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STUTTERING IN CHILDREN: CLINICAL-NEUROLINGUISTIC MECHANISMS, RISK FACTORS, AND EFFECTIVENESS OF COMPREHENSIVE CORRECTION

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Abstract: Stuttering (stammering) is a multifactorial neurolinguistic disorder characterized by impaired tempo-rhythmic organization of speech. The aim of this work is to systematize current data on the pathogenesis and risk factors of stuttering in children, as well as to present our own clinical observations and results of correctional intervention. Based on the examination of 32 children aged 3-10 years, it was found that children with early perinatal risk factors and increased anxiety demonstrate more severe forms of stuttering; comprehensive therapy (speech therapy + rhythm therapy + neuropsychological correction + anxiety management) improves speech in 72% of cases. The results are presented with tables and diagrams.

Keywords: stuttering, anxiety, multifactorial neurolinguistic disorder

Introduction

Stuttering in children is one of the most common speech disorders, with a prevalence of 1-3% in the population (Conture, 2001; Yairi & Ambrose, 2013). According to modern data, the mechanism of stuttering is explained by a combination of neurolinguistic, genetic, psychoemotional, and environmental factors (Smith & Weber, 2017). Neurophysiological mechanisms (De Nil, 2005; Chang et al., 2019), the role of dopaminergic dysregulation (Wu et al., 1997), neuroplasticity of speech networks (Chang & Zhu, 2013), and psychoemotional triggers (Bloodstein & Ratner, 2008) are most actively investigated. Despite a large number of studies, questions of early diagnosis, severity assessment, and the most effective therapy methods remain relevant, especially in the CIS countries.

Neuroimaging studies have shown that children with stuttering have reduced activity in the left premotor cortical region (Fox et al., 2000), impaired interhemispheric integration (Chang et al., 2011), increased activity in the basal ganglia (Alm, 2004), and delayed myelination of speech pathways (Chang & Zhu, 2013). Chang's (2019) work shows immaturity of the ventral striatal networks involved in motor speech planning. It is important to highlight psychoemotional factors; according to Bloodstein & Ratner (2008), stuttering is associated with increased anxiety, sensitivity to stress, family conflicts, overprotection, or, conversely, a deficit in emotional contact. The fact of genetic predisposition should also be considered; Yairi & Ambrose (2013) showed that the hereditary risk is up to 70%. Mutations associated with stuttering have been identified in the GNPTAB and NAGPA genes (Kang et al., 2010). The effectiveness of therapy lies in a combination of treatments, such as speech therapy programs (Lidcombe Program), rhythm therapy, breathing techniques, and cognitive-behavioral therapy for emotional lability; these approaches are most effective (Guitar, 2014).

Materials and Methods (Own Data): 32 children (20 boys, 12 girls) aged 3–10 years were examined in the pediatric neurology department and polyclinic of the Andijan Multidisciplinary Children's Hospital during the period from 2024 to 2025. For the study, a speech therapy examination was conducted (using the methods of Volkova and Lopatina), the severity of stuttering was assessed using the SSI-4 scale (Riley, 2009), and psychological anxiety diagnosis (Spielberger-Khanin), neuropsychological testing (according to Luria), and brain MRI (as indicated) were also assessed. The correctional program also included breathing exercises, rhythm-horizontal speech therapy, CBT elements, and tempo-rhythmic speech training on the background of standard therapy.

Results of the Study: The patients were distributed by age, as shown in the diagram:

Distribution of patients by age:

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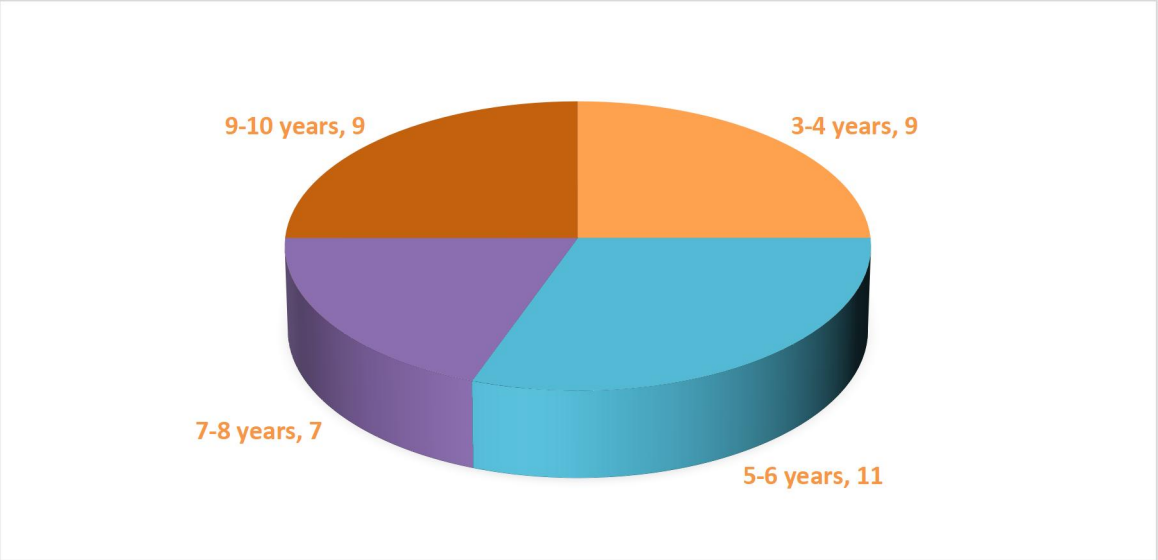

The most significant risk factors were identified, including perinatal hypoxia, genetic predisposition, personality traits associated with stuttering, as well as family circumstances that played a leading role in the development of this pathology.

Risk factor	**Frequency (%)**
Perinatal hypoxia	41%
Family stress	57%
Anxious personality type	62%
Genetic predisposition	48%
Dyslalia in medical history	36%

The severity of the condition was assessed using the SSI-4 scale. The majority fell into the moderate degree, accounting for 48% of the total patients studied, while mild and severe degrees were almost equally represented at 22% and 30%, respectively. The average SSI-4 score was 28 before the start of treatment. After an 8-week therapy program, the average SSI-4 dropped from 28 to 17, and the frequency of spasms per minute averaged 9.1 before treatment and 4.8 after therapy. The anxiety level was 48 before treatment and 31 after, which demonstrated the high effectiveness of the therapy. The overall effect of improvement in the condition was observed in 72% of the children.

Discussion

Our data confirm the findings of Yairi & Ambrose (2013) and Smith & Weber (2017) regarding the multifactorial nature of stuttering. In the studied group, anxiety, family stress, perinatal hypoxia, and a deficit in interhemispheric integration (according to neuropsychological profile data) proved to be crucial. Combined therapy demonstrated high effectiveness, which aligns with the results of Guitar (2014) and Conture (2001).

In conclusion, based on our research, it can be stated that stuttering in children develops as a result of the interaction of neurophysiological and psychoemotional factors. The most significant risk factors in our study are: anxiety, family stress, and perinatal hypoxia. Comprehensive therapy improves speech in 72% of children, reducing the severity of stuttering by 30–45%, and early intervention (before 6 years of age) has a more pronounced effect.

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