

BREATHING+



Pursed Lip Breathing
Respiratory Training Device

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1 BASIC INFORMATION

1.1 Breathing mechanics

- ❑ Slow breathing is an indicator of one's health and generally shows a relaxed state, while fast and intensive breathing shows distress, panic, fear or hostility
- ❑ Most people breathe shallow and fast - keeping air trapped inside, not allowing for new air to enter the lungs. Breath holding, mouth breathing, and over-breathing are commonly observed in modern society
- ❑ In people with asthma or COPD airways sometimes collapse making it even more difficult to breathe. Such a collapse can be prevented by exhaling against the resistance of pursed lips, a technique commonly known as "Pursed Lip Breathing"
- ❑ Breathing is the only autonomous function that we can control consciously, therefore it provides a way to control our autonomous body processes such as heart rate, digestion and endocrine glands.
- ❑ Breathing affects heart rate in such a way that each inhalation speeds up the heart, while each exhalation slows it down, this phenomena is observed as "Heart Rate Variability" and is commonly explained as "Respiratory Sinus Arrhythmia"
- ❑ When exposed to stress, humans inhale air in order to prepare for a "fight or flight" activity. It speeds up heart rate and it starts secretion of stress hormones.
- ❑ People who breathe quickly or rapidly often overeat. Breathing more slowly reduces your appetite. making exhalations longer is also known to improve digestion and is being used as a "Long Breath Diet" in Japan and many other countries

1.2 Breathing exercises

Breathing exercises are most often practiced to treat asthma and COPD as they improve breathing muscle functions, reduce breathlessness and ease breathing. In asthma and COPD, reduced breathing exercises are being prescribed either in the form of prolonged exhalation through pursed lips (*Pursed Lip Breathing*) or in the form of prolonged pause after exhalation, such as the *Buteyko method*, and some alternative techniques such as alternative nasal breathing.

Slower breathing has been effectively used to treat hypertension and elevated blood pressure resulting in lower blood pressure and lower consumption of drugs. The effects are explained as a behavioral change towards a slower breathing resulting in better heart function and increased heart rate variability. Drugs used to treat hypertension include diuretics, beta blockers, calcium channel blockers, and angiotensin converting enzyme (ACE) inhibitors.

Additionally breathing exercises have shown positive effects in treating stress and anxiety related disorders. In general humans respond to stress in a so-called *fight-or-flight* response by raising their sympathetic nervous system. It increases breathing frequency, heart rate and cardiac ejection force consequently raising blood pressure. Simultaneously secretion of stress hormones starts (*cortisol, glucagon, catecholamines, growth hormone, antidiuretic hormone*), thus digestion slows down and the activity of cognitive functions is increased. Parasympathetic tone, which is achieved by slow breathing works vice versa, the body relaxes, peripheral vascular blood flow occurs due to the release of nitric oxide and the heart slows down. Frequent or constant activity of the sympathetic tone imposes a lasting impact in the form of high blood pressure, disturbed digestion, and stomach ulcers.

1.3 Pursed Lip Breathing

Pursed Lip Breathing (PLB) is described in the American Thoracic Society guidelines as involving 'a nasal inspiration followed by expiratory blowing against partially closed lips, avoiding forceful exhalation'. PLB reduces breathing rate, helps make exhalation more efficient, reduces dyspnoea (shortness of breath), and improves cellular oxygenation. is a breathing technique that aims to make exhalations longer and more efficient helps people cope with asthma, COPD, emphysema, and stress related disorders. PLB is gaining recognition in medical community since mid 60s when its positive effects had been first observed. Today there are over 2000 articles indexed in google scholar, pubmed and similar medical databases describing its clinical benefits. According to Cleveland Clinic¹, its effects as are:

- Improves ventilation
- Releases trapped air in the lungs
- Keeps the airways open longer and decreases the work of breathing
- Prolongs exhalation to slow the breathing rate
- Improves breathing patterns by moving old air out of the lungs
- Relieves shortness of breath
- Causes general relaxation

¹ "Pursed Lip Breathing - Cleveland Clinic." 2014. 9 Apr. 2015
<http://my.clevelandclinic.org/health/diseases_conditions/hic_Understanding_COPD/hic_Pulmonary_Rehabilitation_Is_it_for_You/hic_Pursed_Lip_Breathing>

2 BREATHING PROBLEMS

2.1 Shortness of breath

Difficulty in breathing (also known as shortness of breath, breathlessness, or dyspnea) is caused by inefficient breathing. In one's lifetime, one may experience rare episodes of shortness of breath as part of high levels of activity like exhaustive exertion, or during environmental conditions such as high altitude or very warm or cold temperatures. Other than these extreme conditions, shortness of breath is commonly a sign of a medical problem. One of the causes of difficulty in breathing are also lung problems, such as; asthma, bronchitis, tuberculosis, COPD and emphysema. These problems can be treated with medical help and also breathing exercises such as Pursed Lip Breathing.²

2.2 Asthma and COPD

Asthma is most common chronic disease among children, and affects more than 253 million people around the world. It has to be treated with appropriate management and pursed lip breathing is most often practiced to treat asthma and COPD as it makes breathing more efficient, improves oxygenation and reduces breathing rate³. Additionally Pursed Lip Breathing is recommended during an asthma attack.⁴

2.3 Emphysema

In emphysema the alveoli and lung tissue are destroyed - with this damage, the alveoli cannot support the bronchial tubes. Consequently the airway collapses which causes an "obstruction" (a blockage), which traps air inside the lungs. Too much air trapped in the lungs can give some patients a barrel-chested appearance. Pursed Lip Breathing helps emphysema sufferers exhale more efficiently and teaches them to prevent airway collapse by maintaining a positive pressure inside airways⁵.

² Bozkurt, Biykem, and Douglas L Mann. "Shortness of breath." *Circulation* 108.2 (2003): e11-e13.

³ Bott, Julia, and British Thoracic Society Physiotherapy Guideline Development Group. *Guidelines for the physiotherapy management of the adult, medical, spontaneously breathing patient*. BMJ Publ. Group, 2009.

⁴ "Asthma Action Plan - American Lung Association." 2012. 26 Nov. 2014

<<http://www.lung.org/associations/states/colorado/asthma/asthma-action-plan.html>>

⁵ Fregonezi, GA de F, VR Resqueti, and R Güell Rous. "Pursed lips breathing." *Archivos de Bronconeumología ((English Edition))* 40.6 (2004): 279-282.

2.4 Stress and Anxiety

Anxiety is the psychophysiological signal that the stress response has been initiated. The stress response by-product, stress, is difficult to define. The response has multiple dimensions that have yielded research with many foci. Most salient to nursing are investigations of psychobiological variables, the influence of life events, and the interactional model of the stress response. The stress response can be viewed as an interactional process that causes psychophysiological reactions that are immediate and can occur up to and including physiologic events 3 weeks after confrontation with the stressor⁶. Pursed lip breathing helps in coping with stress and anxiety related disorders. It can be used as a 10-20 minutes daily systematic respiratory exercise to train breathing in complex with other rehabilitative activities⁷.

2.5 Pulmonary Rehabilitation

Pulmonary rehabilitation has become a standard of care for patients with chronic lung diseases. There is substantial new evidence that pulmonary rehabilitation is beneficial for patients with COPD and other chronic lung diseases. Several areas of research provide opportunities for future research that can advance the field and make rehabilitative treatment available to many more eligible patients in need⁸. Pursed Lip Breathing should be applied several times through the day to avoid pulmonary complications, such as atelectasis, pneumonia, respiratory failure, sputum retention and shortness of breath. It also provides resistance on expiration and aims to improve lung volumes and to facilitate secretion mobilization^{9,10}.

2.6 Attention Deficit Disorder

Attention deficit hyperactivity disorder (ADHD, also know as just plain attention deficit disorder or ADD) does not show physical signs that can be detected by a blood or other lab test. Typical ADHD symptoms can often overlap — or even mimic — those of other physical and psychological disorders. The causes remain unknown, but ADHD can be diagnosed and effectively treated. Many resources are available to support families in managing ADHD behaviors when they occur. ADHD usually appears first in childhood, but

⁶ Robinson, Linda. "Stress and anxiety." *The Nursing clinics of North America* 25.4 (1990): 935-943.

⁷ "Principles and Practice of Stress Management, Third Edition ..." 2012. 7 Dec. 2014

<<http://www.amazon.com/Principles-Practice-Stress-Management-Edition/dp/160623000X>>

⁸ Ries, Andrew L et al. "Pulmonary rehabilitation: joint ACCP/AACVPR evidence-based clinical practice guidelines." *CHEST Journal* 131.5_suppl (2007): 4S-42S.

⁹ American Association of Cardiovascular & Pulmonary Rehabilitation. *Guidelines for pulmonary rehabilitation programs*. Human Kinetics, 2010.

¹⁰ Bott, Julia, and British Thoracic Society Physiotherapy Guideline Development Group. *Guidelines for the physiotherapy management of the adult, medical, spontaneously breathing patient*. BMJ Publ. Group, 2009.

can also now be diagnosed in adults (as long as some symptoms were present in the individual's childhood, but simply never diagnosed).¹¹

2.7 Speech Disorders

Speech disorders or speech impediments are a type of communication disorder where 'normal' speech is disrupted. This can mean stuttering, lisps, etc. Someone who is unable to speak due to a speech disorder is considered mute. In many cases the cause is unknown. However, there are various known causes of speech impediments, such as "hearing loss, neurological disorders, brain injury, intellectual disability, drug abuse, physical impairments such as Cleft lip and palate, and vocal abuse or misuse." Many of these types of disorders can be treated by speech therapy, but others require medical attention by a doctor in phoniatrics. Other treatments include correction of organic conditions and psychotherapy.¹²¹³

¹¹ "Attention Deficit Disorder (ADD and ADHD) - Psych Central." 2004. 9 Apr. 2015
<<http://psychcentral.com/disorders/adhd/>>

¹² "Speech and Language Disorders and Diseases." 2003. 9 Apr. 2015
<<http://www.asha.org/public/speech/disorders/>>

¹³ "Speech disorder - Wikipedia, the free encyclopedia." 2003. 9 Apr. 2015
<http://en.wikipedia.org/wiki/Speech_disorder>

3 TREATMENT AND PREVENTION

3.1 Breathing Exercises

Poor breathing, either induced by asthma, stress or lack of exercise affects us. Lack of oxygen in the blood makes us feeling unfocused. Inefficient breathing is also wasteful in terms of energy consumption and thus we feel tired. We go for a gym or walk to get few breaths out but either than that we just feel sort of down through the day. It is crucial for us to improve our breathing technique in order to achieve better health and better performance.

3.2 Technology Review

Technology for breathing exercises range in respiratory detection principles, biofeedback principles and its methods of operation (Table 1).

Table 1: Review of technology for breathing exercises

Device	Respiratory Detection Sys	Description	Advantages and Disadvantages	Price range
RESPeRATE device InterCure Ltd.	Mechanic principle (expansion detection)	-Non-drug therapy -Guidance system: visual -For the treatment of high blood pressure -Portable computerized device	✓ Guidance provided ✗ Does not require exhalation against pressure, therefore it is less beneficial	100 USD - USD
HFCWO Device Electromed	Mechanic principle (expansion detection)	-High Frequency Chest Wall Oscillation device -Guidance system: N/A -Positive pressure air pulses are applied to the chest wall	✓ Therapy session lasts about 15 minutes ✗ Not entertaining ✗ Expensive	7500 USD - 8000 USD
OHFO device	Pneumatic principle (mouth to force air into device)	-Oral High Frequency Oscillation -Guidance system: N/A -Developed from the technique of high frequency jet ventilation -Provides a practical and simple method for supplementing breathing in conscious subjects	✗ Used only in USA ✗ Not entertaining ✗ Unhygienic	N/A
IPV device Percussionaire Corp.	Pneumatic principle (mouth to force air into device)	-Intrapulmonary Percussive Ventilation -Guidance system: N/A -Utilizes high frequency -Combines aerosol inhalation and intrathoracic percussion applies via mouthpiece	✗ Unhygienic ✗ Not entertaining	N/A
Acapella by Smiths Medical	Pneumatic principle (mouth to force air into device)	-Combines the benefits of both PEP therapy and airway vibrations -Guidance system: N/A -Improves clearance of secretions -Can accommodate virtually any patient lung capacity	✓ Allows inhalation and exhalation without removing from mouth ✗ Unhygienic ✗ Not entertaining	45 USD - USD
Cornet device by R. G. GmbH & Co. KG	Pneumatic principle (mouth to force air into device)	-Adapter with mouthpiece	✗ Unhygienic	50 USD - USD

		<ul style="list-style-type: none"> -Guidance system: N/A -Reduces unproductive cough -Increases the vital capacity 	<ul style="list-style-type: none"> ✗ Not entertaining 	
Flutter by Aptalis Pharmaceuticals, Inc.	Pneumatic principle (mouth to force air into device)	<ul style="list-style-type: none"> -Mucus Clearance Device -Guidance system: audio -Provides PEP -Ability to vibrate the airways, intermittently increase endobronchial pressure, accelerate expiratory airflow -Changing inclinations makes higher or lower frequency 	<ul style="list-style-type: none"> ✗ Unhygienic ✗ For single patient use only 	50 USD - 100 USD
Frolov breathing Dinamika Ltd., Russia	Pneumatic principle (mouth to force air into device)	<ul style="list-style-type: none"> -A type of intermittent hypercapnic hypoxia training -Guidance system: visual -Exposure to the short-term hypoxia state of oxygen deficiency) -Cures asthma, pneumonia, tuberculosis helps with sports 	<ul style="list-style-type: none"> ✗ Unhygienic ✗ Not entertaining 	50 USD - 100 USD
Powerlung by Power Inc.	Pneumatic principle (mouth to force air into device)	<ul style="list-style-type: none"> -Strength training techniques -Guidance system: N/A -Expanding lung capacity -Different models 	<ul style="list-style-type: none"> ✗ Unhygienic ✗ Not entertaining 	120-140 USD
Spiro-Ball by Levante Barcelona (Werfen Corporation)	Pneumatic principle (mouth to force air into device)	<ul style="list-style-type: none"> -Volumetric/Spirometric Exerciser -Guidance system: visual -Shows inspiratory volume 	<ul style="list-style-type: none"> ✓ Easy usage ✗ Unhygienic ✗ Not entertaining 	20-50 USD
Three-ball by Levante Barcelona (Werfen Corporation)	Pneumatic principle (mouth to force air into device)	<ul style="list-style-type: none"> -Restores and maintains lung capacity -Guidance system: visual?? 	<ul style="list-style-type: none"> ✓ Easy usage ✗ Unhygienic 	15 USD - 20 USD

		-Enhances inspiratory and expir muscles	✗ Not entertaining	
Threshold PEEP/IMT Respironics Inc. Health	<i>Pneumatic principle (mouth to force air into dev</i>	<p>PEEP</p> <ul style="list-style-type: none"> -Designed for therapy with positive expiratory pressure -Guidance system: N/A -PEEP therapy helps reducing the amount of air that is trapped in the lungs -Resistance is provided by a spring-loaded valve -Forced pressure opens the airways helps mobilize secretions <p>IMT</p> <ul style="list-style-type: none"> -Provides consistent and specific pressure for inspiratory muscle strength endurance training 	<p>PEEP</p> <ul style="list-style-type: none"> ✓ Promotes effective breathing patterns improves gas exchange central and peripheral airway function ✗ It is only meant for expiratory exercise ✗ Unhygienic ✗ Not entertaining <p>IMT</p> <ul style="list-style-type: none"> ✓ Increases respiratory muscle strength and endurance ✓ Increases exercise tolerance ✗ Effects of IMT have not been adequately tested ✗ Only meant to be used during inspiratory exercise 	400 USD - 400 USD
RFB micro biofeedback BioMental GmbH	<i>Pneumatic principle (mouth to force air into dev</i>	<ul style="list-style-type: none"> -For functional disturbances of heart rate cycles -Guidance system: visual, audio -Influence on blood pressure 	✗ A lot of machinery	
I-330 C2 by J&J engine	<i>Mechanic principle (measuring lung expansion)</i>	<ul style="list-style-type: none"> -12 channel capability -Guidance system: visual -Supports simultaneous monitoring of multiple signals -More options for analyses (ECG, Respiration, Skin Resistance...) 	<ul style="list-style-type: none"> ✓ Two people can use it at the same time ✗ Hard to use ✗ Very expensive 	1900 USD - 2100 USD
Pulmonica by Harmo Tech	<i>Pneumatic principle (mouth to force air into dev</i>	<ul style="list-style-type: none"> -It produces deep, resonant, meditative sounds that can be felt vibrating in the lungs and sinuses -Guidance system: N/A 	<ul style="list-style-type: none"> ✓ Usage does not require musical knowledge ✓ Activation of diaphragmatic breathing ✗ Forcing air 	150 USD - 150 USD

		<ul style="list-style-type: none"> -It is meant to promote airway clearance, oxygenation and strengthening of respiratory muscles 	<ul style="list-style-type: none"> ✗ Detaining water inside during use ✗ Unhygienic 	
Alvio by Alvio	Pneumatic principle (mouth to force air into device)	<ul style="list-style-type: none"> -An all-in-one breathing trainer, symptom tracker and mobile game controller -Guidance system: visual -Controlling a video game on a smartphone or tablet 	<ul style="list-style-type: none"> ✓ Wirelessly communication phones/tablets ✓ Cloud sharing information ✗ Forcing air ✗ Unhygienic ✗ Danger for open mouth breathing 	N/A
Respi by Respio	Pneumatic principle (mouth to force air into device)	<ul style="list-style-type: none"> -For preventing or reducing asthma attacks -Guidance system: visual -Disposable mouth tube -Proper body posture with smartphone sensors -GPS for ascertaining dangerous areas for asthmatics -Analyzed data sent to physicians 	<ul style="list-style-type: none"> ✓ Linked to smart phone ✓ Hygienic ✗ Forcing air ✗ No positive side effects (relaxation, longer exhalation) 	N/A
Zenytyme by Zenytyme	Pneumatic principle (mouth to force air into device)	<ul style="list-style-type: none"> -For promoting deep, rhythmic breathing to increase oxygen levels -Guidance System: visual -Scientifically engineered -Comes with an application -Sharing experiences on social media -Dongle is connected with bluetooth 	<ul style="list-style-type: none"> ✓ Lightweight dongle ✗ Unhygienic use (you hold device with bare hands) ✗ Water collecting on the device 	N/A
My Spiroo by My Spiroo	Pneumatic principle (mouth to force air into device)	<ul style="list-style-type: none"> -Mobile spirometer -Guidance System: visual -Connected, ultraportable peak flow meter 	<ul style="list-style-type: none"> ✓ For assessing what is causing bronchial flare-up ✗ Unhygienic 	N/A

		<ul style="list-style-type: none"> -Measures how much air is passing out of users' lung -My Spiroo Pro: version for doctors to collect patients data -My Spiroo Home: version for patients 		
Sensawaft by Zyzio	Pneumatic principle (using mouth to force air into device)	<ul style="list-style-type: none"> -For disabled people or hands-free mobile phone makers -Guidance system: visual -Senses pressure variations from the mouth into which user exhales 	<ul style="list-style-type: none"> ✓ Chipset can be integrated with hardware (mp3 players, phones, laptops) ✓ Fun ✗ Non-medical purpose (does not describe how should people improve breathing) ✗ Dizziness if one breaths incorrectly 	N/A
Talk by Arsh Shah Dilb	Pneumatic principle (using mouth to force air into device)	<ul style="list-style-type: none"> -Exhales with varying intensities converting them into electrical signals -Guidance system: visual -Signals processed by microprocessor (Morse engine) -Morse code: converting signals into words 	<ul style="list-style-type: none"> ✓ For people with developmental disabilities ✗ Not entertaining ✗ Non-medical purpose (does not describe how should people improve breathing) 	N/A
Powerbreathe Powerbreathe	Pneumatic principle (using mouth to force air into device)	<ul style="list-style-type: none"> -Inspiratory Muscle Trainer -Guidance system: N/A -For strengthening the muscles we use to breathe -Optimisation of airflow -3 variable resistance levels 	<ul style="list-style-type: none"> ✓ Suitable for beginners ✗ Not entertaining ✗ Mostly designed for athletes 	250 USD - 350 USD
BREATHING+ BreathingLabs	Non-contact pneumatic principle (using mouth to force air into device)	<ul style="list-style-type: none"> -Making exhalations longer and more efficient - Guidance system: Visual and auditory - operates on Android, iOS, Windows, Mac devices -Includes numerous "breathing games" and accessibility tools for pulmonary rehabilitation 	<ul style="list-style-type: none"> ✓ Fun, entertaining ✓ Medical purpose ✓ Non-contact operation ✓ Realtime feedback ✓ Progress tracking ✗ Does not operate standalone, requires mobile phone or computer to operate 	150USD

		<i>-Clinically tested "Pursed Lip Breat technique</i>		
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4 OUR PRODUCTS

4.1 Breathing Games

Breathing games are based on a breathing technique called Pursed Lip Breathing and they are designed to train kids to make exhalations longer. They run on computers and mobile devices where 3-d characters are animated for the best interactive breathing experience. Breathing guidance is being provided and breathing rate is being monitored.

Anyone can observe that conventional video games aren't healthy. They cause tension in hands and upper back and so kids start breathing with upper part of their lungs which is causing shortness of breath and low oxygenation. With breathing games kids learn to breathe deeper and slower and they also improve speaking skills and consequently become more confident and social.

4.2 Breathing Television

Breathing Television is a tool to improve breathing by watching television. It is designed to most efficiently reduce users breathing rate. It does so by synchronising television content with the act of exhaling through pursed lips. Breathing TV has been featured in Journal of Respiratory diseases. Conventional television has emerged into an efficient multimedia distribution mechanism, yet it is shown to have no positive impact in the form of improving breathing. In both, western and eastern medical practice, exhalation through pursed lips has proven to be an efficient method to reduce breathing rate, ease breathing and improve cellular oxygenation.

4.3 Breathing Scrolling

Breathing Scrolling™ is a new healthy way to scroll websites or pdf documents, without using your mouse or keyboard. Just Blow into the headset to scroll any website or pdf document. Scrolling speed can be adjusted to your preference. Breathing scrolling is available as a Chrome extension on Google Chrome browser or as a bookmarklet that can be easily dragged and dropped into your bookmarks bar in other web browser.

4.4 Breathing Headset

BREATHING+ headset is built out of soft and comfortable polyethylene plastic. It is adjustable for different head sizes, durable and washable. It is designed to provide maximum comfort, firm position and best possible PLB detection in a quiet or loud environment.

4.5 BREATHING+ Package

BREATHING+ package is a complete solution that turns your desktop computer and/or mobile phone into a fun interactive breathing exercises gaming system. BREATHING+ is already being used in clinical environments to manage asthma, COPD, postoperative rehabilitation, stress and anxiety. Now you can use this technology in your home to play breathing games and efficiently improve your breathing. It's a new kind of fitness, it's "pilates" of the next century!

5 ADVANTAGES

5.1 Advantages over other available technology for breathing exercises (see table 1)

- ❑ blowing air into the mouthpiece does not require a physical contact with users' mouth or lips, therefore it provides less possibilities for infection.
- ❑ user can be eventually taught to implement the exhalation through pursed lips into their daily routine and change their breathing behavior without raising dependence on technology. Such a behavior can already be observed in humans, for example when a person exhales through pursed lips as a sign of relief.
- ❑ Not required to use tubes or pipes to achieve resistance during exhalation as kids eventually learn to provide such a resistance by exhaling through pursed lips
- ❑ breathing games provide an enhanced motivation and more efficient learning process that keeps kids entertained and motivated
- ❑ audio feedback allows user's to perform exercises with their eyes closed, resulting in a more relaxing experience
- ❑ breathing games make kids track their breathing progress which improves commitment and provides a more efficient long term learning

5.2 BREATHING+ SWOT ANALYSIS

Strengths	Weaknesses
<ul style="list-style-type: none"> ❑ better motivation achieved with breathing games leads to higher motivation and compliance ❑ better hygiene by using non-invasive detection of breathing ❑ improves breathing without raising dependence on technology (because user provides pressure by exhaling through pursed lips and not by exhaling into a tube or pipe) ❑ weekly new breathing games on Android, iOS, Windows and Mac devices which leads to higher long term motivation 	<ul style="list-style-type: none"> ❑ cannot be used standalone, requires mobile phone or personal computer to work ❑ dehydration; after exercise it is necessary for a user to drink a glass of water
Opportunities	Threats
<ul style="list-style-type: none"> ❑ healthier way to use computers, for example “breathing scrolling” or “breathing television” ❑ improves speaking and singing skills ❑ “breathing scrolling” may reduce repetitive strain injuries such as carpal tunnel syndrome 	<ul style="list-style-type: none"> ❑ kids under 7 years should use the product in assistance with their parents or caregivers. ❑ in elderly patients a short-term dizziness is possible. The patient should rest for a while after exercise.

6 EXPERT OPINIONS

6.1 American Lung Association

"Keep using the pursed-lip breathing Until the breathless feeling goes away. Rest in between breaths if you feel Dizzy. Give sips of room temperature water."

6.2 Cleveland Clinic

"Pursed lip breathing is one of the simplest ways to control shortness of breath. It provides a quick and easy way to slow your pace of breathing, making each breath more effective."

6.3 University of Iowa Children's Hospital

"Pursed lip breathing helps you use less energy to breathe. It can help you relax. When you are short of breath, it helps you slow the pace of your breathing and can help you feel less short of breath."

6.4 The Ohio State University Medical Center

"Pursed Lip Breathing keeps airways open longer during exhalation. This helps release trapped air from your lungs and allow fresh air to come in. Practise PLB while you are resting so you can use this technique when you are feeling short of breath."

6.5 University of Minnesota Medical Center

"Inhaling through the nose and exhaling through pursed lips makes breathing easier. Pursed-lip breathing can also help you regain control if you're having trouble catching your breath. You can practice breathing this way anytime, anywhere. If you're watching TV, practice during the commercials. Try to practice several times a day. Over time, pursed-lip breathing will feel natural."

6.6 University Health Service, University of Michigan

"Pursed-lip breathing helps you breathe more air out so that your next breath can be deeper."

6.7 Vanderbilt University Medical Center

"Pursed-lip breathing can help you get more oxygen into your lungs when you are short of breath. When you start to feel short of breath, use pursed-lip breathing to control your breathing. Breathing in through the nose and exhaling through pursed or closed lips makes breathing easier."

6.8 UTMB, The University of Texas

"It is often helpful to have a patient with asthma or COPD exhale through "pursed lips," a maneuver that increases resistance to exhalation at the mouth. This maneuver is believed to transmit an early expiratory back pressure to the bronchial tree and the back pressure is believed to prevent early collapse of small bronchioles and improve exhalation from alveoli (specifically COPD patients)."

6.9 American Thoracic Society

“Pursed-lip breathing attempts to prolong active expiration through half-opened lips, thus helping to prevent airway collapse. Compared with spontaneous breathing, pursed-lip breathing reduces respiratory rate, dyspnea, and PaCO₂, while improving tidal volume and oxygen saturation in resting conditions.

7 CONTACT AND MORE INFORMATION

- **Company name:** Zdrav dih d.o.o. (ex. Mojdih d.o.o.)
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- **VAT (tax number):** SI18120172
- **BANK SWIFT:** IBAN SI56 1010 0004 7878 128
- **Email:** support@breathinglabs.com
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