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BREATHING PROBLEM IN MUSIC PERFORMANCE

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INTRODUCTION

In modern musicology, the problem of preparing a musician for a concert performance is one of the most urgent. Many scientists study it from the standpoint of repertoire selection, overcoming stage anxiety, methods of psychological self-regulation, etc. At the same time, in scientific investigations and fundamental works, quite little attention is paid to the physiological functions of the body, which affect the state of the concert performer, his stage feeling, psychological mood, etc. In particular, in numerous works on the methodology and practice of playing, the topic of breathing is not disclosed at all, although this process plays an important role in musical performance.

Breathing is the "first and last" function in the chain of physiological processes of the human body. As soon as a person wakes up, the activity of the body increases, muscle tone appears, and the activity of the heart increases. All this is an increase in energy consumption, so breathing becomes more frequent, because the blood must provide the necessary amount of oxygen to the organs and muscles for work, as well as remove metabolic products, in particular carbon dioxide.

Breathing is the main factor in ensuring human vital activity. It also acts as an energy base for the entire body. The beauty of the voice, its melodiousness, sharpness depend on how a person breathes. Stress, emotional trauma, crooked posture and uncomfortable clothes worsen the state of breathing.

Breathing is an integral part of every human life process, musicians-performers are no exception. This process has a great influence on the professional activities of the pianist-performer while working on the instrument.

Therefore, the problem of physiological breathing in musical performance, its specificity in various types of musical practice, has not received scientific study and generalization. That is why the study of this problem is relevant.

Emergence of the prerequisites of the problem and formulation of the problem

As mentioned above, the problems of respiratory physiology are currently being actively studied by specialists in this field. However, researchers of

these processes do not associate breathing problems with musical performance.

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Analysis of existing studies of the problem and formulation of the task

The theoretical basis of the research was the works on physiology (Dineika K., Marunenko I. M., Nevedomska E. O., Bobrytska V. I., etc.), psychology (Bragg P. S., Kyrylenko T. S., Kokun O. M., etc.); theories and history of art (Kobets I. M., Yutsevych Yu.E., etc.) and musical performance (Doroshenko L., Zabolotnyi I. P., Yurko O. O., etc.).

Analysis of current research has shown that the gap in breathing in musical performance remains unfilled.

1. Breathing as a psychophysiological problem

Breathing is the main factor in ensuring human vital activity. It acts as the energy base of the entire organism. In other words, a person cannot live without breathing.

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Oxygen is used by tissues to oxidize organic substances, as a result of which energy is released for the life of the organism. Stopping breathing leads to death, first of all nerve cells, and then other cells. Breathing is also involved in the regulation of body temperature, vocalization, smell, production of some hormones and immune protection.

Normal breathing is carried out through the nose and is characterized by the amount of air that has entered the lungs. A rational method of air mass consumption is of great importance. In the process of breathing through the nose, a smaller amount of oxygen enters the lungs than when breathing through the mouth. This is especially felt during heavy physical exertion, so it is advisable to inhale and exhale through the nose and mouth at the same time. The best way to breathe in peace is to breathe in and out through the nose. Nasal breathing moistens, cleans and warms the air.

Periodic ventilation of the lungs is carried out with a special movement of the chest: inhalation – the chest expands, rises; exhalation – descends. During

the expansion of the chest, the lungs also expand. The pressure in them drops below atmospheric, thanks to which the inhalation phase occurs.

There are nervous and humoral regulation of breathing. Nervous regulation of the breathing process is carried out thanks to a special respiratory center located in the brain. The respiratory center is in a state of constant activity and is characterized by automatism (that is, rhythmic impulses that are transmitted to the muscles by neural connections, which ensures the breathing process). The rhythm of the activity of the respiratory center corresponds to the average frequency of respiratory movements in a person who is at rest[1].

Humoral regulation is associated with an increase in carbon dioxide content, which increases the excitability of the respiratory center, as a result of which the frequency and depth of respiratory movements increases, which leads to the removal of excess CO2 from the body. Nervous and humoral functions of breathing are aimed at providing tissues with an adequate amount of oxygen and releasing CO2[2].

Breathing is controlled by the nervous system. During the experiments of two groups of people – with a strong and weak nervous system, psychologists found that people with a weak nervous system breathe 12 % more often than people with a strong nervous system before starting work. People of the second experimental group have a gradually increasing amplitude of breathing, and when they feel that they cannot work, the frequency of breathing reaches a maximum. If you engage in breathing regulation, the nervous system becomes stronger.

Normal breathing is rhythmic, the depth corresponds to the body's need for air. Inhalation is more active than exhalation. As mentioned, the breathing process can be compared to the work of the heart in terms of its rhythmicity, but with the difference that the breathing process is subject to human will – at will, a person can hold his/her breath, breathe deeply or shallowly, change the rhythm. Scientists note that breathing is the only vegetative function of the body that submits to mind control.

Human breathing involves a complex system of organs that can be divided into 3 groups:

• respiratory tract (upper and lower) from the mouth and nostrils to the vocal cords (nasal cavity, pharynx, larynx). This part of the respiratory apparatus serves as a connection between the lungs and the atmosphere;

[1] Регулювання дихання. URL: https://moyaosvita.com.ua/biologija/regulyuvannya-dixannya/ (Дата звернення: 23.02.2023 р.)

[2] Фізіологія дихання. URL: http://um.co.ua/1/1-3/1-3440.html (Дата звернення 17.03.2023 р.)

• lungs. The movement of the lungs consists in their expansion during inhalation and compression during exhalation, in both cases the lungs passively follow the movement of the chest walls;

• the musculoskeletal system of the chest, ribs and respiratory muscles, which primarily includes the diaphragm, as well as the external and internal intercostal muscles. The diaphragm plays an active role in the breathing mechanism.

There are four types of breathing (according to the types of muscles used in the work of the respiratory apparatus):

• *clavicle* – air enters only the upper part of the lungs, so a small amount of oxygen is collected. From the outside, the active work of the shoulder girdle is visible – the shoulders rise. This type of breathing is characteristic of children during the first months of life;

• *thoracic (costal)* – the diaphragm during inhalation takes little part, remains stationary, or slightly retracts upwards. From the outside, it is noticeable that the abdominal cavity is drawn inward. It is carried out by the intercostal muscles, the diaphragm is almost motionless, the inhalation is not vigorous. Predominant in women;

• *abdominal (diaphragmatic)* – the diaphragm descends during inhalation and rises during exhalation. The disadvantage of such breathing is the small amount of air during inhalation. Predominant in men;

• *thoracic-abdominal (mixed)* – simultaneous functioning of the diaphragm and respiratory muscles of the chest. The largest amount of air enters the respiratory system. It is most common among both sexes. Observed with increased breathing.

In an adult, the thoracic-abdominal type of breathing prevails. With such breathing, ventilation of the lungs improves, venous return from the abdominal cavity to the heart is facilitated. Under normal conditions, the mixed type of respiration occurs in the body as follows:

– Smooth, slow inhalation through the nostrils, without noise and interruptions. Passing this path, the air is cleaned of dust and other impurities, warms up and enters the larynx already warm;

– From the larynx, air enters the windpipe (trachea), the trachea is divided into two branches called bronchi. Each bronchus is directed to each lung;

– Air passes to the lower part of the lungs, to the diaphragm;

– The diaphragm descends and provides space for air, presses on the abdominal cavity;

– The abdominal cavity bulges out under the pressure of the diaphragm and takes on a rounded shape;

– Air enters the middle part of the lungs, the lower ribs expand;

– The air goes to the upper part of the lungs, for this the lower part of the abdomen is retracted, the diaphragm rises, which squeezes out the air, presses on the chest cavity, due to which the air rises to the upper part of the lungs.

Diaphragmatic (abdominal) breathing is also defined as normal. In everyday life, this is the most used type of breathing, but a sitting posture hinders it, as it interferes with the movement of the diaphragm. The muscles of the shoulder girdle are more often connected in case of serious diseases or intensive work.

With diaphragmatic breathing, two types of breathing movements function – calm inhalation and exhalation and forced inhalation and exhalation. Calm breathing is carried out passively, muscles do not contract. Forced uses a number of muscles in his work, namely: neck, spine, scapular and dentate muscles. In both cases, the diaphragm and external oblique intercostal muscles work.

Abdominal breathing is considered calm, it calms the nervous system. It also normalizes the work of the heart, helps to get rid of heart and lung diseases. Calm, deep and slow diaphragmatic breathing is a good opportunity to calm the nervous system and prevent emotional shock (neutralize stress). Abdominal breathing also has a healing effect on the processes of digestion (activates the activity of the pancreas and liver) and pulmonary ventilation (cleanses the lower part of the lungs of microbes).

Absence of breathing makes it impossible to exchange substances and maintain vital processes of the body. Saturation of blood with oxygen makes it possible to increase metabolism during physical activity, that is, to increase physical performance.

The following phases of adjusting breathing to work are known:

1) response – in the first seconds, breathing intensifies and accelerates;

2) adaptation – breathing gradually deepens and reaches its steady state, sometimes even calmer than the initial one (such a state occurs on average 3–4 minutes after the start of work);

3) end of work – lung ventilation drops, breathing remains elevated, but 10–20 minutes after the end of work, breathing returns to normal.

At the end of the work, due to the lack of a motor aspect, there is a drop in pulmonary ventilation. The recovery period begins with increased breathing and a gradual return to normal. This is achieved only when CO2 (carbon dioxide) is removed from the body.

Having studied the phases of breathing during work, it can be seen that the increased level of ventilation of the lungs is observed at the beginning and at the end of the process of motor activity. It is important to note that the more often a certain work is performed, the faster the process of adaptation and return to a normal state of breathing takes place after its completion.

It should be noted that fatigue depends on how difficult or easy it is for a person to breathe. According to the researchers, fatigue is a temporary decrease in working capacity under the influence of prolonged or intense work. This normal physiological process is accompanied by changes in the body, which are designed to protect it from overstrain, damage and exhaustion.

Breathing processes are also affected by the general state of the human body. Irritation of the respiratory system can be caused by:

a) lack of oxygen in the body and a large amount of carbon dioxide;

b) irritations that lead to an increase in the breathing rate.

Other factors can affect the rate of breathing: sudden pain, cooling or overheating of the body, fright, heart disease, etc. Breathing has a close connection with blood pressure (a sharp increase in pressure causes a delay in breathing, and vice versa – a sharp decrease in pressure – accelerated breathing).

A person's vital activity and breathing are negatively affected by such conditions as neuropsychological tension and stress.

A stressful state includes psychological and physiological aspects, which have a certain relationship with each other and are determined by the following stages:

1) the stage of anxiety – there is a concentration of the body's protective reactions, which leads to changes in the physiological state, namely, to an increase in blood pressure, an acceleration of the heartbeat and breathing;

2) stage of adaptation – the stage of anxiety gently flows into a state of stability, during which the body freely resists the effects of stress, blood pressure, heartbeat and breathing return to a state that is close to and sometimes coincides with the initial state;

3) stage of exhaustion – the body's reserves are depleted, in a stressful state, each individual reacts differently. Exhaustion can be accompanied by both an increase and a decrease in blood pressure, heart rate and breathing.

The stage of adaptation can be called both physical and psychological adaptation, adaptation of the organism to environmental conditions. The emergence of the stages of the body's reaction to stress can be caused by various factors, in particular: increased responsibility for the actions taken, insecurity, lack of information, mastering new types of activities, the influence of the environment and the negative environment of people, etc.

The feeling of anxiety can be provoked by the expectation of failure, as a result of which, the respiratory process deteriorates and changes, which can lead to a superficial (clavicular) type of breathing. This type of breathing has negative consequences on the body in the form of increased heart rate and pressure, shortness of breath, increased sweating, facial redness and hypoxia.

Oxygen starvation (hypoxia) weakens the work of all body organs, primarily the brain, and leads to nervous conditions and exhaustion.

Screaming is a manifestation of stress, which is also associated with the breathing process. According to the guide, a scream is a deep, forced exhalation, a strong sharp sound of the voice, it occurs due to the tension of the vocal cords and is a natural physiological reaction of a person. Screaming, like deep exhalation, helps relieve tension, but this method is not acceptable in society.

Sobbing, which is understood as loud crying, accompanied by sobbing and choking, tears – is also one of the forms of stress expression, as well as a part of breathing. When a person sobs, he fills his full chest with air and lets out air, screams and tears. After this type of breathing comes calmness, relaxation and even sleep. The internal balance of the body is restored.

Scientists emphasize that not only the physiological, but also the psychological state of a person depends on how he/she breathes. Breathing is closely related to a person's emotional state. Emotions are one of the main regulators of life, they are an individual's response to the influence of various stimuli, which are positive (related to pleasure) and negative (dissatisfaction). During joy, grief, stress, and an unforeseen situation, the unused energy of the body turns into body spasms, which complicate motor activity, including the muscles of the respiratory system, which leads to difficulty breathing.

The duration of the manifestation of emotions is divided into reaction and emotion as a state. An emotional reaction is a short-term emotional state, during which breathing suddenly enters an accelerated pace and begins to interfere with the performance of both external and internal functions of the body. Emotional state – a state in which a person is during a certain time, or even a lifetime, is reflected through personal characteristics, but is not a personality trait.

The body enters an emotional state gradually, so physiological changes, including breathing, do not lead to a deterioration of the body's condition. According to the experiments of psychophysiologist O. Kokun, there are several stages of emotions, which are accompanied by the respiratory system in different ways:

- motivational – an emotional experience associated with the presence of a goal and a biased attitude towards it. Breathing in this case speeds up as you approach the goal.
- reinforcement – is revealed in the process of learning and memorizing. If a person is completely immersed in these processes, then breathing deepens and becomes rarer.
- communicative – observed during the transfer of one's experiences to people, informing about certain events and attitude towards them through

facial expressions, gestures, posture, intonation. The more actively a person communicates, the faster the breathing.

▪ reflective – expressed in the overall assessment of events. Breathing speeds up or deepens depending on the event and the person's reaction to this event.

▪ switching – it turns out that emotions encourage a person to change his/her behavior[3].

"There are several factors in connection with which we can talk in more detail about the work of the respiratory system: comfort during the shift, emotional state and the situation in which a person is" – emphasizes O. Kokun[4].

Indicators of emotions are indicators of: skin-galvanic reaction[5], cardiovascular activity (heart rate, blood pressure), breathing, eye movements, facial expressions, muscle activity, body temperature, etc.

Often, musicians, not understanding the specifics of breathing processes, suppress (hold) their breath, which makes the tension even greater. The more the concert performer worries, his breathing deepens and intensifies. The reason for the heightened emotional state of a musician can be concert (emotional) excitement, as well as the fear of losing the text, not conveying everything intended to the listener, as well as side factors, in particular, thoughts about one's stage appearance, the audience's mood, its disposition to perceive music, etc. According to the definition of psychologist T. Kyrylenko: "The state of anxiety arises in connection with possible misfortunes, unforeseen situations, changes in the usual environment and is accompanied by specific experiences: excitement, apprehension, disturbance of peace. Which can lead to a state of stress"[6].

A heightened emotional state is caused by emotional sensitivity to the music itself, since emotions are the content of music. Internal emotional responsiveness to music, associated with understanding the emotional content of the performed work. External emotional responsiveness to music, associated with psychomotor reactions to the components of musical expressiveness; psycho-emotional states caused by the extreme conditions of

[3] Психофізіологія емоцій: реферат. URL: http://referatu.net.ua/newreferats/23/189332 (Дата звернення 25.02.2023р.)

[4] Кокун О. М. Психофізіологія : навчальний посібник. Київ : Центр навчальної літератури, 2006. 184 с.

[5] The skin-galvanic reaction testifies to the activity of the autonomic nervous system, one of the indicators of which is the process of sweating, which manifests itself when the level of psycho emotional tension changes.

[6] Кириленко Т. С. Психологія: емоційна сфера особистості : навч. посібник. Київ : Либідь, 2007. 256 с..

a concert performance. Scientists, in particular, claim that general emotionality forms the basis of all emotional manifestations of a musician.

Frequent and shallow breathing increases the excitability of the nerve centers, while deep breathing decreases it. Inhalation, according to physiologists, is associated with the excitation of the nervous system, and exhalation – with its inhibition. If you lengthen the inhalation and shorten the exhalation, the functions of the entire nervous system are mobilized. If you need to raise the tone of the nervous system, you should use mobilizing breathing.

During anxiety and fear, a person begins to breathe intermittently, suffocate, and because of this, panic and fear increase even more. Concentration on deep breathing reduces fear, the brain is involved in work. If you need to activate breathing, you need to increase inhalation and decrease exhalation, if you need to calm down, then vice versa.

Novelty, unusualness, suddenness, excessive motivation – signs that most often provoke emotional outbursts, lead to a change in the structure of breathing. In particular, everyday is excessive motivation, which can be divided into two types:

• before action – there is excitement, anxiety that increases the body's need for oxygen. All this disappears when the concert performer begins to work on the piece or perform it.

• after the action. An example of such motivation can be the following situation: after the performance, the concert performer, thinking about his performance, remembers unsuccessful moments, technical imperfections in the game. Such mentions stimulate breathing and, accordingly, cause a need for a large amount of oxygen.

It is important for musicians to know how the respiratory system works and understand its correct use. Let's analyze the breathing process using the example of a concert performance. The presenter's appearance on the stage to announce the number in which the musician will perform is the first stage of excitement and an increase in his energy expenditure. The very moment of "backstage" adjustment can also be counted even before the first stage, and the performance itself is already the second stage, during which the concert performer concentrates his attention as much as possible, is emotionally excited, and accordingly his/her breathing deepens.

Sometimes, during the game, breathing is subordinated to the movement of the hands and body, the sensations associated with the imagery of the piece being performed, technical difficulties, etc. The last note is the transition to a new stage of respiratory activity in the process: the performer is still in an excited state, but gradually his breathing slows down, transitioning to a calm natural state. This happens mostly in most cases, but sometimes, during the

performance, there may be a feeling of "lack of air", or on the contrary, deep breathing, which prevents the performing process, control of one's game. Also, a musician can breathe very loudly, which disturbs not only him, but also the listener. Such deviations are explained by the lack of coordination between muscle work and breathing, and the musician should concentrate on this during the preparation for the concert. Untrained breathing during a public speech has a negative effect on the result: shortness of breath, reddened face, increased heart rate.

A certain unfortunate moment during the performance itself requires the mobilization of thoughts, energy and distracts attention from an important component – free breathing, which most often leads to muscle contraction (for example, facial muscles). This makes breathing difficult, sometimes even delayed. This has an adverse effect on the performance of the work. A person may have frequent headaches from depressed states. Muscles in a spasmodic state do not "breathe", and clenched teeth speak of suppressed aggression, which can often be seen in performing musicians.

Continuous training of the respiratory system by tensing, relaxing and contracting the respiratory organs will lead to trained nervous processes and the ability to calm the nervous system. Breathing exercises improve blood oxygen saturation and the human body restores its normal physiological state and well-being.

Since the respiratory system is a muscular part of the human body, all sensations are transmitted to the respiratory system, which leads to changes in the frequency and depth of breathing. The musician's respiratory muscles are not only responsible for the speech (voice) function (the beauty of the voice, its melodiousness, sharpness depend on how a person breathes), their work depends on the posture of the performer behind the instrument. With the wrong posture, breathing can go astray, be delayed, etc. Therefore, while playing the instrument, the musician must pay a lot of attention to his/her posture, find a comfortable position behind the instrument.

If under some circumstances such an opportunity is not available, the breathing process becomes more difficult. The reason for this is the poor supply of oxygen to the muscles. A small amount of transported oxygen to the concertante's organs, limbs, and muscle connections leads to the accumulation of lactic acid, which reduces muscle performance and leads to fatigue and cessation of work.

Therefore, breathing is the main function that ensures the vital activity of a person. The respiratory process takes part in the production of hormones, voice formation, regulation of body temperature, immune protection, sense of smell, but its main function is to saturate the entire body with oxygen. Without

the work of the lungs and their transport of oxygen to all organs, the body will not be able to function.

2. Breathing as a factor of the musical performance process

The breathing process during singing performs the function of sound production, because the very range of sound, its duration and dynamics depend on correctly placed breathing. The intensity of breathing also depends on the nature of the music, figurative content, dynamic and agogic nuances, author's remarks, etc. Therefore, every singer needs to train his breathing apparatus, learn to consciously manage its capabilities. The singer must be able to arbitrarily change breathing modes, control the duration of inhalation and exhalation, the amount of air during these processes.

Without a set singing breath, all efforts to master song material or stage language will lead to zero results at best, and at worst to complete or partial loss of voice. After all, the singer often mistakenly uses only the ligaments in sound production, pressing them to amplify the sound.

Correct breathing is primarily the use of the full volume of the lungs, the use of the muscles of the abdominal press and the diaphragm during breathing, and the use of natural resonators that strengthen and enrich the sound of the voice. In this case, the vocal performer will never get tired of his throat from long singing.

A singer's voice sounds when a jet of air forces the vocal cords to vibrate, so for every singer, correct breathing is a necessary condition for high professionalism and the opportunity to show their level of knowledge, skills and abilities. You need to know that although breathing and sound interact, sound is dominant in this pair, but its quality directly depends on breathing. The vocalist's timbre also depends on breathing, but precisely on the force and pressure with which the air stream enters. Inhalation plays an important role in the singer's breathing, because the quality of sound production depends on the quality of inhalation. The speed of inhalation and the time of its delay depends on the tempo of the piece being performed.

The vocalist's breathing is deep (down and to the sides), it is impossible to move the dome of the diaphragm to a high position, so as not to cause a breath hold. The costo-abdominal type of breathing cannot exist without communication with the resonators and the position of the sound, it will not be able to ensure the correct sounding of the voice. The lower costal-diaphragmatic (bone-abdominal) type of singing breath can be characterized as mixed.

Vocalists pay great attention to the issue of correct breathing. While studying, they have the discipline "Voice setting" in which they master the skills of placing the voice on the breath, holding the support. A vocalist-

performer must follow the smoothness of sound management and the smoothness of breathing for each sound. A sharp impulse of breathing through the diaphragm is immediately reflected in the sound quality. The main task of every singer is to learn how to use breathing techniques and technical means correctly, because when a singer constantly concentrates on how to breathe better and what technique to use, singing loses the freedom of self-expression, the opportunity to focus on the interpretation of the work. Control of air use should be constant. With experience, the vocalist no longer thinks about it, uses his breathing capabilities subconsciously.

The muscular system of the abdominal cavity plays an important role: it takes part in the respiratory process and affects the evenness of exhalation, helps the singer to perform high notes. The more developed the musculature of the respiratory system, the better the muscles of the abdominal cavity work, the stream of air will come out smoother and calmer. If the musculature is weak, the vocalist must work on its development, using different techniques and types of breathing, in particular, doing exercises without the participation of the voice, and only over time add a clear pronunciation of words.

The support of the vocalist's breath is the tension of the muscles (diaphragm) during inhalation and their gradual relaxation with exhalation. It is important that during the singer's exhalation, the air-sound jet (with the participation of the abdominal press and the diaphragm) is directed to the resonance point, which creates resistance to breathing and sound. In order for the voice to sound good, there was respiratory and sound support, the vocalist needs to use not only the interaction of the vocal and respiratory centers, but also to use emotionality, which is necessary in the process of musical performance.

Of great importance in the respiratory processes of the singer is the posture, which should be natural and comfortable for him/her. Shoulders thrown back a little, chest raised and head held straight, you need to stand straight with emphasis on both legs equally or slightly put one of the legs forward – the classic posture of a vocalist-performer. In the process of performing, it is not recommended to lean on anything, or to keep the body in tension.

Breathing is of particular importance for a vocalist, which should be silent, without any overtones. Breathing with an undertone is a sign of a "worn out" vocal apparatus, the inability to breathe properly or the singer's bad taste. Short breaths, which are not enough for phrases, are the result of weakness and lack of energy of the vocal cords. Sometimes, such a defect produces a hissing sound.

Vocal inhalation is determined by a technical or creative task, the mouth and nose must be involved in breathing, because air evenly enters from the

nose into the lower part of the lungs, and from the mouth – into the upper part. Air taken only through the nose can lead to unpleasant sound and noise. This is especially evident at a fast pace. At the same time, breathing only through the mouth dries the mucous membrane of the larynx and mouth.

The vocalist's breathing is also a powerful factor in conveying expressiveness. *Piano, forte,* filling, various techniques and methods of weakening and strengthening the sound, the vocalist achieves exclusively by regulating breathing. At the same time *piano,* certainly, needs less air, but even in this case, the performer must not forget about support during performance.

"Bad" breathing or improper use of breathing leads to false intonation. Loss of support causes lowering of intonation. This happens, mainly, during the performance of a piece on the piano, because such dynamics require skillful regulation of breathing. Therefore, the strength of breathing and resistance in different dynamics, different ranges and different registers is different. The distribution of breathing in the thoracic register is much smaller than in the head one. The insufficient amount of air supply in the upper and head register leads to the fact that the sound "sits" on the throat.

The performer's attention is always directed to creativity, revealing the artistic intent of the piece, dynamics and conveying emotions, all this ensures professionally staged breathing, the ability to correctly and economically distribute air.

A common respiratory defect in singers is: excessive intake of air, bulging of the abdomen, chest, which leads to a tight sound, improper functioning of the respiratory apparatus. Forced exhalation is the main cause of losing good vocalists and spoiling their voices. If the singer has natural breathing, there is no need to interfere and change his natural skills, it is only necessary to achieve a soft exhalation without losing the freedom of breathing.

Correct breathing is no less important for a conductor than for a singer and wind player. Improper breathing leads to fatigue, accordingly, a decrease in the energy and expressiveness of the conductor's movements, which affects the character of the music and its performance as a whole.

It should not be forgotten that the preservation of a conductor's energy depends on complete muscle relaxation, and free breathing and its correct organisation can help. For example, convulsive breathing, due to poor oxygen supply to the lungs, leads to muscle contraction throughout the body. It seems that the speed and depth of breathing depends on the tempo of the piece being performed, but this is not the case. For example, athletes make sure that their breathing is steady and constant when running or doing exercises. Similarly, a conductor's breathing must also be controlled. This is one of the features of professional conducting.

It is often seen that at the beginning of a phrase, the conductor shows the choir how to take a breath, takes it together with the singers and holds it until the end of the phrase. This leads to stiffness and a great deal of energy expenditure during the performance. Singing together with the choir also leads to shortness of breath and rapid fatigue for the conductor, because he conducts, sings, reproduces the artistic intent of the work, and conveys its emotional content to the singers. The synchronisation of all these actions requires a significant energy resource, so during a concert performance, the conductor expends a lot of physical and emotional energy.

The conductor must understand the main thing – tension and stiffness of movements cause convulsive and irregular breathing, and vice versa, convulsive, delayed, unnatural, not free, intermittent breathing leads to tension in the muscles of the shoulder girdle, arms, and the whole body. The breathing pattern should interact with the conductor's movement pattern, and the hands should interact with the music. The conductor and choristers (soloists) should be aware that taking a maximum breath is harmful. It is advisable to inhale and exhale at 70–80 % of the lungs' capacity[7].

An important element in breathing for a conductor is the coincidence of movements with inhalation and exhalation. After all, it is known that inhalation coincides with muscle tension, and exhalation, on the contrary, with relaxation. A strong movement "leans" on the inhalation, and a light movement on the exhalation. Athletes know this rule and always follow it, because if breathing is not coordinated with movements, it will be difficult to perform exercise elements, running, etc. and the athlete will not be able to reach the finish line. While inhaling, muscles are mobilised, while exhaling, on the contrary, tension is replaced by relaxation, and excitement by calmness. Therefore, proper breathing in athletes is the key to victory[8]. Most often, the conductor's upward movement of the arms coincides with the inhalation, and the exhalation with the downward movement of the arms, which provides an emphasis on the conductor's "one". It is important that the movements of the hands and breathing are coordinated. The conductor should breathe through the nose, silently, evenly, rhythmically, deeply, calmly, naturally and easily.

The choir director should work with the choristers (soloists) on breathing culture, emphasising that an incorrect, noisy, frequent and very deep breath can lead to incorrect sound production, false intonation, etc. Chain breathing is important for choristers, which is an advantage of choral performance over

[7] Заболотний І. П. Дихання у процесі життєдіяльності і співу. *Мистецькі пошуки: зб. наук.-метод. праць. СумДПУ ім. А. С. Макаренка.* Суми : ФОП Цьома С. П., 2017. Вип. 7. С. 56–61.

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solo performance. With this type of breathing, you can continuously perform long phrases or even an entire piece. A feature of this type of breathing is the feeling of a collective choral ensemble. General choral breathing is also a component of choral technique, because this type of breathing allows you to skilfully perform pauses and caesurae, to feel each other in a large group.

The breathing of a brass performer differs significantly from physiological breathing. Performing breathing is controlled and subordinated to the artistic and imaginative requirements of a piece of music, unlike physiological breathing, which occurs spontaneously. Natural breathing has a small volume, approximately 500 cm3, which fully satisfies the body's needs for normal life. When playing wind instruments, the entire lung capacity of 3500 cm3 or more is mostly used.

Performing breathing has a non-rhythmic amplitude that depends on the nature and construction of the musical phrases being performed. The difference between physiological breathing and performing breathing is a significant expenditure of physical strength.

When playing wind instruments, breathing mainly takes place partially through the nose and mouth, and physiological breathing takes place through the nose. Natural breathing is passive and takes place without control, executive breathing is based on the support of the diaphragm, it is spent sparingly, in accordance with musical phrases. In conditions of resistance due to the musician's cane or lips, greater efforts are required from the respiratory muscles, which increase when playing in the upper register or when playing *forte*.

A performing brass player's breathing pattern cannot be characterised by the inhalation alone. A performer can take in air in a thoracic breathing pattern and then release it into the abdominal region. This happens during a continuous (without pauses) performance of a virtuoso or cantilena piece where there is no convenient place for a deep abdominal breath, because diaphragmatic breathing is more convenient when playing wind instruments.

The breathing of a brass musician depends not only on the type of instrument and timbre, but also on the duration of musical structures and the depth of the caesura. Under conditions of forced breathing (the breathing of a wind performer), it is impossible to determine the types of breathing in their purest form, because the large supply of air required for playing cannot be obtained by contracting individual parts of the respiratory apparatus. The wind instrument performer must ensure that his/her breathing is accompanied by the least amount of energy expended, causing the least amount of body tension and muscle effort.

Abdominal inhalation is quick and easy thanks to the great mobility of the diaphragm. The strong and flexible abdominal muscles satisfy the need for

intensity and good exhalation regulation. Diaphragmatic breathing does not have such negative effects as laryngeal tightness, stiffness of the tongue and lower jaw, which has a positive effect on the timbre and expressiveness of the wind instrument. The greater mobility of the diaphragm has a positive effect on the musician's health.

The use of diaphragmatic breathing is recommended in cases where rapid breathing is required in a limited time, i. e. diaphragmatic breathing cannot be the main breathing method of the brass player.

With the mixed type of breathing of a brass musician, inhalation occurs due to a large expansion of the chest in the transverse and longitudinal directions. This expansion occurs due to the lowering of the diaphragm, the raising of the ribs and the widening of the intercostal spaces. The mixed type of breathing has all the qualities of diaphragmatic breathing, but at the same time provides a much larger volume of inhalation, increased gas exchange in all parts of the lungs and an even distribution of the load on all respiratory muscles. Chest-abdominal breathing is the most natural and common type of physiological breathing. Mixed breathing in brass musicians is the optimal type of performance breathing.

During thoracic-abdominal breathing, there is a need to tighten the lower abdomen – a lower-abdominal mixed type of breathing. This type of breathing, combined with the sensation of air flowing into the sides and back, provides a very large volume of inhalation. Characteristic of this breathing is a feeling of full support coming from the very bottom of the airways, which creates conditions for fine regulation of exhalation.

The lower abdominal type of breathing is the most rational for playing wind instruments. It is contraindicated only for those musicians who have an occupational disease of wind players – inguinal hernia. In order to prevent this type of breathing from leading to diseases, it is necessary to strengthen the muscles of the lower abdominal wall with special exercises.

It can be concluded that the type of breathing that involves the diaphragm is practically suitable. The most appropriate type of breathing for playing wind instruments is the thoracic-abdominal type, during which the lung cavity is filled with air to the maximum extent possible, the lungs are ventilated, the diaphragm works, and the performer has the maximum amount of time to exhale. The difference between thoracic-abdominal and diaphragmatic breathing is only in the depth of the respiratory excursions, so during these types of breathing, different time is spent on delivering air to different parts of the lungs.

As you exhale, a jet of air enters the narrow opening between the lips, the culmination of the entire sound production process. The air that passes through the narrow opening between the reed plates creates a sound wave that

corresponds to a specific musical sound by means of oscillating movements. The need to exhale air in a continuous thin stream under high pressure is very demanding on the performer and puts a lot of strain on the lungs and heart.

Physiologists have shown a connection between respiratory muscles and other organs involved in sound production. Supported breathing is a stimulant for the performing brass player's laryngeal apparatus, which increases its performance. The specificity of performing breathing has the least need for muscle energy expenditure, without tension and fatigue of the body, so that the performer can achieve the highest performance skills.

Breathing patterns include a well-defined inhalation, which should be unforced with good ventilation of all parts of the lungs and an even load on all respiratory muscles, and, if necessary, should be fast and capable of taking in a large volume of air. The basis of breathing is the ability of a person to control this process. Physiological breathing occurs unconsciously, so for beginners, set breathing is a problem because it needs to be controlled all the time.

Inhale the air smoothly and quietly. Noisy or raspy breaths indicate the presence of obstructions in the airways that may persist during the performance of the piece, which will negatively affect the quality of the wind instrument performer's sound.

The respiratory system of a brass musician is a very complex system; during playing, breathing includes a resonant, corrective and musical-expressive function. Each sound requires a certain amount and density of breath. Dynamic filigree also requires the skill of the performer and a certain reserve of the musician's respiratory system. Respiratory vibrato, interval technique, timbre colouring, different types of attack and strokes also depend on breathing and the natural capabilities and abilities of the performer and his or her respiratory system. Artificially holding a musician's breath while playing is associated with a deviation from normal physiological breathing, which contributes to a violation of gas exchange in the lungs due to insufficient air flow into the body.

For many centuries, breathing while playing wind instruments was not studied and was based on scientific research and methods of vocalists and vocal teachers, which led to mistakes in training, the formation of the respiratory apparatus of wind performers, and resulted in occupational diseases. The transfer of breathing techniques from the practice of vocalists suggests that wind instrument performers did not sufficiently understand the specifics of the breathing of a wind player and its difference from that of a vocalist.

The vocal cords of vocalists are the only obstacle to the movement of the air jet, while the closed mouth, the resistance of closed lips or tongue or reed,

the narrow mouthpiece opening, the instrument cavity, valves, etc. become obstacles for a brass player, so it is understandable that the performer's exhalation is more intense than that of a vocalist, which causes active work of the abdominal muscles.

The professionalism of a brass musician is determined by a very short but productive inhalation and the ability to correctly distribute the power and duration of the exhalation. The uniform movement of the exhalation during the performance depends on the duration of this process; the evenness of the exhalation is of great importance in the sound of the instrument and shows the high level of the musician's breathing technique.

For a musician, technically correct performance breathing is of great importance. They should not take a breath at every pause, as this can lead to rapid fatigue and contradict the content of the piece. In a musician's practice, the time of inhalation is determined not mathematically, but by the inner sense, his or her natural musicality, phrasing and sense of caesura.

An important component of the performance skills of wind musicians is the coordination and correlation between breath and lips, tongue, and fingers. The coordination between the lips and the breath is essential in preventing incorrect or false intonation. It is important for the performer to imagine the pitch and duration of the sound in advance.

Breathing also plays an important role in achieving freedom of muscle movements of the finger apparatus, as the respiratory centre is closely connected to the human nervous system, and if there are disturbances in the respiratory cycle, they will cause tension in the whole body. The movement of the respiratory centre, lips, tongue, and fingers must be coordinated. Otherwise, this leads to a deterioration in technique and a performer's stressful state, which can have consequences for the brass player's concert performance.

The performance process for pianists is a complex physiological process that requires the complete mobilisation of the whole organism. As already mentioned, any physiological process in the human body is preceded by inhalation. A deep breath before starting to play is not established immediately, but in the course of lessons, through years of practice on the instrument. Often, a performing pianist intuitively adjusts to the comfortable operation of the respiratory system.

The breathing attitude to performance gives the pianist a sense of support and the opportunity to feel their own body – arms slightly raised, stomach tightened. To achieve this feeling, the pianist must have abdominal breathing rather than superficial chest breathing. At the same time, the laws of musical presentation of material provide for short-term breath hold and its distribution over the phrase, rather than exhaling at the first sound of the piece.

Performers often think of breathing as expanding the chest, but in reality, it is mainly the diaphragm that works in breathing. The movement of the chest affects the rhythm and movement of the piano, so breathing through the diaphragm is very important when playing the piano.

Breathing is also related to the expressiveness of sound, its production, and the sense of phrasing and nuance. Often, due to imbalanced breathing, a performer loses the rhythm and tempo of a piece, so it is very important for a pianist to develop their respiratory system during practice and to monitor how they breathe in certain cases during the performance. You need to breathe according to the nature of the music and the musical phrasing. Correct breathing helps to organise the performance process, convey the subtleties of music, and facilitates the performer's technical tasks.

When playing the piano, the pianist needs a lot of energy, especially for mental activity, so breathing and posture are very important because they affect the supply of oxygen to all organs and systems of the body. For physical endurance, a pianist needs a sufficient amount of oxygen, because oxygen, as already mentioned, is the most important component of the entire body. The factor that determines the supply of oxygen to the whole body is the efficiency of the lungs, and breathing and body position are important components.

Using chest breathing reduces the pianist's endurance and interferes with piano playing, because all the muscles involved in playing the instrument are somehow connected to the chest. By using diaphragmatic breathing, the performer uses less energy and increases the endurance of the game. By using the rib muscles and diaphragm, maintaining the correct posture that allows the lungs to expand to their maximum capacity, the pianist ensures that the maximum amount of oxygen is supplied to all organs.

When working on a piece and speeding up the tempo, the pianist must understand that it is impossible to breathe at a fast tempo as if it were a slow tempo. The faster the tempo, the more notes are covered in one breath cycle. The breathing process must obey the metrical periodicity of the piece.

For a fluid, beautiful sound of the instrument and the transmission of emotions, the pianist must link the interpretation of the piece with breathing and phrasing. The form of the phrases should be vocal, because music in general originated from singing. It is the combination of breathing and phrasing that is an important factor in the improvement of a performer. Every pianist should know that brass players and singers achieve singing by taking the right breath and using oxygen correctly, and transfer these techniques to their profession. A grand piano is an orchestra instrument, and its sound capabilities are quite wide. Knowing and using the correct breathing will help the performer achieve mastery in achieving technical freedom and sound colour.

Exhaling a full lung capacity during a pause will certainly also affect the performance, as it can throw off the breathing rhythm. Therefore, controlling breathing processes is equally important for vocalists, wind players, and instrumentalists alike. Pianists should pay great attention to their breathing in their work.

An important factor for a performing pianist is the posture, because stooping and hunchback makes it difficult to breathe evenly and calmly. The main thing with the correct posture is the feeling of a "core" running along the back, the shoulder blades adjacent to the back, the chest open and the shoulders down. Raising the shoulders may indicate that the performer is using a type of breathing that is not comfortable for him or her, or is nervous, anticipating difficult technical places that are difficult to cope with.

To achieve the correct posture at the instrument, you need to support your feet. This allows you to stand up at climaxes and increase your support on the keyboard. If this interferes with steady breathing, it is advisable for pianists to abandon such approaches to climaxes.

The breathing process should be trained and controlled by the performer during piano lessons (preparation for a performance), because, as a result of physical and emotional stress, the rhythm of breathing is disturbed (breathing is erratic, air retention occurs, etc.), which does not help the performer, but prevents him/her from controlling himself/herself during the game.

Stage breathing, trained during the pianist's home lessons, should be calm, quiet, and the performer should not hold his or her breath, especially at the climaxes.

Adapting the breathing process to the content of the piece can also lead to rapid fatigue. Breathing should be appropriate not only to the content of the piece, but also to the technical difficulties being performed. It also depends on the quality of the instrument and the acoustic conditions.

A concert performance is the result of a musician's intense creative work and is a responsible act for the performer. Being on stage is always a stressful situation. To calm down and prepare the whole body for a stage performance, you need to improve your breathing: breathe calmly, slowly, deeply. Gradually, the nervous state will calm down, and air will freely enter the body. This will relax the muscles, and motor processes will accelerate, which will certainly improve the quality of the performance.

Mostly, convulsive breath holding and, as a result, muscle clamps await the performer when performing virtuoso pieces. The fast tempo, complexity of texture and techniques provoke frequent and shallow breathing. In order to avoid this problem, the performer must find optimal opportunities for normal breathing and pay attention to this physiological process throughout his or her work: practice it at the initial stage of the work on the piece, and eventually

bring the breathing process to automaticity. With the increase in tempo and the complexity of musical thought, the reflex of correct breathing will remain, which will free the pianist's apparatus from stiffness and lethargy[9].

Breathing, like pauses, needs to be given special attention. Breathing makes music truly alive. If a musician doesn't know how to "breathe", the music they perform is dead. Everything must be thought out: longer breaths in sections, smaller breaths in sentences, and even smaller breaths in phrases. Pauses are not a sign of silence. Pauses are silence. As you know, there is no such thing as an absolute pause; they often create such tension that they say more than sounds.

Thus, a concert performance is a stressful situation for a musician. Performers must be able to control themselves both psychologically and physically during a performance, because the physiological state of the concertgoer has a significant impact on the outcome of the performance, and poor health affects the quality of breathing and, consequently, the performance. Proper breathing techniques will help you easily balance your state before and during a concert. Important elements of performance breathing are:

- natural, comfortable and unnoticeable breathing for others;
- use of the diaphragmatic type of breathing;
- calm and soft inhalation and exhalation;
- correct posture and sitting at the instrument;
- coordination of breathing with the reproduction of the artistic idea of the work, its emotional content;
- ability to correct breathing during a concert performance.

CONCLUSIONS

The study of the problem of breathing in the performing arts allows us to draw the following conclusions:

In modern musicology, the topic of breathing of concert performers does not have any thorough scientific research that would be devoted to this topic separately, however, this issue requires solving a number of tasks, including: physiology and psychology of breathing, consideration of issues related to the peculiarities of breathing in the music performance process and determining the place of this process of the body in the preparation of the performer for a public performance.

Breathing is the most important function of the body, with the help of this process, oxygen enters all organs and carbon dioxide is excreted to ensure human life and the full functioning of the body. Working on breath control helps to train the respiratory organs, respiratory muscles, and the area of the

[9] Дорошенко Л. Поради співакам-солістам. Київ, 1958. 94 с.

brain responsible for the respiratory process and prepares the performer for different situations when you need to calm yourself down.

Breathing processes are important not only for vocalists and wind players, but also for conductors and pianists. If the performer has a small amount of air and distributes it incorrectly, he or she will start to suffocate, which will lead to fatigue, loss of self-control, problems in the performance process, in particular, inattention, loss of self-control, etc.

Correct breathing is no less important for a pianist and conductor than it is for a brass player and vocalist. Improper breathing leads to rapid fatigue, contributes to a large number of diseases and is a barrier to performing works on stage with energy, mood and character. The process of conducting, singing or playing instruments should be energy-efficient. Not only complete muscle freedom, but also the correct organisation of the breathing process will help the performer to maintain strength. Muscle cramping leads to cramped breathing, and cramped breathing, on the contrary, leads to tension in the body's muscles. Therefore, along with voice, arm, and body posture, you need to work on your breathing.

Performers must be able to control themselves during a concert performance, both psychologically and physically. By mastering proper breathing techniques, everyone can easily balance their state before and during a concert. Stressful conditions during concert performances are no exception, but not everyone knows how to control themselves in such cases. Nevertheless, the physiological state of a concert performer has a great influence on the outcome of the performance, and breathing plays a significant role in this.

SUMMARY

Breathing is the most important function of the body, with the help of this process oxygen enters all organs and carbon dioxide is excreted to ensure human life and the full functioning of the body. By studying the problem of physiological breathing of performers, we were able to prove that respiratory processes are important not only for vocalists, wind players, but also for conductors and pianists. The aim of this paper is to study the peculiarities of physiological breathing in different types of musician's performance activities. Performers must be able to control themselves during a concert performance, both psychologically and physically. By mastering proper breathing techniques, everyone can easily balance their state before and during a concert. Stressful conditions during concert performances are no exception, but not everyone knows how to control themselves in such cases. Nevertheless, the physiological state of a concert performer has a great

influence on the outcome of the performance, and breathing plays a significant role in this.

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