S.N. Zinatulin
Guidelines on the use of individual inhaler

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The manual describes the main principles use (Frolov's Respiration Training Device, FROLOV'S®, model of 2005). Recommendations were developed based on clinical research in patient care institutions and research centers, including the Russian Scientific Centre of Restorative Medicine and Balneology in Roszdrav, at the Russian State University of Physical Culture, Sport and Tourism, at the Department of Therapeutic Physical Training, Sports Medicine and Physiotherapy at the Moscow State Medical and Stomatological University, in the Novosibirsk Scientific Centre of Clinical and Experimental Medicine.

Guidelines are based on age, adaptive abilities, and physiological reserves. Also, the manual describes parameters for combining aromatherapy with the device, which acts synergistically to increase the therapeutic potential of the training.

The manual is simple enough for anyone to follow, yet detailed enough to satisfy specialists in the area of rehabilitation and prevention, therapeutic physical training, sports and restorative medicine.

Introduction

Breathing is of utmost importance to our health. Every cell in our body depends on the transport of carbon dioxide and oxygen, and proper breathing is necessary to insure this transport.

Science reminds us that oxygen is ultimately taken up within our cells. This is called internal respiration. External respiration is the process occurring in the lungs.

Because it is the cells that use oxygen, we can say that the entire body takes part in respiration. Respiratory exercises have been used since ancient times in medicine for diseases of the respiratory, circulatory and nervous systems, and have been shown to improve metabolism, stimulate physical and mental efficiency, and increase the body's energy reserves. The respiratory program we describe has universal appeal, is safe, clean, and effective for man and woman, child and adult.

A new model of Frolov's Respiration Training Device (FROLOV'S®), an individual simulator inhaler (ISI), was developed so that anyone could effectively train his or her respiration.

Researchers at Dinamika have determined the most important factors that influence breathing, and developed a technique to address those factors. Considering the dependence of different body functions and processes on breathing, principles of self-regulation and body functional balance, it is not surprising that the respiratory technique developed benefits more than just the respiratory system; it benefits the entire body.

This breathing technique addresses several training aspects of breathing simultaneously. Each aspect has a synergistic effect on the others. The end result is not only an improvement of the respiratory system, but in all the systems of the body. Since the respiratory system is connected to, and can unite the other systems, the breathing technique was named a "unifying technique".

The technique is based on several principles, including a balanced application of several training factors. Thus, it applies both hypoxia (decrease of O2) and hypercapnia (increase of CO2), resistance during both inhalation and exhalation, decrease of breathing volume per minute, and decrease in frequency of breaths.

Frolov's Respiration Training Device and the technique behind it replicate the low oxygen (hypoxic) conditions found at high altitude. These are the same conditions experienced by the Caucasians, who have become one of

the best examples of health and longevity. As research shows, this type of breathing normalizes blood pressure and improves blood flow, metabolism, and the condition of the nervous system, slows aging, and increases energy potential. Since this type of breathing is against mild resistance, lung ventilation is improved and respiratory muscles are strengthened which contributes to the successful treatment of bronchopulmonary diseases in adults and children.

Therapeutic essential oils/herbal concoctions can be added to the inhaler, which considerably increases its curative and health-improving effect.

1. Function and Principle of Operation

1.1. Function.

The Individual Simulator Inhaler (ISI) was designed to be used for respiratory exercises as well as for inhaling essential oils and/or herbal decoctions.

The simulator inhaler is a medical device and is designed only for individual use. It is used for treatment, rehabilitation and prevention of various diseases in adults and children as young as 5.

Indications: chronic bronchitis, bronchial asthma, vegeto-vascular dystonia (hypo- and hypertensive type), essential hypertension, and angina pectoris. In cases of acute and obstructive bronchitis the device is used during the period of recovery. The simulator inhaler is used in conjunction with other treatments for bronchitis, pneumonia, pulmonary tuberculosis, pulmonary emphysema, psychosomatic disorders, after cardiac infarction, strokes, and surgeries. Its use improves the effect of medicines, thereby shortening the treatment period.

The simulator inhaler (ISI) is recommended for disease prevention, to train respiratory muscles, to develop the correct breathing rhythm, enhance exercise tolerance, improve adaptive capabilities, and increase resistance to unfavorable ecological conditions, industrial factors, weather, and psychological stresses.

Contraindications: acute diseases, bronchial hemorrhages, hemoptysis, respiratory failure beyond the second degree, cardiovascular collapse of stage 2A, and implanted pacemaker.

Attention

* Respiratory exercises should not be performed during acute episodes of chronic diseases. Consult your health care provider for treatment. Respiratory exercises can be resumed 7-10 days after flare-up is resolved.

** In the case of acute myocardial infarction, acute stroke, acute pyelonephritis, pancreatitis, adnexitis, appendicitis, pneumonia, hepatitis, cholecystitis and other acute diseases, the simulator inhaler should not be used until 2-3 weeks after the patient recovers from the acute condition. A course of respiratory gymnastics with ISI may be started during the initial stage of recovery.

*** In the case of acute respiratory diseases or the flu, the simulator inhaler can be used for inhalations only. Once out of the acute phase, training

can be resumed with both inhalation and exhalation.

**** Respiratory failure of a degree higher than 2, cardiovascular collapse, stage 2A are conditions when the respiration rate achieves 28 per minute and shortness of breath appears even during normal physical activity.

1.2. Principle of operation

* To prepare for use, clean water is poured into the simulator inhaler. Water provides the resistance to both inhalation and exhalation. This resistance allows for what is known as the RID effect (simulated respiration regulator) and the PPEE effect (positive pressure at the end of exhalation). Both effects are achieved in the process of respiration training. Also due to the resistance, the respiratory muscles are strengthened and their endurance is increased. In addition, the muscles of the bronchi are trained and there is a pneumomassage effect on the bronchi and lungs. In the process of respiratory exercises some air mixture with moderate content of oxygen and a moderate increase in the carbonic acid concentration (hypoxic-hypercapnic gas mixture) is formed in the device, which helps restore normal functioning of the immune system as a result of the developed reactions of activation and training.

The bottom of the internal cup has a step-like form, which allows for precise regulation of resistance. This is an important consideration related to the age and health of the patient.

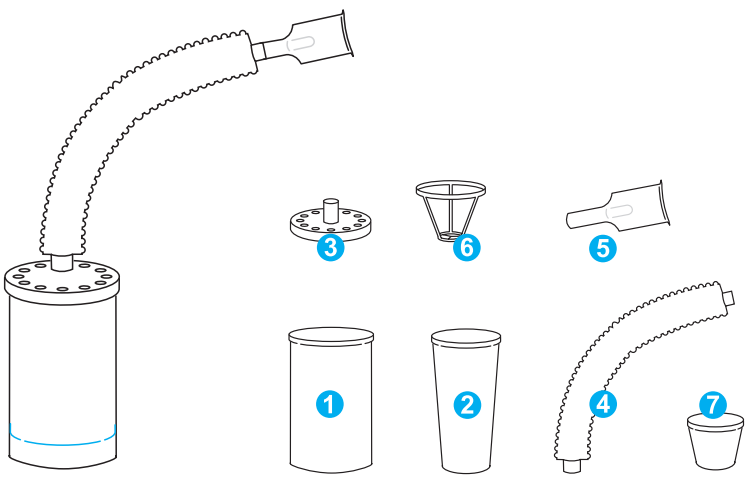
** To perform inhalations with essential oils, a special reservoir is used. This reservoir makes it possible to use three essential oils simultaneously, without mixing them in the solution. This combined aromatherapy considerably increases the effectiveness of aromatic oils. The use of essential oils in the process of respiratory exercises facilitates aroma molecule flux to the lungs and to the blood, enhancing the efficiency of respiratory exercises.

*** To have inhalations with essential oils, herb decoction or drug substance, the solution is poured into the simulator inhaler.

2. Structure and preparation of the inhaler for operation

The inhaler consists of an external cup (1), internal container (2), cover (3), respiratory tube (4) and a mouthpiece (5). The set also includes a container for essential oils (6) and a graduated jar (7).

Picture 1. Complete Set

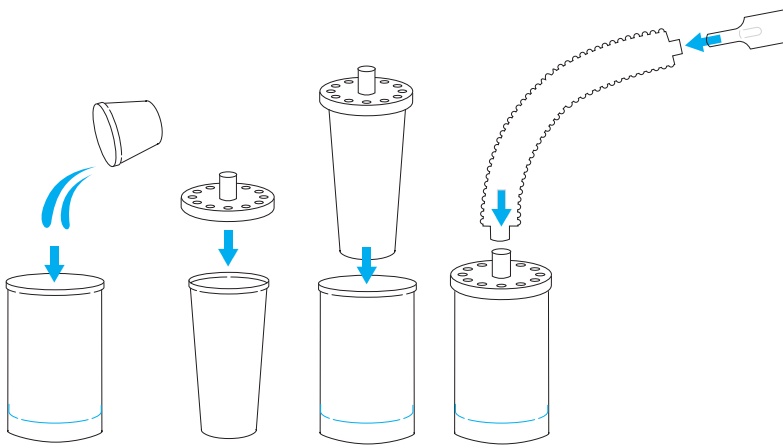


Before the first application and after each training session, it is necessary to take the inhaler apart, clean all parts with warm water and detergent, rinse in running water and dry.

Measure the required water volume using the graduated jar. Pour the water into the inhaler cup. Tighten the cover on the internal container.

Put the internal container into the cup, press the cover in such a way that it tightly covers the cup. Place the respiratory tube on the branch connection of the cover. Insert the mouthpiece into the loose end of the respiratory tube.

Picture 2. Assembly diagram



Attention! Included is a special container designed specifically for inhaling essential oils. This container is not for herb decoctions (drug substance solutions).

3. Procedure of exercises using the simulator inhaler

3.1. General rules

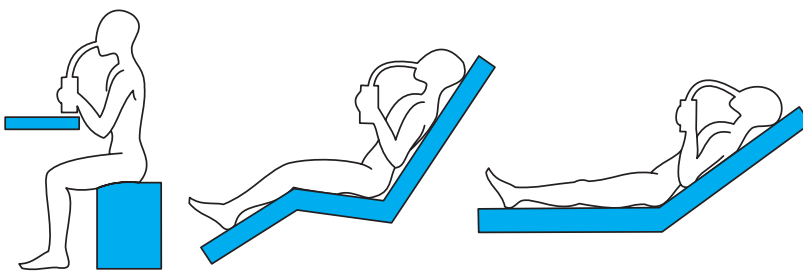
It is recommended to do respiratory exercises using the simulator inhaler daily, preferably at the same time of day. The treatment course of respiratory exercises using ISI lasts 3-4 months on average. Then the number of sessions can be reduced to 2-3 times a week for prevention and/or maintenance.

The preferred time of day to train is in the evening, 2-3 hours after dinner or 1-1.5 hours after a light dinner so that the stomach is empty. Training before sleep enables the improved metabolism to continue through the night, and helps encourage deep sleep. It is also possible to train on an empty stomach. After dinner and before exercising, you may drink 200-300 ml of water, juice or some other drink. It is not recommended to eat after evening respiratory exercises. It is however preferred that you drink a glass of water.

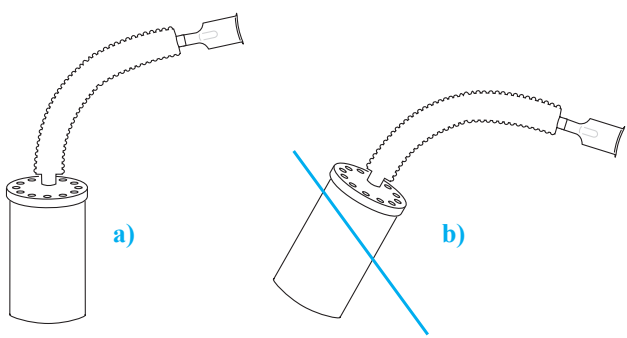
Attention! Diabetics, pregnant women, children, or those on medications may eat a small amount of food before going to bed.

Find a comfortable position so that you can easily breathe ‘with your stomach’. Recommended positions include sitting at a table, in an arm-chair (sofa), reclined, or lying on your side (**Picture 3).**

Picture 3. Positions for exercises with the simulator inhaler



Hold the cup of the simulator inhaler straight up during the exercises. Bend the tube as necessary.



Picture 4. Position of simulator inhaler: a) correct, b) incorrect

3.2. Peculiar characteristics of the curative respiration procedure

a) Resistance to respiration: Resistance to both inhalation and exhalation is provided by the water placed in the inhaler.

b) Extended period of the respiratory act (PRA): PRA is the total time of one respiratory cycle (inhalation and exhalation). It is recommended to gradually increase the time of the respiratory act by increasing the period of exhalation. During the first days of exercises the PRA is 5-10 seconds.

As a result of regular training, the time of one respiratory cycle gradually increases and can reach 30-40 seconds or more.

c) The period of one session: During the first few days, each session lasts 5-10 minutes. This time gradually increases and training sessions can last up to 25-30 minutes after 1-1.5 months of training.

d) Water volume: During the course of training while the level of training increases, the volume of water in the simulator inhaler can be increased from 10-18 ml (in the beginning of training) up to 20-30 ml after 1-1.5 months of training.

e) Diaphragmatic respiration: ISI training is diaphragmatic in nature. The belly, not the chest, moves forward and back.

3.3. Beginning respiratory training

Assemble the simulator inhaler and add the required volume of water at room temperature (see Table 1).

Table 1

Age/state of health	Children and teenagers			Healthy adults, under 60	Healthy adults over 60 and sick adults
	5-7 y/o	8-11 y/o	12-16 y/o		
Volume of water in simulator inhaler, ml	10	12	14-15	18-20	13-15
Duration of exercise, min	5-7	5-7	6-10	8-10	6-10
PRA, s	5-6	5-8	6-10	8-12	6-10

Choose a comfortable position in which abdominal breathing is easy.

Use a stopwatch to monitor the time of exhalation.

Put your mouth over the mouthpiece; do not hold the mouthpiece with your teeth, but with the lips. Inhale and exhale through your mouth, noticing the bubbling sound of the water.

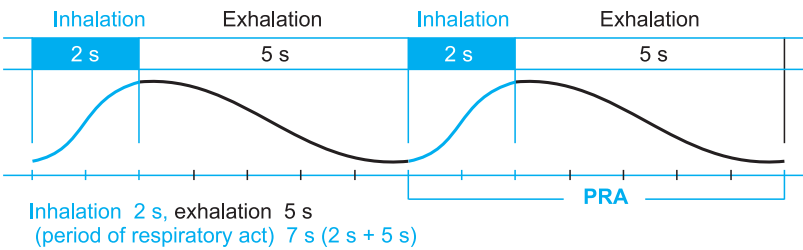
Breathe calmly, keeping an equal duration of the respiratory act (PRA), and rhythm of breathing. The nose does not participate in breathing.

The first training session should last 5 to 10 minutes. Put the mouthpiece into your mouth and tightly press it with your lips. Take a calm smooth

breath into your mouth through the simulator inhaler. After the inhalation, start exhaling through the mouth into the simulator inhaler smoothly and calmly. Usually during the first days of the training the length of inhalation is 2-3 seconds, the length of exhalation is from 5 to 10 seconds.

The sum of the total time of inhalation and exhalation in seconds is called the period of the respiratory act – PRA.

Picture 5.



Continue to breathe calmly through the simulator inhaler during the whole training session; inhalation for 2-3 seconds and a prolonged exhalation. Use the stopwatch to insure a consistent exhalation time. We cannot emphasize enough how important it is that you learn to breathe with a slow, calm, consistent rhythm without straining.

Determine the length of time you can exhale comfortably, without strain or shortness of breath. If, for example a five second exhale time is comfortable, try exhaling five seconds during each breath during entire session.

During the first three-four days perform only such simple respiratory exercises, maintaining the same PRA (exhalation plus inhalation time). Also, keep the total length of training 5-10 minutes during these first three-four days.

ATTENTION!

For children with bronchial asthma, obstructive bronchitis, vegeto-vascular dystonia and for adults with bronchial asthma, obstructive bronchitis, arrhythmia, lung emphysema, multiple bronchiectasis, after myocardial infarction, stroke, pneumonia, pleurisy, after chest or abdominal cavity organ surgeries, it is recommended to perform inhalation through the nose and exhalation through the simulator inhaler during the first 2-3 weeks. After that, you can begin the normal method of inhaling and exhaling through your mouth.

3.4 The main course of respiratory exercises

Respiratory exercises should be done daily. In the process of training the time of training sessions as well as PRA (period of respiratory act) should be gradually increased. Also, to improve the effect, it is necessary to gradually increase the volume of water in the simulator inhaler. This allows you to increase the resistance to breathing.

Table 2.

	STARTING EXERCISES				BASIC COURSE OF TRAINING		
Age, years	Water, ml	Duration, min	PRA, s		Water, ml	Duration, min	PRA, s
5-7	10	5-7	5- 6		12-14	12-15	9-10
8-11	12	5-7	5- 8		15-18	15-20	10-15
12-16	14-15	6-10	6-10		18-20	15-20	12-20
Sick adults, adults over 60	14-15	6-10	6-10		20-25	20-25	20-30
Healthy adults under 60	18-20	8-10	8-12		25-30	25-30	30-40

*** Attention!** In the process of training only the length of exhalation should increase. The length of inhalation remains the same (2-3 seconds).

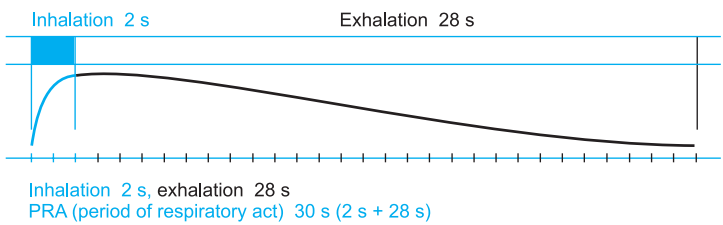
* Athletes and people who regularly do physical exercises can use 22-25 ml of water, breathe with a PRA of 20-25 seconds, and train for 15-20 minutes during the first week. During the second week each of these parameters begin to gradually increase. The amount of water can be increased by as much as 1 ml every day and reach as high as 35-40 ml. The duration of each session increases 1 minute every 2-3 days and eventually reaches 30-35 minutes. The PRA can increase 1 second every 2-3 days and eventually reach 50-60 seconds or more.

A more gradual increasing of training factors (PRA, water volume, and the time of the training session) is sometimes necessary. If, for example, increasing the water volume to 20 ml causes shortness of breath or any other discomfort, you should not increase the water volume at that point. After 3-5 days of training you can again to increase the volume of water by 1 ml and see if you have any discomfort. The duration of the training sessions can also be increased. If you breathe for 20 minutes and at the end of the session there is a sense of tiredness or slight fatigue from the training that means 20

minutes are enough for you. If there is no sense of tiredness, you can make the time of training 1 minute longer in 1 or 2 days.

The PRA is the third variable you can control. If, for example, you can breathe easily during the whole training session with a PRA of 15 seconds, you can increase PRA by 1 second in 2-3 days. The length of the respiratory act is gradually increased in the course of training and with the lapse of time the length of one uninterrupted exhalation can be 25-30 seconds, and for healthy, trained people 40-60 seconds or longer.

Picture 6.



Inhalation 2 s, exhalation 28 s
PRA (period of respiratory act) 30 s (2 s + 28 s)

Feelings of slight shortage of breath and warmth are possible as well as salivation, expectoration of sputum, and yawning. These physiological reactions are not dangerous and are connected with the adaptation of the organism to new breathing conditions.

In the process of regular training the organism readjusts its work: the normal function of respiratory organs, of the nervous and immune systems is restored, and blood circulation and metabolism are improved. That is why you can proceed to preventive training after 4-6 months of regular training with the improvement of the body state.

3.5 Preventive course

Performing regular respiratory exercises is a simple, convenient, and effective method of preventing disease.

Scientific research and practical observations show that people who regularly do respiratory exercises are characterized by good health, have practically no diseases, live long and are noted for their optimism and positive energy. That is why even after you have restored your health, we suggest continuing respiratory training 2-3 times per week to maintain your high level of health.

It is not recommended to interrupt training for long periods (a month or more) to prevent slipping back into the poor health you had before you began the respiratory training.

Preventive exercises should be done with the same optimal training parameters (water volume, PRA, length of training sessions). You should keep a journal record of these training parameters and make notes about the state of your health.

In the process of curative and preventive respiratory courses you can efficiently use high quality aromatic essential oils of different varieties to improve stamina and the activity of the body systems.

3.6 Additional recommendations

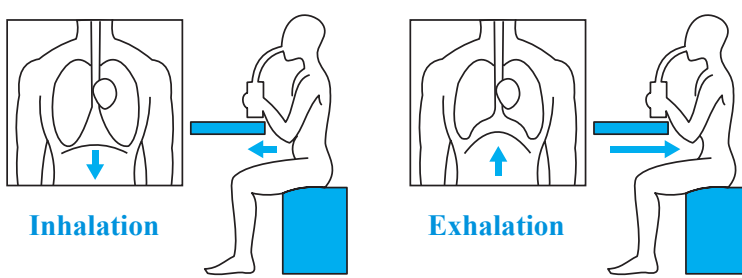
1. For respiratory system or acute catarrhal diseases, you may find it effective to perform the respiratory training with the addition of essential oils and herb decoctions

2. We recommend recording in a training journal heart rate per 1 minute before and after training and if required, blood pressure, state of health, additional medications and the results of any physician examinations.

3. In the case of chronic diseases or additional medications, you should undergo examination by your physician to adjust your medications.

4. One of the keys for efficient respiratory training is correct diaphragm respiration. This means that the stomach moves forward during the inhalation and backwards during the exhalation.

Picture 7



If you are unable to belly breathe (diaphragm breathing) with the device, you can still use the device with your natural breathing technique. However, be sure to practice belly breathing during the day without the device, and start belly breathing with the device as soon as you can.

Diaphragmatic respiration enhances the efficiency of respiratory exercises, considerably improves blood and lymph flow and provides a massaging effect on the organs of the abdominal cavity (liver, gall bladder, stomach, pancreas, intestines, kidneys, prostate gland and other organs).

5. Attention: Respiratory training should be smooth, calm, without strain, and without any jerking of the stomach.

6. Find the position of the body in which you can breathe smoothly and comfortably through the inhaler.

7. Respiratory training improves your metabolism. Consequently, your appetite will likely change. Pay attention to this and adjust your eating accordingly. Many overweight people can lose weight by this simple method.

Table 3. Example of a Journal

Date	Duration, min	Water, ml	PRA, s	Pulse before and after	Notes
23.06.2006	20	25	25	76 / 68	Blood pressure has been 160-170 per 95 for the whole week, I feel well, the bowels work better.

ATTENTION!

Do not do the respiratory exercises during the acute phase of a disease, in which case you should consult with your health care provider. You can resume respiratory exercises 5-7 days after having recovered from the episode.

4. Inhalations with essential oils

4.1 General aspects

Individual simulator inhaler can be used with essential oils. Aromatic essential oils are known to be beneficial. During inhalations, molecules of the oils have a direct effect on the lungs, which is why the oils are used for the treatment of various respiratory issues. For example, essential oils are used for the prevention of acute respiratory disease, flu, diseases of the bronchi and lungs and for the rehabilitation of patients after pneumonia, tuberculosis, and lung surgeries.

In addition, essential oil molecules produce a specific effect on various organs and tissues and on the whole organism in general. That is why inhalations with aromatic essential oils can be used both in addition to respiratory exercises and as an independent method of treatment, rehabilitation and prevention, to improve immunity, metabolism and the state of the nervous system.

For this purpose, one essential oil can be used, but according to research, the use of several essential oils is more efficient and makes it possible to get the desired effect more quickly. The simulator inhaler has a special container for essential oils. Choose the necessary essential oils with the help of a specialist.

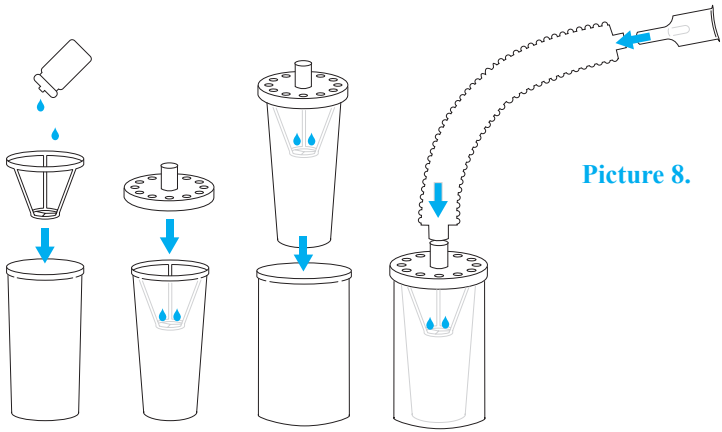
4.2 Preliminary operations, cold inhalations

Put the container for essential oils into the internal container. Put 1-2 drops of the chosen essential oil into the cell of the container and put the cover on it. Place the internal container into the cup of the simulator inhaler and tighten the cover on the cup. Place the respiratory tube on the cover branch piece. Insert the mouthpiece into the respiratory tube. Please see **Picture 8.**

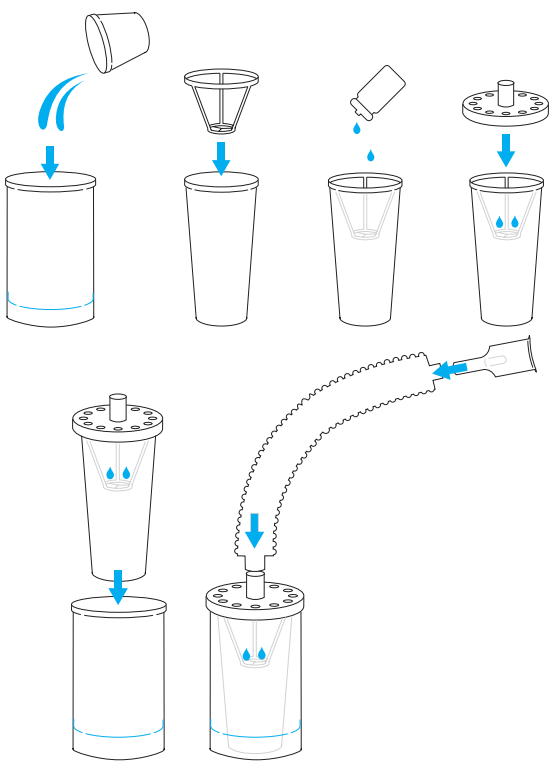
4.3 Preliminary operations, hot inhalations

Pour the required volume of water at 70-80°C (158-176°F) into the cup (see Table 1 on page 11). Put the container for essential oils into the internal container.

Put 1-2 drops of the chosen essential oil into the cell of the container and put the cover on it. Place the internal container into the cup of the simulator inhaler and tighten the cover on the cup. Place the respiratory tube on the cover branch piece. Insert the mouthpiece into the respiratory tube. Please see **Picture 9.**



Picture 8.

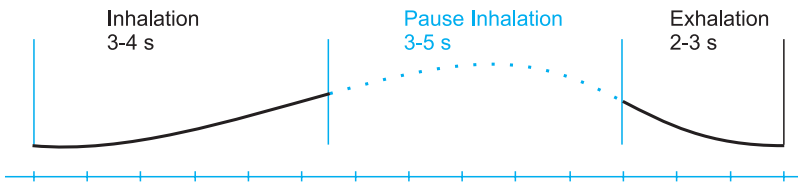


Picture 9.

4.4 Inhalation procedure

Place the inhaler on a table or some other base. Bend your head a little and take the mouthpiece into your mouth. Take smooth, slow breaths in through the mouth during inhalations. Pause after the inhalation, hold your breath and then breathe out calmly through your mouth into the inhaler. It is recommended to breathe in for 3-5 seconds, making a pause after the inhalation for 3-5 seconds, and breathe out through your mouth into the inhaler for 2-3 seconds.

Picture 10.



The duration of training with aromatic oils is 8 to 10 minutes. Every 4-6 days, you can increase the number of drops by one as tolerated to a maximum of 2-3 drops. Inhalations can be taken once or twice a day, preferably 2-3 hours after meals. It is recommended not to go out for 30-40 minutes after an inhalation session (1 1/2 hours in cold weather). The number of inhalation sessions per 1 course is15-20 once a day, or 20 twice a day.

If inhalations with one type of essential oil are tolerated well, you can try inhalations with two or three types of essential oils. Each of the oils is poured into a separate cell of the essential oil container so that the oils do not mix in the solution.

You should perform diaphragm respiration during inhalations. In the case of coryza, inflammation of paranasal sinus (maxillary sinusitis, frontal sinusitis), you can breathe out through your nose. In the case some sputum and mucus is discharged as a result of inhalations, stop the inhalation session, clear your throat and rinse your mouth. Then continue the inhalation.

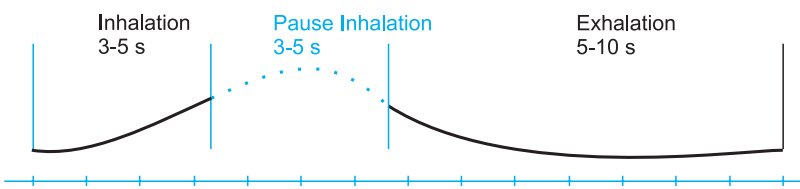
* After each session take the device apart, clean its parts with water and cleaning solution, and dry.

5. Respiratory exercises in combination with essential oil inhalations

Pour the required water volume into the cup (see Table 1 on page 11). Place the container for essential oils into the internal container. Put 1-2 drops of the essential oil into the cell of the container. Put the cover on the internal container. Place the internal container into the cup of the simulator inhaler and tighten the cover on the cup. Place the respiratory tube on the cover branch piece. Insert the mouthpiece into the respiratory tube.

When doing respiratory exercises in combination with essential oil inhalations, you should to take a smooth breath in through the mouth for 3-5 seconds. Having breathed in, pause for 3-5 seconds and slowly breathe out through the mouth into the simulator inhaler, through the water for 5-10 seconds. It is recommended to perform diaphragm respiration (please see page 15).

Picture 11.



* After the inhalation take the device apart, clean its parts with water and cleaning solution, and dry.

6. Maintenance and storage precautions

Before the first use and after each use take apart the simulator inhaler, clean its parts with warm water and cleaning solution (soap, baking soda), rinse and dry. If required, all parts of the simulator inhaler should be sterilized for 30 minutes with superoxol with 0.5% of cleaning solution at 18-24° Celsius (65-75° Fahrenheit).

Never use the simulator inhaler if the color of the plastic changes or if there are cracks or other defects that make it unusable. Keep the simulator inhaler in a plastic bag of polyethylene film or in a carton box at room temperature.