TECHNOLOGIES FOR ELIMINATING STUTTERING IN PRESCHOOL CHILDREN BASED ON BREATHING EXERCISES

Ismailova Iroda Rustambek qizi
master's student, Kimyo International University of Tashkent, Faculty of Special Pedagogy

Annotation: *This article covers the theoretical and practical aspects of eliminating stuttering in preschool children based on breathing exercises. The anatomical and physiological features of the respiratory system, age-related changes in the respiratory process in children, and the role of breathing in the speech process are analyzed on a scientific basis. It is substantiated that insufficiently formed speech breathing in children with stuttering, shortness and unevenness of exhalation have a negative impact on speech fluency.*

Also, the step-by-step technology for developing respiratory function, the methodology for forming thoracic-abdominal (diaphragmatic) breathing, the procedure for organizing speech therapy sessions, and methods for controlling lung capacity using special devices are described. Respiratory gymnastics, especially exercises that activate the diaphragm, are shown to be an effective tool for coordinating the activity of the speech apparatus, normalizing speech breathing, and reducing the level of stuttering.

Keywords: *stuttering, speech breathing, diaphragmatic breathing, lung ventilation, vital capacity, speech therapy, respiratory gymnastics, preschool age, speech apparatus, hyperventilation.*

Annotatsiya: *Mazkur maqolada maktabgacha yoshdagi bolalarda duduqlanishni nafas mashqlari asosida bartaraf etishning nazariy va amaliy jihatlari yoritilgan. Nafas olish tizimining anatomik-fiziologik xususiyatlari, bolalarda nafas jarayonining yoshga doir o'zgarishlari hamda nutq jarayonida nafasning o'rni ilmiy asosda tahlil qilingan. Duduqlanish kuzatiladigan bolalarda nutqiy nafasning yetarli darajada shakllanmaganligi, nafas chiqarishning qisqaligi va notekisligi nutq ravonligiga salbiy ta'sir ko'rsatishi asoslab berilgan.*

Shuningdek, nafas funksiyasini rivojlantirishning bosqichma-bosqich texnologiyasi, ko'krak-qorin (diafragmal) nafasini shakllantirish metodikasi, logopedik mashg'ulotlarni tashkil etish tartibi hamda maxsus asboblar yordamida o'pkaning tiriklik sig'imini nazorat qilish usullari bayon etilgan. Nafas gimnastikasi, ayniqsa diafragma faoliyatini faollashtiruvchi mashqlar nutq apparati faoliyatini muvofiqlashtirishda, nutqiy nafasni

me’yorlashtirishda va duduqlanish darajasini kamaytirishda samarali vosita sifatida ko‘rsatib berilgan.

Kalit so‘zlar: *duduqlanish, nutqiy nafas, diafragmal nafas, o‘pka ventilyatsiyasi, tiriklik sig‘imi, logopedik mashg‘ulot, nafas gimnastikasi, maktabgacha yosh, nutq apparati, giperventilyatsiya.*

Аннотация: *В данной статье рассматриваются теоретические и практические АСПЕКТЫ устранения заикания у детей дошкольного возраста на основе дыхательных упражнений. На научной основе анализируются анатомические и физиологические особенности дыхательной системы, возрастные изменения дыхательного процесса у детей, а также роль дыхания в речевом процессе. Обосновывается, что недостаточно сформированное речевое дыхание у детей с заиканием, одышка и неровность выдоха негативно влияют на беглость речи.*

Также описывается поэтапная технология развития дыхательной функции, методика формирования грудно-брюшного (диафрагмального) дыхания, порядок организации логопедических занятий и методы контроля объема легких с использованием специальных устройств. Показано, что дыхательная гимнастика, особенно упражнения, активизирующие диафрагму, является эффективным средством координации работы речевого аппарата, нормализации речевого дыхания и снижения уровня заикания.

Ключевые слова: *заикание, речевое дыхание, диафрагмальное дыхание, вентиляция легких, жизненная емкость легких, логопедическая терапия, дыхательная гимнастика, дошкольный возраст, речевой аппарат, гипервентиляция.*

INTRODUCTION

Preschool age is one of the most important stages in the physical, mental and speech development of a child. It is during this period that the speech apparatus is actively formed, the processes of sound pronunciation, breathing and articulation are coordinated. The fluency and expressiveness of speech largely depend on properly organized speech breathing, and the consistent, deep and stable process of inhalation and exhalation is the physiological basis of sound production.

In recent years, the incidence of stuttering among preschool children has been increasing. Stuttering is a complex speech defect characterized by a violation of the fluency, tempo and rhythm of speech as a result of involuntary spasmodic contractions of the muscles of the speech apparatus. This problem negatively affects not only the speech process, but also the emotional state,

social adaptation and personal development of the child. In the genesis of stuttering, along with the peculiarities of the functioning of the central nervous system and psychological factors, insufficient formation of speech breathing also plays an important role.

In preschool children, breathing is often superficial and rapid, and diaphragmatic breathing is not fully formed. As a result, the air flow during speech is not sufficiently controlled, exhalation is short and intermittent. This leads to impaired speech fluency, repetition of sounds and syllables. Therefore, special speech therapy technologies based on breathing exercises play an important role in the process of stuttering correction. Breathing exercises can activate the diaphragm, prolong exhalation, and develop speech breathing control skills. Systematic and step-by-step respiratory gymnastics exercises help children coordinate the activity of the speech apparatus, reduce excessive muscle tension, and increase speech fluency.

Humans and every other living organism take in oxygen from the external environment and release carbon dioxide gas is called respiration. Important physiological processes take place during respiration. When the organism breathes, air from the external environment enters the lung cells, from there into the blood, and through the blood, it supplies all organ cells with O2, and the CO2 gas formed during the metabolism in it passes into the blood, through the blood to the lungs, and from there into the external environment. At the same time, with the participation of the received O2, products, fats, carbohydrates are oxidized in cells and tissues to generate energy. As a result, all physiological processes in the body, such as excitation, movement, reproduction, etc., are carried out at the expense of this energy. In addition, the respiratory organs are also involved in the perception of the smell of various substances and the pronunciation of speech.

Respiration is divided into external and internal respiration. External respiration refers to the exchange of gases between the lungs and blood.

In internal or interstitial respiration, gas exchange occurs between tissues and blood. Atmospheric air contains 20.9% O2, 0.3% CO2, and 79.3% N2. Other substances are present in small quantities. If the CO2 content in the air reaches 4-5%, a person becomes weak, the heart rate increases, he has a headache, vomits, and may even faint. The respiratory system is divided into upper and lower parts. The upper part of the respiratory system includes the nasal cavity, larynx, trachea, and bronchi. The lower part of the respiratory system includes the bronchi, lungs, and the thin elastic connective tissue membrane that surrounds them, the pleura. Lung tissue is divided into right and left parts. The right lung consists of 3 lobes, and the left lung consists of 2

lobes. The main part of the lung tissue is made up of the pulmonary alveoli, which are surrounded by tiny blood vessels called capillaries. The air entering the alveoli fills them, and the alveoli provide gas exchange. During gas exchange, oxygen passes into the blood. Red blood cells (erythrocytes) in the blood bind oxygen and deliver it to the tissues. Carbon dioxide in the tissues exits through the alveoli. The blood concentration of gases during inhalation and exhalation, the amount of O2 and CO2 gases, varies. During inhalation, 500 ml3 of air enters the lungs. The total amount of gases in the lungs is called the vital capacity of the lungs. In healthy people, it ranges from 2500 ml3 to 3500 ml3 on average.

The respiratory organs include: nasal cavity, larynx, larynx, trachea, bronchi, lungs and pleura.

Nasal cavity. At birth, a person's nasal cavity is small and thin, and is not sufficiently developed with mucous membrane, blood and lymph vessels, nerve fibers, receptors and small hairs. In addition, the frontal sinuses and lower nasal septum are not developed at all. After 2 years, the maxillary sinus begins to enlarge, and the frontal sinuses are fully formed by the age of 15.

At birth, a child breathes abdominally. Breathing through the nose is formed at 3-4 years, and gender differences appear at 7-8 years. Boys have abdominal breathing, girls have chest breathing. This process is completed by 14-15 years. By the age of 10-14, the shape of the nasal cavity changes and increases in size. The volume of the nasal cavity increases by about 2.5 times as the child grows older. When breathing, the air entering from the external environment passes through the nasal cavity, warms, moistens and is cleaned of dust particles. After that, the air in the nasal cavity passes through the larynx into the larynx.

The larynx is located opposite the 4-5 cervical vertebrae, and in newborns it is short, narrow and funnel-shaped, consists of a mucous membrane, muscles, and is supplied with blood and lymphatic vessels. The larynx, in addition to performing its respiratory function, is also the 1st-order voice apparatus that produces sound. Its inner layer consists of a hairy mucous membrane, and its wall is composed of cartilage and muscle. In the middle of its inner layer are the vocal cords and muscles, as a result of their movement, contraction and relaxation, sound is produced by opening or closing the vocal folds. Air passes into the trachea.

The larynx or trachea. The trachea begins in the lower part of the larynx, that is, opposite the 6-7 cervical vertebrae, and continues to the 5th thoracic vertebrae. The trachea is short and thin in newborns, consisting of cartilage and a muscular layer. Its length is 3-4 cm, at 5 years old it is 5-6 cm, at 10

years old it is 6.3 cm, at 15 years old it is 7.5 cm, and in adults it is up to 9-13 cm. Its length and the size of the cartilage increase with age. The mucous membrane of the trachea is thin, richly supplied with blood and lymphatic vessels. That is why dust particles and microbes quickly settle on the mucous membrane of the trachea and are transferred to the bronchi.

Bronchi. The trachea is divided into the right and left bronchi at the front of the chest. The bronchi grow rapidly until the age of 7, enter the lung tissue, branch into many small bronchi, like a tree branch, and gradually form alveoli.

Lungs. The lungs are located in pairs on both sides of the chest, consisting of the right and left lungs. Each lung is conical, with the upper part called the tip, and the lower part called the base. As children grow older, the weight and volume of the lungs increase. In newborns, the weight of two lungs is 50-57 g, in 1-2 years 225 g, in 5-6 years 350 g, in 9-10 years 395 g, in 15-16 years 690-700 g, and in adults 1000 g. The lung volume is 70 cm3 in newborns, 270 cm3 in 1 year, 640 cm3 in 8 years, 680 cm3 in 12 years, and 1400 cm3 in adults.

Lung growth is mainly due to the increase in alveolar cells

In newborns, the size of the alveoli is 0.5 mm, at 3-4 years old it is 0.12 mm, and at 15 years old it is 0.17 mm. In newborn boys and girls, breathing is abdominal, that is, mainly due to the diaphragm. The movement of the upper parts of the chest is very small. As the child begins to walk upright at the age of 2, the chest becomes more vertical, and chest-type breathing begins to develop in the child. From the age of 3, chest-type breathing begins to occur. In children, breathing is faster and shallower than in adults. As the child grows older, the air capacity of the lungs increases.

The lungs are covered with a special membrane or pleura. One sheet of pleura covers the inside of the diaphragm during chest breathing, while the other sheet surrounds the lungs, and these sheets are inconspicuously fused with each other near the lungs. Between the closed sheets is a cavity called the pleural cavity, which contains a small amount of fluid, which moistens the sheets and prevents them from rubbing against each other.

1. Vital capacity of the lungs. The total amount of air that enters the lungs during a strong breath is called the vital capacity of the lungs.

In this case: normal breathing. 500 ml

reserve inhalation and exhalation 1500 ml

residual air 1500 ml

Newborn children breathe 15-20 ml with each breath, 35-50 ml at 6 months, 60 ml at 1 year, 115 ml at 2 years, 130 ml at 6 years, 160-170 ml at 11 years, 225 ml at 14 years, and adults breathe 500 ml.

The vital capacity of the lungs in each person depends on their height, weight and age.

The vital capacity of the lungs in young children is as follows. It is difficult to determine the vital capacity of the lungs in newborns; it can only be determined at the age of 3-4 years.

3-4 years old 400-500 ml

5-6 years old 800-1000 ml

8-10 years old 1350-1500 ml

14 years old 1800-2200 ml

15 years old 2500 ml

In normal adults, this figure is 3000-3500 ml, and in good athletes it is up to 5000-6000 ml.

The vital capacity of the lungs is determined by a spirometer.

Minute volume. The amount of air that enters the lungs in 1 minute. This amount is 650-700 ml in infants, 2600-2700 ml at 1 year, 3500 ml at 6 years, 4900 ml at 14 years, and 5000-6000 ml in adults.

3. Lung ventilation. Lung ventilation is indicated by the minute volume of the lungs. The circulation of air in the lungs during breathing is called lung ventilation.

When a child breathes quickly, lung ventilation is high. Newborn children breathe 60 times per minute, 25 times at 7 years, 15-20 times at 13-15 years, and adults breathe 16-18 times per minute.

For 1 kg of O2 consumption by children's organs, 1400-1500 cm3 of air must pass through the lungs per minute. In adults, this indicator is 300-40 Stages of work on the development of respiratory function and speech breathing in children with speech disorders.

The work includes the main stage, which must be carried out in strict sequence. The duration of each stage begins only with the results of the work.

Before starting the exercise, children should not only be examined by a pediatrician and a neuropathologist, but also by an otolaryngologist in order to obtain a conclusion about the patency of the nasal passages and the condition of their mucous membranes. Children with acute respiratory diseases, rhinitis, adenoids are not included in the group.

It is advisable for a speech therapist to check the respiratory function of children when they are admitted to a preschool educational institution, and then repeat the procedure in the middle and end of the year.

It is recommended to use the devices "Peakflowmeter" and "Children's Speedometer" for testing. With the help of the "Peakflowmeter", the peak volume of the accelerated exhalation is determined using the peak flowmeter.

The data obtained are entered into the children's examination card and allow for an accurate assessment of the dynamics of the vital capacity of the lungs during the training.

The training is carried out using familiar methodological methods, as well as those developed by us. It is also carried out on the basis of the use of a separate content methodology that does not correspond to the respiratory gymnastics of A.N. Strelnikova.

It is advisable that no more than 7-8 children be engaged in the group at the same time.

Stage 1. Preparation for the development of the thoracic-abdominal type of breathing based on traditional methods.

Purpose: to develop the feeling of the movements of the diaphragm and the anterior abdominal wall, that is, the respiratory organs corresponding to the thoracic-abdominal type of breathing.

The stage includes four exercises. The duration of each exercise is 4-5 minutes. The exercises are repeated 2-3 times during the day. Each exercise is studied for a week.

The first stage lasts for the time necessary to develop the thoracic-abdominal type of breathing.

The approximate duration of the stage is four weeks. During this time, the child performs the exercises sequentially, first lying down, then sitting and standing.

In the first sessions, children should maintain active attention when performing breathing exercises.

Observation of children shows that some of them, during the transformation of the body, switch to the upper rib type of breathing, which is learned, and the hands placed on the diaphragm do not perform movements. In this case, the speech therapist places the child's palm on his diaphragm and offers him to "feel with his hand" and see how the abdominal walls move during breathing.

When performing the exercises, the speech therapist monitors that the child's breathing does not accelerate and that his shoulders do not rise. Such control is important, since in children with speech disorders, hyperventilation easily occurs with a significant increase in the volume of exhaled air (the appearance of hyperventilation can be determined by the following signs: paleness of the face, complaints of dizziness and, as a result, refusal to exercise).

Conclusion. In preschool age, the respiratory system is not yet fully formed, and breathing in children is rapid and superficial. This condition also

directly affects the speech process. In children with stuttering, insufficient development of speech breathing, shortness of breath and lack of control over exhalation lead to impaired speech fluency. Therefore, it is important to organize breathing exercises systematically, gradually and on a controlled basis.

Exercises aimed at forming thoracic-abdominal breathing, activating the movement of the diaphragm, and coordinating inhalation and exhalation stabilize the activity of the speech apparatus. Determination of respiratory indicators and dynamic monitoring using special devices allow assessing the effectiveness of the exercises.

Speech therapy technologies based on respiratory gymnastics are an important tool for normalizing speech breathing in children, reducing excessive muscle tension, and increasing speech fluency. This approach provides comprehensive and systematic work in the process of correcting stuttering.

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