

Etiology, forms and diagnosis of rhinolalia

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Rhinolalia is a change in the timbre of the voice due to a violation of the pronunciation of most sounds and a violation of the palatopharyngeal closure. It is wrong to attribute this deviation to mechanical dyslalia, it is treated separately in modern speech therapy. With this disease, nasalization or "noise" (an important feature of rhinolalia), gross distortion in voice pronunciation, difficult to understand, articulation and acoustic speech disorder, secondary impairment of phonemic processes and written speech, poor vocabulary development occur. The disease is quite common – one among 760 children is born with it or acquires it later. Rhinolalia is a disorder of articulation and voice formation caused by defects in the structure and function of the speech apparatus. It is characterized by gross distortions in voice pronunciation, nasalization of consonants and vowels, secondary violations of phonemic processes and written speech, underdevelopment of the lexical and grammatical aspects of speech. Diagnostic examination for rhinolalia includes consultations with an otolaryngologist, maxillofacial surgeon, and speech therapist to determine the anatomical and functional defects of the articulating apparatus and the degree of impairment of all aspects of speech. Surgical, physiotherapeutic, orthodontic treatment can be used to overcome rhinolalia. In this article, the treatment of patients with rhinolalia, the types of the disease, and examination-diagnostics have been investigated.

Keywords: rhinolalia, etiology, diagnosis, treatment.

Introduction. Rhinolalia is a violation of voice pronunciation and voice timbre due to violation of palatopharyngeal closure. This disorder is observed in 1 among 760 people. Some authors consider rhinolalia as a form of mechanical dyslalia, but in modern speech therapy, it is required to distinguish rhinolalia as an independent speech disorder. In the literature, the terms "nasalization" or "rhinophonia" are sometimes used to refer to rhinolalia but both of these concepts do not fully reflect the nature of the speech disorder because they only show a special voice disorder (nasalization). All this constitutes the research subject of the article.

Formulation of the problem. Rhinolalia is an isolated anatomical defect of the articular apparatus and does not affect the general development. However, it should be taken into account that with open rhinolalia, the cleft palate appears to be under the influence of pathogenic factors on the embryo during a critical period for the development of the nervous system. Therefore, some forms of rhinolalia can often result in mental retardation. In order to pronounce sounds more clearly, children strain their facial muscles, lip muscles, tongue and nasal wings, which worsens the overall impression of speech. Imprecise articulation and distorted pronunciation of sounds are accompanied by secondary impairment of auditory differentiation and phonemic analysis. This causes a violation of written speech – dysgraphia and dyslexia. Limitation of speech contacts in children with rhinolalia leads to insufficient formation of vocabulary and the grammatical side of speech, that is, OHP (Huseynova, 2007: 75).

Research objectives:

Congenital clefts of the face can be caused by a pregnant woman being infected with toxoplasmosis, flu, rubella, parotitis and other infections in the early stages of pregnancy, contact with pesticides and other harmful substances, smoking, drug and alcohol use during pregnancy, stress, and endocrine disorders in the expectant mother. The critical period for the formation of facial clefts is the 7th-8th week of embryogenesis (Koichi, 2011: 251).

The mechanism of the development of rhinolalia is associated with a violation of the interaction between the nasal cavity and the oropharynx. Depending on the characteristics of this disorder, it is possible to distinguish open and closed forms of rhinolalia. Taking into account the possible causes (anatomical defects or dysfunction of the speech apparatus), each of the forms can be organic and functional. The classification of rhinolalia directly depends on the type and severity of the violation of the structure of the oropharynx and nasal cavity:

- by design: open and closed rhinolalia;
- according to the causes of occurrence – organic and functional.

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Main part. According to the time of onset, frank organic rhinolalia can be congenital or acquired. Congenital open rhinolalia in children with soft and hard palate clefts ("cleft palate"), splitting of the alveolar process of the upper jaw and upper lip ("cleft lip"), shortening, bifurcation or absence of the soft palate, small uvula, hidden (submucosal) clefts of the hard palate is observed. Open rhinolalia means the absence of a barrier between the oral and nasal cavities, which is necessary for the normal development of speech. When trying to speak, the air stream, which should come out of the mouth and be stronger, is simultaneously distributed and comes out of the nose, which causes nasal resonance. That is, open rhinolalia is characterized by the presence of a permanent open connection between the nasal and oral cavities, which leads to the simultaneous free passage of air through the nose and mouth during speech and the formation of nasal resonance during phonation. With open organic rhinolalia, the articulation of sounds and voice pronunciation are grossly impaired. The root of the tongue is always in a high position, and the tip of the tongue is in a passive, low position, due to which most consonants get a "back tongue" shade and resemble the sound [kh]. During open rhinolalia, the vowels u, i, e, o change more. As for the consonants, the timbre of sounds *f, v, o, l, b, t, k, q, l, r* is disturbed (Sadiyev, 2006: 111). In the case of open rhinolalia, sometimes there are certain defects on the bone base of the hard palate covered with mucous membrane – cracks called submucous. This cleft is revealed by lightly pressing the back edge of the hard palate and pulling it in a triangular shape in the place of the cleft during the high-pitched pronunciation of the "ch" sound [k],[s]. With open rhinolalia, all sounds have a strong nasal tone, they are practically indistinguishable from each other; the voice is muffled and calmed down (Van Demark, 1980: 175-178).

Children with open rhinolalia can demonstrate different intellectual status – from normal to mental retardation and varying degrees of mental retardation. Children often have neurological symptoms: nystagmus, ptosis, hyperreflexia. If a child with open organic rhinolalia realizes and lives with his defect, this causes the formation of secondary mental layers in him: isolation, irritability, shyness. With open functional rhinolalia, the sound pronunciation of vowels mainly suffers; consonants remain intact due to sufficient palatopharyngeal closure (Aghayeva, 1999: 38).

With open organic rhinolalia caused by congenital clefts of the face, the vital functions of nutrition and breathing suffer from the first days of the child's life. When feeding a baby, milk flows from the nose, so the newborn does not gain enough body weight and does not receive the necessary nutrients. Inhaled air does not have time to warm up enough in the nasal passages, because it immediately enters the lower respiratory tract through the slit. Children with cleft palate and open rhinolalia are prone to malnutrition, otitis media, eutachitis, bronchitis and pneumonia. Congenital cleft palate is often combined with malocclusion (Fletcher, 1970: 604).

Acquired open organic rhinolalia occurs as a result of cicatricial deformations caused by damage to the glossopharyngeal or vagus nerves or tumor compression, traumatic perforation of the palate, paralysis and paresis of the soft palate. Cases of open functional rhinolalia occur after removal of adenoids or with post-diphtheria paresis of the soft palate. At the same time, insufficient elevation of the soft palate and incomplete palatopharyngeal closure are possible during phonation.

Closed functional rhinolalia occurs with hypertonicity of the soft palate, which prevents the outflow of air through the nose. This condition can develop as a result of adenoidectomy, neurological disorders, and also against the background of repeating the nasal speech of others. The causes of closed organic rhinolalia are related to various anatomical changes in the nasal cavity or nasopharynx. Anterior closed rhinolalia can be associated with the curvature of the nasal septum, nasal polyps, hypertrophy of the mucous membranes, tumors of the nasal cavity. Posterior closed rhinolalia adenoids, polyps, nasopharyngeal fibromas, growth of unpaired pharyngeal tonsils, etc. observed with closed rhinolalia are associated with the presence of an obstruction that blocks the flow of air through the nose. Depending on the level of anatomical obstruction (nasal cavity or nasopharynx), respectively, closed anterior and closed posterior rhinolalia are distinguished. In other words, anterior (when the anatomical barrier is located in the nasal cavity) and posterior (when it is located in the nasopharynx) (Lewis, 2003: 49-51).

Closed organic rhinolalia is accompanied by a violation of the pronunciation of nasal sounds ([m], [m'], [n], [n'], replacing [m] by [b], [n] – by [d]. At the same time, the timbre of the voice also suffers. Due to the impossibility of nasal breathing, children are forced to breathe through their mouths. Children with closed organic rhinolalia are prone to colds, the development of asthenic syndrome. With closed functional rhinolalia, the voice acquires a dull, unnatural, dead tone (Fletcher, 1970: 603).

In some cases, there is a mixed type of rhinolalia (a combination of factors characteristic of both open and closed rhinolalia) as well. That is, mixed rhinolalia is observed when the first two types are combined – there is both a deficiency of the palatopharyngeal ring and nasal congestion. This condition is characterized by simultaneous runny nose and absence of nasal sounds.

Organic rhinolalia can be congenital or acquired. It is observed at birth in children with the anomalies as follows:

- cleft palate, palatolalia; cleft lip;
- shortening of the soft palate;

- hidden clefts of the hard palate;
- the absence of a small tongue in the throat;
- bifurcation of the lesser uvula.

Diagnosis of rhinolalia. Examination of voice pronunciation of children with rhinolalia is very different from other speech disorders, both in terms of methods and content. This examination is carried out in two aspects. The first aspect has the character of articulation and aims to clarify the features of speech sounds generation and the functioning of the members of active articulation in the pronunciation process. The second aspect – phonological – aims to clarify how the speech sound system is distinguished by the child under different phonetic conditions. When identifying patients with rhinolalia, it is found out that the muscles of the face, tongue and lips are weak, the soft palate and the larynx are limp and less mobile. In addition, they have poor development of the muscles of the back wall of the pharynx, low mobility and weakness of the tip of the tongue against the background of excessive development of the root of the tongue. Deformation of the members of the active articulation apparatus is often noted in children with rhinolalia. Thus, some young children have cases where one of the corners of the mouth is droopy, the tongue protrudes from the mouth, and a part of the soft palate falls down.

Speech therapy classes for the correction of open organic rhinolalia are conducted before and after surgery. Articular gymnastics, breathing exercises, logopedic massage (finger massage of fragments of the hard palate and vibration massage of the soft palate) are performed before an operation. At this stage, work on the production and automation of existing sounds (keeping the nasal tone) develops the strength and flexibility of the voice, expands the child's vocabulary, develops auditory attention and phonemic hearing, etc.

In children with rhinolalia, the prelinguistic period proceeds abnormally: there is an emphasis on the absence of quiet or silent articulation of modulated and various sounds. Rhinolalia causes delay in speech development: a child utters the first words after 2 years he/she is born. Speech is confused, inarticulate and incomprehensible to others. The diversity and complexity of disorders underlying rhinolalia require the participation of specialists in surgical stomatology, orthodontics, otolaryngology, speech therapy, and psychology in its elimination. The diagnosis of rhinolalia is carried out with the participation of a speech therapist, an otorhinolaryngologist, a maxillofacial surgeon, as a result of which the picture of defects, the reason for their appearance (anatomical structure of the speech apparatus or functional deviation) and degree are formed. Correction of rhinolalia is carried out from several sides and requires complex work of multidisciplinary specialists. Physiotherapy, surgical, orthodontic treatment, psychotherapy and speech examination are applied in a complex manner for complete restoration of speech (Koichi, 2011: 249-250).

In the logopedic examination of a patient with rhinorrhea, the main focus is on the assessment of the structure and mobility of the articular apparatus, physiological and phonation breathing, and voice disorders. The Gutzmann test is used to determine open rhinolalia – the pronunciation of vowels [A] and [I] with alternate closing and opening of the nasal passages. When the nostrils are closed, the sounds are muffled, and at the same time, the speech therapist feels the strong vibration of the nasal wings with his fingers.

Then the sound pronunciation of all vowels and consonants, the prosodic aspect of speech, phonemic processes, the state of vocabulary and grammar are checked; the reading and writing status of schoolchildren is observed. Based on the medical diagnosis and examination of oral speech, a plan of medical and correctional-pedagogical work for rhinolalia is drawn up.

It should be noted that the state of phonemic perception of children suffering from rhinolalia should also be checked during the examination of articulatory defects. In order to test phonemic perception, a speech therapist can usually use these methods:

1. Distinguishing and memorizing the given words from other words by hearing (similar in terms of sound composition, words different in terms of sound composition);
2. Recognition, differentiation and analysis of simple expressions;
3. Differentiating individual sounds, syllables from the series of sounds, words and phrases;
4. Memorization of a sequence of two-, three- and four-element syllables (ma-me-mu; ka-va-ta, etc.)

In order to determine children's perception of the rhythmic structure of words, the tasks such as to find syllables with different structures in words and to clap hands according to syllables can be used.

Repetition of isolated sounds or short sounds can be used to test auditory discrimination of speech sounds. During the repetition of similar sounds ([b], [p]; [s], [S]; [r], [l], etc.), it is possible to detect phonemic perception defects in children with rhinolalia. For this purpose, a child can be asked to repeat the syllables with that sound composition: sa-sha; sa-sha; sa-sha; sa-sha-sa; sa-za-sa; za-sa; sa-za-sa etc.

Prevention of rhinolalia. It should be said that the movement of the lips interacting with the tongue muscles is also limited. Since congenital clefts of the lip and palate make sucking difficult, they cannot eat properly from infancy, become weak and are prone to various diseases. Unlike other peers, they suffer from upper respiratory tract diseases more often, pathological changes in the throat-nasal tract of children with rhinolalia are often manifested. Their partitions in the nasal cavity, nasal wings are deformed. Growth (hypertrophy) of adenoids and tonsils is observed. Sometimes, inflammatory processes in the nasal cavity

pass from the mucous membrane of the nose and oral cavity to the middle ear, as a result, another defect such as hearing loss and its weakening occur in such children.

With organic forms of rhinolalia, it is required to eliminate anatomical defects: production of a pharyngeal obturator, surgical correction of facial deformities (uranoplasty, velopharyngoplasty, cheiloplasty), adenotomy, nasal polypotomy, septoplasty, removal of neoplasms, etc. The main role in the treatment of functional rhinolalia belongs to physiotherapy and psychotherapy. The medical effect is complemented by the work of differentiated speech therapy. We will consider the features of the correction process using the example of rhinolalia with palatine clefts (Fletcher, 1970: 603).

The goal of postoperative work on the correction of rhinolalia is to strengthen the acquired skills under new anatomical conditions. For this purpose, massage of the postoperative scars of the palate, development of the palato-pharyngeal valve, development of differential oral and nasal exhalation, correction of voice pronunciation, elimination of the nasal tone of the voice, elimination of lexical-grammatical gaps, structure and phrasal speech are carried out.

Functional rhinolalia, as a rule, has a favorable prognosis and is eliminated with the help of phoniatric exercises and speech therapy classes. The effectiveness of the elimination of organic rhinolalia is mainly determined by the results of surgical treatment, the time of initiation and the completeness of the speech therapy work.

Approbation of research results. The main provisions of the article are reflected in the author's theses submitted to scientific conferences in Azerbaijan and abroad, as well as in scientific articles published in various journals in Azerbaijan and abroad.

Conclusion. Prevention of rhinolalia means to prevent the occurrence of anatomical defects and functional disorders of the speech apparatus and to eliminate them in time. A baby cannot acquire speech through imitation, which is the norm. This situation continues until surgery. The duty of parents is to encourage all attempts of sound and speech production as well as proper pronunciation of such children. As a result of the examination of the voice part of speech and its comparison with other parts of speech, the speech therapist must clarify whether the detected deficiency is an independent defect or one of the components of general speech development delay. The determination of specific corrective measures depends a lot on this. Conversations with parents are very important in order to organize the correct correction of the speech defect. During these conversations, the correct breathing mechanism, control of voice and voice pronunciation should also be explained to a parent in a simple way. For a child born with clefts of the palate and soft palate, the period of initial formation of gurgling and speech occurs under special conditions, in a unique way. A baby hears well, is happy with addressed speech and gradually begins to understand. However, due to the absence of a plug between the nasal and oral cavities, he/she is deprived of the possibility of sound pronunciation. All pronounced sounds acquire a nasal tone, and most vowels are not pronounced at all.

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Етіологія, форми та діагностика ринолалії

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Ринолалія – зміна тембру голосу внаслідок порушення вимови більшості звуків і піднебінно-глоткового змикання. Це відхилення неможна ототожнювати із механічною диспалією, адже в

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сучасній логопедії ці явища розглядаються окремо. При цьому захворюванні спостерігаються назалізація або «шум» (важлива ознака ринолалії), грубе спотворення голосу, утруднене розуміння, розлад артикуляції та акустики мовлення, вторинне порушення фонематичних процесів і писемного мовлення, використання обмеженого словникового запасу. Зазначено, що хвороба є поширеною – кожна 760-а дитина народжується з нею або набуває її пізніше. Ринолалія – це порушення артикуляції та голосоутворення, зумовлене дефектами будови та функціонування мовленнєвого апарату. Обґрунтовано, що порушення характеризується грубими порушеннями вимови голосу, назалізацією приголосних і голосних звуків, вторинними порушеннями фонематичних процесів і писемного мовлення, недорозвиненням лексико-граматичного складника мовлення. Діагностичне обстеження при ринолалії включає консультації отоларинголога, щелепно-лицевого хірурга, логопеда для визначення анатомо-функціональних дефектів артикуляційного апарату, ступеня ураження процесів мовлення. Для подолання ринолалії можна застосовувати хірургічне, фізіотерапевтичне, ортодонтичне лікування. У статті досліджено лікування хворих на ринолалію, види захворювання та обстеження-діагностику.

Ключові слова: ринолалія, етіологія, діагностика, лікування.

Accepted: September 08, 2023

