

**USING SPEECH THERAPY TECHNOLOGIES TO ELIMINATE TEMPO-RHYTHM  
DISORDERS IN CHILDREN WITH SPEECH DELAYS**

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**Annotation:** This article examines the effectiveness of using speech therapy technologies to correct tempo and rhythm disorders in the speech of children who stutter. The study highlights the application of multimodal approaches, audiovisual resources, and individualized exercises in speech therapy sessions to normalize pronunciation and speech rhythm. The results emphasize the importance of modern speech therapy technologies in enhancing speech development in children who stutter.

**Keywords:** Stuttering, speech rhythm, tempo disorder, speech therapy technology, individualized exercises, audiovisual resources.

**Introduction.** Stuttering is one of the most common disorders in children's speech development, significantly affecting the tempo and rhythm of speech. Disturbances in speech rhythm and tempo directly influence a child's pronunciation, vocabulary selection, attention span, social interaction, and emotional stability. Therefore, identifying and correcting tempo-rhythm disorders in the speech of children who stutter is an important scientific and practical task.

Modern speech therapy technologies allow for an individualized approach in the speech therapy process, as each child's speech disorder has unique characteristics. Multimodal approaches, audio-visual resources, interactive pedagogical games, and individualized exercises performed at home during speech therapy sessions help normalize children's pronunciation, restore speech rhythm and tempo, and support the development of emotional and social skills. The relevance of this research lies in the fact that using speech therapy technologies enables rapid and effective development of speech in children who stutter, reduces speech disorders, and enhances children's success in school and social activities. At the same time, correcting rhythm and tempo disorders is most effective not only during speech therapy sessions but also with consistent support from parents and teachers at home.

The main objective of this study is to identify tempo and rhythm disorders in the speech of children who stutter, examine the effectiveness of applying speech therapy technologies, and establish a scientific basis for developing individualized pedagogical-speech therapy approaches. In this context, the implementation of speech therapy technologies has modern and practical significance in normalizing children's pronunciation, speech rhythm, and tempo, as well as supporting their emotional and social development. Stuttering is one of the most common speech development disorders in children, affecting not only pronunciation and articulation but also speech rhythm and tempo. Rhythm and tempo disorders in speech directly impact a child's vocabulary, listening and comprehension abilities, attention, and success in social interaction.

Therefore, early identification and correction of tempo-rhythm disorders in children who stutter is an important task in pedagogy and speech therapy practice.

Modern speech therapy technologies allow for an individualized approach, as each child's speech disorder is unique. This study explores effective methods for normalizing pronunciation, restoring speech rhythm and tempo, and developing emotional and social skills through multimodal approaches, visual and audio resources, pedagogical games, and individualized exercises performed at home.

The relevance of this study lies in the fact that using speech therapy technologies allows for rapid and effective improvement of speech in children who stutter, reduces speech disorders, and enhances their success in school and social life. Additionally, correcting rhythm and tempo disorders achieves maximum effectiveness when combined with consistent support from parents and educators at home. The main aim of the research is to identify tempo and rhythm disorders in the speech of children who stutter, study the effectiveness of speech therapy technologies, and create a scientific foundation for developing individualized pedagogical-speech therapy approaches. In this context, the application of speech therapy technologies holds modern and practical importance in normalizing pronunciation, speech rhythm, and tempo, as well as supporting the emotional and social development of children.

**Literature review.** The significance of speech therapy technologies in correcting tempo and rhythm disorders in the speech of children who stutter has been highlighted in numerous studies. [1] Y. A. Vygotsky and colleagues analyzed delays in children's speech development and disruptions in speech rhythm, emphasizing the need for individualized speech therapy approaches. [2] R. I. Luria demonstrated the connection between phonetic sensitivity, pronunciation errors, and stuttering, highlighting the importance of individualized exercises for normalizing speech rhythm and tempo. [3] A. M. Volkov examined the impact of rhythm disturbances on children's emotional stability and self-expression, and also emphasized the effectiveness of multimodal approaches in speech therapy sessions. [4] S. V. Petrova studied the potential of audiovisual resources and pedagogical games to normalize speech rhythm and develop pronunciation skills in children who stutter, demonstrating the effectiveness of modern speech therapy technologies. [5] I. N. Kuznetsova and colleagues analyzed effective methods for improving children's speech rhythm and tempo through individualized exercises and at-home practice. [6] T. V. Smirnova highlighted the importance of developing comprehensive methods that combine multimodal approaches—including visual and audio resources, interactive pedagogical games, and individualized exercises—to normalize speech rhythm and enhance tempo in children who stutter. [7] O. P. Ivanova emphasized the critical role of active involvement from parents and educators in the process of correcting speech rhythm and tempo using speech therapy technologies.

Collectively, these studies provide a scientific basis for assessing the effectiveness of speech therapy technologies in eliminating tempo-rhythm disorders in the speech of children who stutter and for developing individualized pedagogical-speech therapy approaches.

**Research methodology.** The study was conducted using experimental and observational methods to identify tempo and rhythm disorders in the speech of children who stutter and to evaluate the effectiveness of speech therapy technologies. The research involved 60 children aged 6–10 years, including 30 children who stutter and a control group of 30 typically developing children. The degree of stuttering was determined by a speech therapist and

neurologist using standardized assessment tools, including phonetic analysis software and speech rhythm monitoring. During the study, disruptions in pronunciation, vocabulary, speech rhythm, and tempo were regularly recorded, and speech analysis was conducted using audiovisual recordings and specialized speech therapy cards. Throughout the experiment, children received individualized speech therapy sessions, pedagogical games, visual and audio resources, and exercises to be performed at home, applying a comprehensive approach to normalize speech rhythm and tempo. Additionally, the children's emotional state, attention span, and participation in interactive exercises were monitored.

The obtained data were statistically analyzed using SPSS, evaluating reliability, standard deviation, and percentage indicators. Comparative analyses between the experimental and control groups were performed to determine the effectiveness of speech therapy technologies in improving speech rhythm and tempo. The study adhered to ethical standards, all participants were involved with parental consent, and children's personal data were kept confidential. This methodology provides a scientific basis for identifying tempo and rhythm disorders in children who stutter, evaluating the effectiveness of speech therapy technologies, and developing individualized pedagogical-speech therapy approaches.

**Table 1. Types of tempo and rhythm disorders in the speech of children who stutter**

| Type of Temp-Rhythm Disorder          | Participants (n=30) | Percentage (%) | Notes                                                           |
|---------------------------------------|---------------------|----------------|-----------------------------------------------------------------|
| Slowed speech and pauses              | 22                  | 73             | Repeated pauses and slow speech are most common among children. |
| Irregular speech tempo                | 18                  | 60             | Alternating fast and slow words disrupt overall speech tempo.   |
| Articulation and pronunciation errors | 25                  | 83             | Pronunciation errors also disrupt speech rhythm.                |
| Limited emotional expression          | 15                  | 50             | Stuttering affects children's ability to express themselves.    |

This table shows the types and prevalence of tempo-rhythm disorders in children who stutter, providing essential information for planning individualized speech therapy sessions. Pronunciation errors (83%) and slowed speech with pauses (73%) are the most common disorders, while irregular speech tempo is also frequent (60%). Limited emotional expression affects self-expression and social interaction (50%).

**Table 2. Effectiveness of speech therapy technologies in improving speech rhythm and tempo**

| Speech Therapy Methods             | Participants (n=30) | Improvement in Speech Rhythm and Tempo (%) | Notes                                                                              |
|------------------------------------|---------------------|--------------------------------------------|------------------------------------------------------------------------------------|
| Individual speech therapy sessions | 30                  | 80                                         | Personalized sessions are most effective for normalizing pronunciation and rhythm. |

| <b>Speech Therapy Methods</b> | <b>Participants (n=30)</b> | <b>Improvement in Speech Rhythm and Tempo (%)</b> | <b>Notes</b>                                                                 |
|-------------------------------|----------------------------|---------------------------------------------------|------------------------------------------------------------------------------|
| Pedagogical games             | 25                         | 70                                                | Games stimulate speech and reduce emotional difficulties.                    |
| Visual and audio resources    | 22                         | 65                                                | Audiovisual materials help normalize speech tempo and improve pronunciation. |
| Exercises performed at home   | 20                         | 60                                                | Regular home exercises reinforce speech rhythm and tempo.                    |

This table demonstrates the effectiveness of different speech therapy technologies and methods in improving the rhythm and tempo of children who stutter. Individual and multimodal approaches yield the highest results. Personalized speech therapy sessions show the greatest improvement (80%), highlighting the importance of individualized approaches. Pedagogical games and audiovisual resources significantly enhance speech rhythm and tempo, while home exercises provide additional reinforcement and reduce stuttering. The table confirms the effectiveness of combining multimodal and individualized approaches in speech therapy practice and provides an essential basis for developing strategies to improve children's speech.

**Research discussion.** The study results clearly demonstrated the identification of tempo and rhythm disorders in the speech of children who stutter and the effectiveness of speech therapy technologies in addressing these issues. The experimental findings revealed that disruptions in speech rhythm and tempo in children who stutter are closely associated with pronunciation errors, difficulties in word selection, and limitations in emotional expression.

Individual therapy sessions and multimodal approaches—including visual and audio resources, pedagogical games, and exercises performed at home—produced the most significant improvements in pronunciation, speech rhythm, and tempo. Audiovisual analyses highlighted recurrent errors and individual-specific speech disruptions, underscoring the necessity of personalizing speech therapy interventions. The study also confirmed the critical role of active involvement by parents and educators in supporting children's speech development, as home-based exercises and regular monitoring significantly contributed to normalizing speech rhythm and tempo. Comparative analyses between the experimental and control groups clearly demonstrated the effectiveness of speech therapy technologies and confirmed that combining individualized and comprehensive approaches yields the highest outcomes.

**Conclusion.** The results of the study clearly demonstrated the identification of tempo and rhythm disorders in the speech of children who stutter and the effectiveness of using speech therapy technologies to address these issues. The experimental findings confirmed that individual therapy sessions, multimodal approaches, pedagogical games, visual and audio resources, and home-based exercises provide the most significant improvements in pronunciation, speech rhythm, and tempo. The study also highlighted the critical role of active involvement by parents and educators, as regular monitoring and individualized approaches substantially support children's speech development, enhance emotional stability, and improve success in social

communication. Furthermore, the research confirmed the practical significance of speech therapy technologies in reducing tempo and rhythm disorders and emphasized the need to optimize pedagogical-speech therapy strategies.

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