framework of specific development of the type "schizotypic diathesis" with symptoms of irregular development of mental functions such as dysregulation, disharmony, defitarism and dissociation [4], expressed in each particular patient to varying degrees.

In physical status, 70.0% of children had specific dysplasias (especially varied in the region of the skull) - brachycephaly and dolichocephaly, epicanthus, gothic palate, protruding, soft ears, multiple tops, low hair growth, protruding hair, abnormal tooth growth. Stigmas of connective tissue dysplasia were revealed: hyperelasticity of the skin, hypermobility of joints, diastasis of the rectus abdominis muscles, hernia, cardiopathy, more often in the form of minor anomalies of heart development, etc. [2].

During the dynamic neurological examination in children hypoxic-ischemic encephalopathy syndromes were detected with different frequency and course. Syndrome of increased neuro-reflex excitability manifested itself as general anxiety, startle, disruption of the sleep-wake cycle, and revitalization of peripheral reflexes. These symptoms appeared after 3 months of life, and later, by 6 months and beyond, transformed into severe sleep disturbances (night screams, insomnia, night vigils, night food, night terror, fears and panic in sleepy states, etc.). Violations of the biorhythm of sleep and wakefulness persisted for a long time, up to the age of 1 year and older. The listed protopathic autonomic dysfunctions were accompanied by vivid vegetative-visceral manifestations: hyperemia or pallor of the face, spotted dermographism, profuse hyperhidrosis, frequent urination, tachycardia, etc. Severe sensory hypersensitivity was revealed - cutaneous, auditory, fingertips, negativity, nails. In 25.0% of children under 3 months of age, hydrocephalic syndrome (HS) was diagnosed, the symptoms of which were moderately expressed and decreased by 6 months, which indicated the functional nature of intracranial hypertension. The syndrome of vegetative-visceral disorders manifested itself with characteristic vascular spots, transient cyanosis, hyperhidrosis of the hands of the feet, thermoregulation disorders, gastrointestinal dysfunctions with regurgitation, increased intestinal motility, rumbling, flatulence, constipation, and loose stools. In addition, lability was noted in the heart rate (arrhythmia, tachycardia) and the respiratory system (apnea, deep breaths). It should be noted that disorders of the gastrointestinal tract, cardiovascular and respiratory systems persisted for a long time and were associated with the mental state of the child.

A special place in the psychophysical state of children was occupied by the noted syndromes of movement disorders. A delay in motor development was noted in 40.0% of children: later than the calendar period, they turned over, sat down and began to walk. Syndrome included impaired movement harmony, increased or decreased physical activity. In 100.0% of cases, "non-localized" neurological signs were detected. These were disorders in the gaze innervation system (slow jerky movements of the eyeballs during tracking, lack of friendly eye movements, the possibility of isolated movement of the eyeball, freezing of the gaze - the equivalent of an attack of Kloos), reflexes of oral automatism, orofacial hyperkinesis, impaired facial expressions, hypomimia, paramimia.

Gross motor skills disorders included pretentious finger movements (choreoathetosis) later than the normative age, as well as changes in muscle tone in the form of muscle hypotension, or transient hypertension with manifestations of dystonia, plastic hypertension of the muscles, symptoms of waxy flexibility, recurvation in the joints, at a later date - a symptom ballerinas (walking on toes), many stereotypes: arena and shuttle running, waddle walking, bending back (as «duck»), throwing legs, wing symptom, etc [4,7,13].

The dynamics of autistic disorders in children of the selected cohort was different. A common feature for all children was emotional deficiency, expressed to varying degrees, the relative poverty of the sound repertoire at the pre-speech stage of development. Actually, autistic disorders in most of the children arose in a regressive manner, more often at the age of 1 to 2.5 - 3 years. During this period, a manifesto of autistic, affective, regressive-catatonic symptoms was noted, which persisted against the background of retardation of mental and speech development. By the age of 3 - 4 years, some children showed a rather vivid picture of autistic disorders, while others showed a tendency towards regression of the state.

It should be noted that the severity of non-localized neurological signs (as signs that do not have a specific topical representation in the brain tissues) depended on the child's mental state. They either reduced or became so intense that they led to neurological overdiagnosis in the form of conclusions about the presence of cerebral palsy in the child, especially with the persistence of a ballerina's symptom or a particular pretentious gait. Observation of the dynamics of NSS showed that their intensity is especially pronounced during the period of exacerbation of mental illness, and with a weakening of the clinical picture (the onset of remission), they are reduced, but they can remain in a state of risk of illness in actual health [4].

When carrying out the psychodiagnostic test «GNOM» and determining the coefficient of mental development, it could be in the range of both below 80 and above 110 points [5,6]. The indicators indicate that in the presence of emotional-volitional characteristics and somato-vegetative deviations, cognitive development did not have significant deviations.

The assessment of the severity of autistic disorders according to the CARS scale ranged from mild (15 points) disorders to severe (48 points). The indicators indicate that in the presence of emotional-volitional characteristics and somato-vegetative deviations, cognitive development did not have significant deviations.

By the end of early childhood, the observed cases were distributed according to nosologic forms and ICD-10 codes. Childhood autism (F84.0) was 3%, childhood autism due to organic brain disease (F84.01) 15%, childhood autism due to other causes, or infantile psychosis (F84.02) 40%, atypical autism with mental retardation (F84.11) - 11%, atypical autism without mental retardation (F84.12) - 12%, Rett syndrome (F84.2) - 1%, Asperger syndrome (F84.5) - 2%, and finally other general development disorders (F84.8) - 16% (Table 1).

| Diagnosis Sex | F84.0 (%) | F84.01 (%) | F84.02 (%) | F84.11 (%) | F84.12 (%) | F84.2 (%) | F84.5 (%) | F84.8 (%) | Total (%) |
|---|---|---|---|---|---|---|---|---|---|
| Male | 3 | 12 | 24 | 10 | 8 | 0 | 2 | 9 | 68 |
| Female | 0 | 3 | 16 | 1 | 4 | 1 | 0 | 7 | 32 |
| Total | 3 | 15 | 40 | 11 | 12 | 1 | 2 | 16 | 100 |

***Table 1:*** *Distribution of children with ASD at the age of 3 - 4 years according to ICD-10 diagnosis.*

## Discussion and Conclusion

In the present study, children with emerging autistic disorders were followed prospective for 3 years. The deviations were observed from the first months of pregnancy, continued during childbirth, however, hypoxic-ischemic lesions of the central nervous system left only 10% of cases, and morphofunctional immaturity - 15%. At the same time, the early development of children was accompanied by somato-vegetative disorders, dysembryogenetic stigmas (connective tissue disorder as minor anomalies in the development of the heart) were revealed.

From an early age, movement disorders were detected in the form of individual symptoms of the so-called «soft» neurological signs. The distribution in the cohort by sex was with an excess of boys versus girls (2:1). In all examined children, these symptoms were detected from the first year of life, which could be regarded as the presence of certain neurological stigmas of the endogenous spectrum, which corresponds to the opinion of a number of foreign authors [15,16]. At the same time, observation showed that in cases of the development of autistic disorders in the form of infantile psychosis, an expansion of the spectrum of neurological symptoms is noted: the addition of distinct extrapyramidal disorders, autonomic lability, etc. reduced form. A similar dynamics of NSS is noted by individual authors [17-19], and the severity of symptoms also correlates with the severity of psychopathological symptoms.

Thus, this study shows that NSS can be both stigmas of predisposition to endogenous disorders and clinical markers of mental illness (typical, atypical autism). Further dynamics of these symptoms can be traced in subsequent prospective and follow-up studies.

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