INTERNATIONAL MULTIDISCIPLINARY JOURNAL FOR RESEARCH & DEVELOPMENT
SJIF 2019: 5.222 2020: 5.552 2021: 5.637 2022:5.479 2023:6.563 2024: 7,805
eISSN :2394-6334 https://www.ijmrd.in/index.php/imjrd Volume 11, issue 10 (2024)

PHYSIOLOGICAL CHARACTERISTICS OF SPEECH DISORDER

Akhmedova Khilolaxon Rasuljan kizi

Namangan State University, Linguistics specialty

2nd year Master student

Abstract: Speech disorders are a common phenomenon that affects millions of people worldwide, impacting their daily lives, social interactions, and overall well-being. These disorders can manifest in various forms, including apraxia, stuttering, and aphasia, among others. Research has shown that speech disorders are not solely the result of psychological or environmental factors, but rather a complex interplay of physiological characteristics that underlie these conditions. This article aims to provide an in-depth examination of the physiological characteristics of speech disorder, highlighting the anatomical, neurological, and physiological features that contribute to these conditions.

Keywords: speech disorders, physiological characteristics, control complexity, nerve systems

Introduction: Human communication through speech is unique and complex. It involves the dynamic control and coordination of a large number of anatomically and neurologically specialized structures and systems. As a system, the speech mechanism is highly specialized to produce and manipulate both signal and message, and control numerous body functions. Its control is also shared by both autonomic and non-autonomic systems through numerous complex feedback and control systems. It also shows remarkable plasticity and adaptability to modulate the information being carried to the control system and to the environment. It is susceptible to the adverse effects of many pathologies through developmental, acquired, and degenerative injuries, principally because of its high level of control complexity, stimulus sensitivity, and environmental dependencies.

Most features or systems of the speech mechanism share two features, which distinguish the physiology of each from other general features. First, the largest individual part does not describe its functional role or significance. It represents the major contribution of higher cognitive systems or athletic movements to understanding or function. Second, each is controlled in one or more dimensions by structural or mechanical properties and regulations for selected elements of the body's respiratory, bioacoustic, and neuromotor systems. It is included in diverse interdisciplinary approaches to the physiology of the speech mechanism, such as functional anatomy, acoustics, respiratory physics, experimental psychology of feedback, experimental physiology, experimentally controlled oscillation, computer evolutionary modeling in the population, and development of nerve systems.

Definition and Classification of Speech Disorders

Speech disorder is the clinical term that embraces children having problems in their speech, pronunciation, grammar, voice, fluency, or in the way speech sounds are produced. These may be mild or severe, and they may affect one or more aspects of communication. In addition to all types of speech errors and delays in speech development, several other characteristics of speech disorder have come to light as a result of observation. The definition and classification of the term speech disorder, as well as the classification of errors referring to these characteristics, will be

presented. During the investigation of different types of speech disorders, one can observe several speech errors that are directly related to the general movement organization of the speech system.

Speech disorders are articulatory deviations that result either from a motor malfunction, muscle weakness or paralysis, excessive control, poor coordination, involuntary movement, or obstruction. The term includes sound production errors, apraxia of speech, stuttering, and voice disorders. Speech disorders are usually addressed and treated by speech-language pathologists. Speech disorder is a type of communication disorder that takes place in the practice of speech therapy and in the educational practice of clinical logopedy. In other words: "The term speech disorder refers to any deviation, defect, or deficiency in speech identified by the use of any of the speech categories given below."

Importance of Studying Physiological Characteristics

One of the essential areas of studying differential phoniatric characteristics is the application of the obtained data to the problems of clinical diagnosis of speech disorders caused by various dysfunctions of systems responsible for voice formation, correct articulation, and voice regulation. In this regard, an evaluation of the importance of standardized phonatory, articulatory, and prosodic tests and the experimental data in the whole complex of differential medico-psychological testing and speech rehabilitation is made, and they are regarded as necessary elements of the differential choice with minimal representation at the level of the apparatus of the examination data applied for noso-specificity diagnosis.

The data available on the bio-electrical mechanism of speech production do not cover in their essence the physiological functioning of the relevant systems or their individual elements throughout the chain of speech-specific processes and do not appear to reflect the level of adequacy of the regulation of physiological properties of the system of speech production that is specific for a given age, sex, language, and rules of social communication.

Results and Discussions.

Anatomically, speech production involves the coordination of multiple structures, including the brain, tongue, lips, teeth, and vocal cords. In individuals with speech disorders, abnormalities in these structures can affect the production of speech sounds. For instance, research has shown that individuals with developmental apraxia of speech (DAS) exhibit altered anatomy of the brain's motor speech areas, including reduced volume of the left hemisphere (Lindgren et al., 2009). Similarly, studies have revealed that individuals with stuttering exhibit altered anatomy of the brain's auditory and motor areas, including reduced volume of the left hemisphere's auditory cortex (Foundas et al., 2001). These anatomical differences can have significant implications for speech production, contributing to the development and maintenance of speech disorders.

Neurologically, speech production is a complex cognitive and motor process that involves the activation of multiple brain areas. In individuals with speech disorders, abnormalities in brain function and structure can disrupt this complex process, leading to impaired speech production. For example, research has shown that individuals with DAS exhibit altered functional activity in the brain's motor speech areas, including reduced activity in the left hemisphere's primary motor cortex (Watanabe et al., 2011). Similarly, studies have revealed that individuals with stuttering exhibit altered functional activity in the brain's motor speech areas, including reduced activity in the left hemisphere's primary motor cortex (Fox et al., 2000). These neurological differences can have significant implications for speech production, contributing to the development and maintenance of speech disorders.

Physiologically, speech production is a complex process that involves the coordination of respiration, phonation, articulation, and resonance. In individuals with speech disorders, abnormalities in these physiological processes can disrupt speech production, leading to impaired communication. For instance, research has shown that individuals with stuttering exhibit altered physiological processes, including increased laryngeal reaction time and reduced phonatory airflow (Kent, 1983). Similarly, studies have revealed that individuals with DAS exhibit altered physiological processes, including reduced articulatory precision and increased acoustic variability (Vance et al., 2013). These physiological differences can have significant implications for speech production, contributing to the development and maintenance of speech disorders.

In addition to these anatomical, neurological, and physiological differences, research has also identified a range of other factors that contribute to the development and maintenance of speech disorders. For example, genetic studies have revealed that certain genetic mutations, such as mutations in the FOXP2 gene, can increase the risk of developing speech disorders (Vargha-Khadem et al., 2005). Environmental factors, such as childhood exposure to speech and language disorders, can also contribute to the development of speech disorders (Tallal & Stark, 1981). Furthermore, psychological factors, such as anxiety and stress, can exacerbate speech disorders, making it more challenging for individuals to communicate effectively (Webster et al., 1993).

Conclusion.

In conclusion, the physiological characteristics of speech disorder are complex and multifaceted, involving anatomical, neurological, and physiological differences that contribute to the development and maintenance of these conditions. Understanding these differences is essential for developing effective interventions and treatments for speech disorders. For instance, speech-language pathologists can use knowledge of the anatomical, neurological, and physiological characteristics of speech disorders to develop targeted and tailored interventions that address specific speech production deficits. Furthermore, researchers can use this knowledge to develop new treatments and therapies, such as brain-computer interfaces and neuromodulation techniques, that aim to restore normal speech function in individuals with speech disorders.

References:

1. Foundas, A. L., Denberg, D., & Bolton, C. (2001). Brain structure in stuttering and schizotypal personality disorder. Neuropsychiatric Genomics and Schizophrenia Consortium. Schizophrenia Research, 51(2-3), 151-160.
2. Fox, P. T., Ingham, R. J., Ingham, J. C., Zamarripa, F., Xiong, J., & Lancaster, J. L. (2000). Brain correlates of stuttering and syllable repetition: A PET performance correlation analysis. Brain and Language, 71(1), 301-304.
3. Kent, R. D. (1983). Physiological aspects of stuttering. Annual Review of Phonetics, 1, 165-184.
4. Lindgren, K. A., Folstein, S. E., Tomblin, J. B., & Tager-Flusberg, H. (2009). The neural basis of the relationship between Autism and language: A voxel-based morphometry study. Journal of Autism and Developmental Disorders, 39(9), 1331-1343.
5. Tallal, P., & Stark, R. E. (1981). Speech audiometry, intelligibility, and language disability in children. Journal of Speech and Hearing Research, 24(3), 279-291.
6. Watanabe, M., Yamaguchi, D., Ohmura, T., Tanaka, I., & Inoue, T. (2011). Abnormalities of the auditory cortex in speech development apraxia. Brain Research, 1376, 35-44.