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# BASIC PRINCIPLES

## AND METHODOLOGICAL RECOMMENDATIONS FOR SPEECH CORRECTION IN PATIENTS UNDERGOING OPEN RHINOPLASTY

## PRINCIPIOS BÁSICOS Y RECOMENDACIONES METODOLÓGICAS PARA LA CORRECCIÓN DEL HABLA EN PACIENTES INTERVENIDOS EN RINOPLASTÍAS ABIERTAS

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## ABSTRACT

Previous studies have shown that after undergoing surgery in an open rhinoplasty, patients present significant alterations in the quality of the voice. This can cause anguish and discomfort in patients, being more significant in children. For this reason, in this work, methodological recommendations are made to improve the work of speech therapy professionals with the purpose that they have adequate tools and methods to efficiently perform their work. The paper is mainly focus on explaining how to achieve a correct breathing and articulation during speech highlighting the activities in the several stages of treatment. It is necessary to emphasize that the work of the speech therapist to be effective should not be carried out after the surgical intervention, but must begin in a preoperative phase.

Keywords:

Speech therapy, open rhynoplasty, quality of the voice.

## RESUMEN

Estudios previos han demostrado que tras someterse a una cirugía en una rinoplastia abierta, los pacientes presentan alteraciones importantes en la calidad de la voz. Esto puede causar angustia y malestar en los pacientes, siendo más significativo en los niños. Por ello, en este trabajo se realizan recomendaciones metodológicas para mejorar la labor de los profesionales de logopedia con el fin de que cuenten con las herramientas y métodos adecuados para realizar de manera eficiente su labor. El trabajo se centra principalmente en explicar cómo lograr una correcta respiración y articulación durante el habla, destacando las actividades en las distintas etapas del tratamiento. Es necesario enfatizar que el trabajo del logopeda para ser efectivo no debe realizarse después de la intervención quirúrgica, sino que debe comenzar en una fase preoperatoria.

Palabras clave:

Terapia del habla, rinoplastia abierta, calidad de la voz.

## INTRODUCTION

According to Nemati, et al. (2018), citing Pourdanesh, et al. (2014), rhinoplasty is a common aesthetic procedure worldwide. In rhinoplasty, internal nasal valve is changed due to anatomical distortion by lateral osteotomies, as well as cephalic resection of the lateral crura of the alar cartilages. The changes in nasal valve result in weakening the physiological support of the upper lateral cartilages and the medialization of the tissue. Moreover, removing the nasal hump during open rhinoplasty may lead to distortion of the junction of the upper lateral cartilages and the septum and collapse of the internal nasal valve angle (Jalali, 2015). Therefore, change in nasal airway can affect voice due to narrowing nasal airway being reported in several studies (Behrman, et al., 2002; Brandt, et al., 2014; Foroughian, et al., 2014; Chen, et al., 2016; Nemati, et al., 2018; Guarro, et al., 2019).

Taking this into account, the main purpose of speech therapy in both preoperative and postoperative rhinoplasty is to form a normal speech without nasal tone. Although nasal discharge (sneezing) can be observed to any degree, it is possible to determine the correct articulation of all sounds and their accurate pronunciation in the preoperative period. The knowledge gained in this case facilitates further work after the operation and shortens the duration of the correction work.

Ippolitova (1983), notes that the main condition in the work of correction is the activation of healthy parts of the speech apparatus (lower and middle). The effect of speech therapy work here is to reduce the degree of load on the defective upper region of the mouth. During rhinoplasty, disorder of pronunciation is observed. In this regard, it is important to re-form the correct pronunciation of all speech sounds in speech therapy. The basic principles of speech therapy in open rhinolaryngology are based on the features of the normalization of speech and serve to eliminate its existence by investigating the causes of this disorder. To this end, the principles of corrective action are consistent with the following directions:

(1) The principle of using physiological respiration on the basis of methodical work serves to form speech into the diaphragm with gradual breathing through the mouth.

(2) The development of speech and breathing is carried out simultaneously.

(3) Although some sounds are obtained correctly due to their pronunciation in speech, this gives the impression of deception, as this is often due to the general tension of the muscles of the articulatory apparatus and the incorrect position of the tongue to ensure normal articulation. From this point of view, sounds that create the impression of a normal sound should not be used in speech therapy classes. For this purpose, it is important to start the correction work from the very beginning, without making sure that the children pronounce normal sounds when starting speech therapy work on rhinolalia.

(4) The sequence of speech therapy work on sounds during rhinolaryngology is determined by the preparation of the articulatory reserve of sounds. Because speech sounds are often interdependent and interrelated, the existence of one group of complete sounds is a creative basis for learning other groups of sounds, and as a result, some sounds help to overcome the difficulty in pronouncing other sounds. Articles with sounds are important because new sounds are learned from them. Different support sounds can be used to study individual sounds.

(5) The development of the articulation base of sounds is carried out with the help of special articulatory gymnastics. This gymnastics can be sustainable as it is carried out with the development of the child's speech breathing.

One of the aspects of corrective work is the use of a system of tasks for the development of articulation practice. The use of a system of tasks should be based on the physiological interaction of the muscle group of the speech apparatus, ie. the use of interactions and interdependencies should be the main focus. It is not necessary to use inappropriate articulation tasks (sucking the tongue, delivering the protruding tongue to the upper lips) in the application of normal vocal articulation. Thus, the use of unnecessary tasks does not coincide with arbitrary actions, which are important for the strengthening of individual sound articulation.

In the correction work, the subject practice the movements needed to pronounce the other sound. It is necessary to watch the subject (specially children) to perform the indicated actions comfortably, without tension; otherwise, the tension can irradiate other speech apparatus muscle groups. Another effective direction is to apply articulation tasks only in a strictly differentiated plan and only in critical cases. This activity must be natural, physiological and performed by the subjects without special stress. Often these activities are used in cases of combined violations. In addition, in rhinorrhea, massage and mechanical assistance are used to develop the movement of the muscle group in the case of severe dysarthria, exercises are used to eliminate unilateral weakness of the tongue. Tasks are often strictly differentiated according to their important application and benefits being clear from this, that it is necessary to pay attention to the formation of the articulatory

structure in the movements performed during the gymnastics of the articulatory apparatus.

(6) Also, when speaking, the subject's attention should be focused on the articulation so as not to interfere with the strengthening of the correct pronunciation in the habitual articulation. It is important to remember that in this case, it is not necessary to draw the child's attention to the sound control, because children should not know in advance that they are training on the pronunciation of each sound.

It is important to highlight that proper speech skills are only partially reinforced by the parents under the guidance of a speech therapist. In the first 10-15 lessons, the control over the formation of correct speech skills is carried out only by a speech therapist.

Therefore, according to what was explained previously in this article, methodological recommendations are presented to improve the work of speech therapists to treat patients with speech disorders due to open rhinoplasties surgeries, focused especially on the treatment of children. The work is focusmainly on texplaining how to achieve a correct breathing and articulation during speech highlighting the activities in the several stages of treatment, preoperative and postoperative.

## DEVELOPMENT

Ermakova (1984), developed a step-by-step method of voice pronunciation and sound correction. The author noted that the correctional work before the operation creates a direct positive environment for the formation of correct pronunciation, so it was identified by tthe author the next stages of correction work:

- Preoperative preparation. The importance of this stage is emphasized by the author, which at this stage is important to prevent the strengthening of pathological compensatory habits and to lay the foundation for the development of normal speech.
- Postoperative stage. It is important for the study of vowel sounds and elimination of excessive nasal resonance.
- Correction phase of voice pronunciation, breathing, phonation and articulation coordination
- The stage of full automation of new knowledge. Special activities should be considered at this stage:
- prepare the palate for joint after surgery and prevent dystrophy of the esophageal muscles
- to draw a directed air flow and to brake the type of bridge breathing
- strengthen the muscles of the larynx
- create the basis for correct pronunciation by developing oral practice and placing the tongue forward in the oral cavity
- to form the auditory perception of phonemes.

Analyzing her work experience, Ermakova writes that due to prophylactic criteria, it is necessary to activate the closure of the pharynx more quickly after surgery and to prepare the kinesthesia of unspoken speech in the best conditions, close to the norm (Ermakova, 1984). In this case, the child activates the kinesthesia of the pharyngeal occlusion in a well-organized stereotype of movement. Otherwise, the movement of the palate is inhibited to ensure the stereotype of pathological breathing and articulation.

Postoperative work to eliminate speech disorders can begin 15-20 days later. Postoperative work focus primarily on teaching the patient to use new anatomical conditions in the speech process. In the postoperative period, the anatomical and physiological basis of normal speech is provided. In this case, the main purpose of speech therapy is the development of complete joint-pharyngeal function (velopharyngeal function).

During the training, a comfortable combination of palate and pharynx, mastering the air flow directed by the pronunciation of vowel sounds without nasal resonance, and the study of breathing are followed by the correction of vowel sounds.

T.V. Volosoves' medical research is devoted to the issue of early correction in children with maxillofacial pathology. For the first time, he introduced a system of examination and correction in children from 1 to 3 years of age with congenital cleft lip and palate. According to his notes, it is characterized by features of speech ontogeny, which manifests itself without intense stuttering. The most typical stuttering sounds [p], [b], [t], [d] are articulated quietly or very quietly due to the leakage of airflow from the nasal passages, and thus children are unable to achieve hearing reinforcement. Volosoves points to the effect of activity on speech development and suggests involving children in play activities with objects that have other corrective effects on sound formation. At home, a differential system of individual speech therapy classes with children in special groups of inpatient and preschool institutions should be developed. Carrying out this type of speech therapy in the preoperative period consists of a number of stages.

In the preoperative period of open rhinolaryngology, speech therapy was almost non-existent, and its existence was discussed with caution. Classes were conducted mainly with operated patients. During the operation, the

anatomical defect is partially or completely eliminated, but the effect required for speech is often not created. The late implementation of uranoplasty, its insufficient effect on speech improvement, the long-term nature of postoperative speech therapy, and a number of other factors led to the need to reconsider the duration of postoperative speech therapy and to seek productive ways of preoperative speech therapy.

Since rhinorrhea is not only caused by a slit, it also depends on the incorrect position of the tongue in the oral cavity and the violation of the interaction of all the muscles of the articulatory apparatus, it can be assumed that the last two aspects can be worked out before surgery providing the initial conditions for speech improvement. Thus, it is possible to create a broader basis for the formation of correct speech in the preoperative period. During this period, speech therapy is often performed in patients with certain anatomical defects. Therefore, the emergence of correct speech at work is also the formation of personality development.

The formation of correct speech in rhinolaryngology (work on pronunciation) is formed by studying the combination of directed breathing with the formation of complete articulation of speech sounds at the same time.

Identifying the organization of speech therapy work for the relevant periods, Ippolitova noted that the education of oral respiration in children with rhinorrhea is important for the formation of correct speech. Before describing the preparation period, it should be noted that each period is based on certain main objectives. During this period, the main purpose of the training is to form a correct speech breath in parallel with the mastery of the articulatory apparatus. This period can be divided into two stages (Ippolitova, 1983):

**(A)** Formation of speech respiration during differentiation of breathing and exhalation through the mouth and nose. At this stage, diaphragmatic breathing (under the ribs) is considered the most productive for the formation of correct speech.

At the beginning of the training, it is important to determine the physiological type of breathing by placing the palm of the hand on the side above the child's waist. If the child is breathing through the ribs, the speech therapist adjusts his breathing to the patient's breathing rhythm and begins to work. If the child has clavicle or chest breathing, then the ribs should try to create six breaths by imitation. You can do this by placing the child's palm on your side and checking the child's breathing with your own palm. The child feeling the movement of the speech therapist's ribs during breathing, can imitate it and the ribs are tuned for six breaths.

Ippolitova does not consider it necessary to perform a special task for the development of breathing, such as blowing cotton, which is often used in speech therapy, inflating a soft rubber toy, as not all of these types of breathing are related to speech. In addition, tasks that are harmful to speech are often performed with tension by the child, and such harmful tasks can irradiate the entire muscular complex of the speech apparatus, thereby complicating articulation. At the same time, the child's attention is always focused on the direction of speech breathing and the condition of the articulatory organs during breathing. In this case, it is important to change the position of the tongue in the oral cavity in order to organize proper breathing through the mouth (Ippolitova, 1983).

When breathing and breathing patterns are well learned, the child's attention is immediately drawn to the position of the articulatory organs: in this case, the tip of the tongue should be held in the lower incisors when breathing through the mouth, in which case the mouth opens as if yawning. If the movement of the tip of the tongue to the lower incisors does not sufficiently lower the root of the tongue, it is possible to temporarily allow the tongue to be sucked between the teeth or to squeeze the root of the tongue with a spoon.

Proper breathing through the mouth when the tongue is released completely eliminates nasal congestion when emiting sounds and, as a result, in speech as a whole.

**(B)** Development of oral practice. This development is carried out in parallel with the work on the development of diaphragmatic breathing, as the gymnastics of the articulatory apparatus on the articles of vowels and consonants.

At this stage, the pronunciation of vowels has a high effect on speech accuracy. For this purpose, sound pronunciation begins with special gymnastics, in the process of which the structure of the pronunciation organs for each vowel sound is carefully monitored. The main focus is on keeping the tip of the tongue in the lower cutters from the beginning during the preparation of the article of all vowel sounds. This method increases the volume of the oral cavity and thus allows airflow through the mouth. During the articulation of vowels, the position of the lips changes due to the interaction of the muscles, which naturally leads to the correct position of the tongue in the pronunciation of each individual sound.

The main task in the preparation phase is to breathe through the mouth, so all articulation tasks are performed without sound input. Sometimes the child completes the

tasks but cannot feel that it is an article of vowels; in this case, the speech therapist has the opportunity to clarify and improve the structure of the article. The formed articulations are kinesthetically remembered, a conditioned reflex connection is established between the articulation and its image, and it can easily make a sound by whispering by turning to the drawing. During the speech therapist's explanation, children get acquainted with the exact position of the pronunciation organs in the direction of air flow from the mouth.

At this stage, in the formation of articulation, it is necessary to pay attention to the fact that the task is performed without tension, to prevent the development of synkinesis of the facial and facial muscles.

If rhinorrhea is combined with other speech disorders during the tasks, it is necessary to consider several specific ways of influence during the development of oral practice. To improve the voluntary movements of the muscles of the tongue, lips and face during articulation, the therapist can tell the child where and how this or that muscle tension occurs. It is necessary to teach to listen to the breathing during this tension, to feel the condition of the pronunciation organs involved in this articulation, to visually (using a mirror) and kinesthetic memory of this condition. The child can be helped mechanically to feel more precise. For example, the therapist could take the tongue in a sterile napkin and give it the necessary structure.

The interaction of the muscles of the articulatory organs must be taken into account when forming the articulation practice. For example, in order to form a certain articulatory structure, the tongue needs to be placed a little deeper in the oral cavity. In this case, the edges of the mouth move forward mechanically, or, conversely, the tongue moves forward when the edges of the mouth are pulled to the edges. These methods may be used with absolute visual control (work in front of a mirror).

The method of obtaining the correct articulation allows the child to explain the visible aspects of the articulation and thus influence the invisible aspects. This movement helps the child to feel the tension of one or another muscle group and differentiate between them. Thus, in the application of speech therapy, special gymnastics of the articulatory organs is used (only exercises that are important for speech sounds are practiced). In addition, a number of additional tasks are considered to ensure the development of articulation practice. The development of articulatory practice is accompanied by the development of speech breathing. All the tasks for the formation of sound articulation are also considered the training of oral breathing, that is, the study of speech breathing serves as a gymnastics of the speech apparatus.

Another important stage of correctional work is to increase the activities of the child in speech therapy classes according to their individual characteristics (Huseynova & Agayeva, 2018) analyzed the stages of correction of rhinolalia and noted that the number of tasks presented to the child in each lesson may be different. Thus, the first session may be limited to oral breathing exercises and may involve the formation of a few vowel sounds. Older children can be given many tasks, but it is not necessary to rush to complete all kinds of tasks in one lesson. It is necessary to follow the work on the article according to the sequence described above. It is advisable not to work hard on articulation that is not completely accurate at first. In the course of speech, each sound changes its articulation depending on the sound that comes before and after it, so the article being worked on acquires full accuracy when practiced in speech.

Each session should begin with a repetition of all that has been learned; it is important to repeat each type of task several times in the first session, and it is sufficient to repeat them quickly in the next session. Thus, the program of the preparatory stage of the work provides the child with the formation of proper breathing through the mouth and the mastery of a number of sounds (vowels - whispered pronunciation and fricative deaf consonant sounds).

The main features of this period of work are:

1. Parallelism in work on respiration and articulation.
2. Maximum avoidance of the child's auditory control during pronunciation.
3. Constant repetition of a set of tasks mastered before mastering new ones.

Volkova (1999), presented a methodology of speech therapy correction of rhinolalia, noting that the correct pronunciation of one group of sounds creates an arbitrary basis for the formation of another group of sounds. That is, "support" sounds are used (p.143):

1. Connection of sounds during long breathing through the mouth.
2. Formation of shortness of breath through the mouth during the realization of explosive consonant sounds.
3. Differentiation of short and long breaths through the mouth and nose during the formation of the pronunciation of the group of sonorous sounds and affricates.
4. Formation of subtle sounds.

During this period, the main purpose of the training is the same as in the first period, ie. the formation of proper speech breathing coincides with the development of articulation. The work on the sounding of fricative sounds is carried out until the formation of explosive deaf sounds, as the learned articles are carried out by breathing the same length through the mouth. The purpose of this is to teach the child to make a sound during long breaths through the mouth. Later the second type of mouth breathing is formed: shortness of breath through the mouth; it is important to draw the child's attention to the urgency and enthusiasm of the air flow. In a next stage of speech therapy work is done for a group of sonor sounds - l, m, n, r and affricates - on consonant sounds. And finally, the formation of subtle sounds are addressed. Thus, in this process the child learns the pronunciation of all speech sounds (Volkova, 1999).

The features of the work in this period are as follows:

1. Parallelism in work on respiration and articulation.
2. Conscious auditory control of the child's own pronunciation.
3. Application of literal signs of learned sounds serving literacy learning.
4. Automation and differentiation of sounds in different conditions (syllable, word, sentence, text).
5. Prevention of dysgraphia.

Human voice is an extraordinary mix of physical phenomena and personal characteristics, it is also one of the greatest ways to communicate our moods (Guarro, et al., 2019). The author believes that an effctive speech therapy following the guidelines exposed so far can help to provide a better speech to the patients operated of rhinoplasty. This may be of greater importance when the patient is a child, contributing to a higher self-esteem of the patient.

## CONCLUSIONS

Children with congenital pathologies not only suffer from visible facial and jaw developmental defects, but also other complex issues which demand the attention of specialists in various fields (pediatrician, geneticist, neurologist, otorhinolaryngologist, gastroenterologist, dentist, speech therapist, speech pathologist, psychologist, pediatrician, etc.). These children may suffer from limited vital and social functions. Accordingly, the most important social task of speech therapy proffesionals is to create optimal conditions for the successful correction of disorders in the development of the child, his education, his orientation and integration into social work in society. As was analyzed, a better treatment may be achieved if children are tretaed before the operation however it is important to highlight that the solution of this problem should be carried out taking into account medical, biological and socio-legal issues.

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