

# Have You Tried Box Breathing?

Analysis by [Dr. Joseph Mercola](#) ✓ Fact Checked

## STORY AT-A-GLANCE

- › Box breathing is a form of breath control that triggers the parasympathetic nervous system to help manage stress and improve relaxation so you can take control of your health
- › This technique, also called square breathing or four-square breathing, is used by Navy SEALs to help reduce stress in high-pressure situations
- › It involves nose breathing to slow over-breathing and raise CO2 levels to balance oxygenation. Use a simple technique to measure your CO2 tolerance, a predictor of physical health
- › Nose breathing raises production of nitric oxide, which offers antiviral benefits. Consider the four-minute Nitric Oxide Dump to promote blood flow and normalize blood pressure

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Breathing is universal, habitual and nearly always automatic. When you get stressed, your breathing pattern and rate change. This often results in more chest breathing in response to a "fight or flight" situation, a response triggered by the autonomic nervous system.<sup>1</sup>

In April 2019, a headline in The New York Times announced, "Americans Are Among the Most Stressed People in the World ..."<sup>2</sup> This was slightly less than one year before the

COVID-19 pandemic raised stress levels even further.

Americans are no strangers to stress. A poll was conducted in 2007 by the American Psychological Association (APA). In a press release they noted that one-third reported they were living with "extreme stress" and 48% thought their stress had "increased over the past five years."<sup>3</sup> Russ Newman, APA executive director for professional practice, commented:<sup>4</sup>

*"Stress in America continues to escalate and is affecting every aspect of people's lives – from work to personal relationships to sleep patterns and eating habits, as well as their health.*

*We know that stress is a fact of life and some stress can have a positive impact, however, the high stress levels that many Americans report experiencing can have long-term health consequences, ranging from fatigue to obesity and heart disease."*

Fortunately, your breathing is not completely automatic. Controlled breathing is one strategy that has proven effective in reducing physiological stress indicators and improving feelings of being calm.

This means you can control your breath to help manage stress, improve relaxation and make greater strides to take control of your health. Let's start with a short explanation of some of the different parts of the nervous system.

## **Functions of the Sympathetic and Parasympathetic Systems**

Stress and your body's reactions to environmental stimuli that cause stress are survival mechanisms. However, chronic activation of the system causes the consistent release of hormones that produce harmful physiological changes.

While the fight-or-flight response is critical if you're facing down a bear or running from an assailant, ongoing exposure to societal stress can raise your risk of chronic disease and death.<sup>5</sup> Your response to a stressful situation begins in the amygdala of your brain,

which plays a role in how you handle the emotions associated with stress, joy and other scenarios.<sup>6</sup>

The amygdala sends a signal to the hypothalamus, which communicates to the body through the autonomic nervous system. This system controls functions in the body that happen automatically, such as your heart rate, blood pressure and breathing.

The autonomic nervous system has two parts, one that raises the alarm and another that helps calm you down. The sympathetic nervous system signals the fight-or-flight response to begin. This gives you the energy and focus you need to flee from a risky situation. Once the danger has passed, the parasympathetic nervous system helps apply the brakes to the release of hormones so that the body can rest.

Each of these changes happens quickly and without any input from you. This is why you can jump out of the way of a snake in the grass before you fully recognize there's anything in your path.

Keeping the sympathetic nervous system revved up and ready has a detrimental effect on your health. By using controlled breathing, you can calm yourself and create real physiological changes, including:<sup>7</sup>

- Lowering your heart rate and blood pressure
- Lowering levels of stress hormones
- Balancing carbon dioxide and oxygen blood levels
- Improving immune functioning and energy levels
- Increasing feeling of being calm

## **Box Breathing Reduces Stress and Promotes Health**

The technique of box breathing is what SEALS use. In this video, Mark Divine of SEALFIT demonstrates box breathing and tactical breathing. He explains tactical breathing is used during performance to calm the mind when you're under duress. For those of us

not in combat situations, this might happen in the boardroom, during an athletic competition or while taking a test.

SEALS use box breathing as the practice technique, so tactical breathing is effective when it's needed. There are four steps and each is done for the same amount of time. Breathing affects how you think and feel.<sup>8</sup> Lynne Everatt is an author, personal trainer and wellness expert from Toronto. She spoke to a reporter from Forbes, saying:<sup>9</sup>

*"Stress and anxiety trigger neurocircuitry that was designed to be used sparingly to deal with life-or-death threats, not on a daily basis as a response to gnarled traffic, a toxic boss or work overload.*

*Chronic stress has a corrosive effect on the brain that has been linked to degeneration of the hippocampus (the brain's memory center) and impaired functioning of the prefrontal cortex that can manifest in our lives as depression, dementia and impaired executive function."*

To begin practicing box breathing, get in a quiet place where you can concentrate and maintain good posture. Ideally, you'll want to measure how many cycles or minutes you can do the technique and work up to five minutes.<sup>10</sup>

Do each step below with focus and intention on your actions. Most people who use this technique recommend inhaling and exhaling to a count of four or five. Either is acceptable as long as each phase takes same the length of time.

Step 1 – Begin by exhaling the air out of your lungs to a slow count of four. Some recommend exhaling through your mouth; Divine recommends exhaling through your nose.

Step 2 – Hold your breath for a slow count of four.

Step 3 – Inhale slowly to a slow count of four through your nose, keeping your back straight and breathing through your abdomen so your shoulders do not rise.

Step 4 – Hold your breath for a slow count of four and return to step 1.

# Nose Breathing Offers Many Advantages

Breathing through your nose offers specific health benefits. Researchers have found that people who usually breathe through their mouth have a higher risk of sleep problems and attention deficit disorders.<sup>11</sup> One theory for this is the difference in brain oxygenation.

Individuals who mouth breathe tend to hyperventilate or get more oxygen than is needed.<sup>12</sup> This lowers the level of CO<sub>2</sub> in the body, which is important since you need a balance of oxygen and CO<sub>2</sub> to function optimally. Nose breathing helps accomplish this.

Your vagus nerve is the major part of the parasympathetic nervous system.<sup>13</sup> Diaphragmatic breathing, which you may have heard as slow abdominal breathing, triggers the vagus nerve and stimulates the parasympathetic nervous system. Since the 1970s, deep breathing has become a central part of helping reduce stress and anxiety, widely accepted by Western clinicians.<sup>14</sup>

By stimulating the vagus nerve and thus the parasympathetic nervous system, nose breathing can help reduce stress, anxiety and the release of stress hormones. Breathing through your nose helps you to breathe less.

This might sound like a bad recommendation, yet many people chronically over-breathe and deplete their carbon dioxide reserves. Chronic mouth breathing has been associated with several health problems, including:

- Sleep apnea<sup>15</sup>
- Bronchoconstriction with exercised-induced asthma<sup>16,17</sup>
- Abnormal facial development<sup>18,19</sup>
- Poor dental health<sup>20</sup>
- Hyperventilation, which results in reduced oxygen to your brain and heart<sup>21,22</sup>

## More Breathing Techniques to Improve Health

As I've written before in "Top Breathing Techniques for Better Health," the function behind box breathing that reduces stress, raises your CO2 level and signals your parasympathetic system is diaphragmatic breathing. You can easily assess your body's tolerance for CO2 at home, using a technique developed by Dr. Konstantin Pavlovich Buteyko.<sup>23</sup>

This Russian physician discovered that the level of CO2 in your lungs correlates with your ability to hold your breath after a normal exhalation. Begin by sitting straight with your feet flat to the floor. Take a small breath in and out through your nose. After exhaling, pinch your nose to keep air from entering and then start your stopwatch. Hold your breath until you feel the first desire to breathe. When you feel that urge, resume breathing and note the time.

Your first breath should be calm and controlled through your nose. If you feel like you had to take a deep breath, then you held your breath too long. What you just measured is called the "control pause," or CP. This is a reflection of the tolerance your body has for carbon dioxide. Most people can hold it 20 to 40 seconds, but 40 to 60 is optimal. Anything lower than 40 may be reason for concern.

One strategy for improving your CP is to raise your fitness and endurance levels. Another is to improve your breathing technique by expanding your abdomen rather than lifting your shoulders. When your shoulders lift during inhalation, it's called vertical breathing.

This can make you feel taller and it does not involve extending your stomach. However, correct breathing causes your midsection to widen and is called horizontal breathing. This engages your diaphragm, which allows you to take a more complete breath and stimulate your vagus nerve.

## **Nose Breathing Nitric Oxide May Have Antiviral Properties**

Another reason to breathe through your nose is to raise the production of nitric oxide (NO).<sup>24</sup> Your body produces NO in other places as well, including your endothelial cells.

This is a soluble gas that has some exceptional health benefits, some of which I discuss in "The Importance of Healthy Bacteria in Nitric Oxide Production."

Many of those benefits may be a result of NO being a signaling molecule. Doctors use the gas in a number of clinical settings, including to help reverse pulmonary high blood pressure in newborns. NO produced by your endothelium helps to relax arteries and reduce blood pressure. This helps to promote oxygenation to all your organs.<sup>25</sup>

Another benefit of inhaled nitric oxide has been in the treatment of viral infection. Clinical trials are currently underway for the treatment of people infected with SARS-CoV-2. The principal actions that could help combat COVID-19 include:<sup>26</sup>

- Dilating pulmonary arteries to help the lungs get more blood
- Opening bronchial airways to increase oxygen delivery
- Directly eliciting antiviral activity against the virus

Louis J. Ignarro, Ph.D., author of the article in *The Conversation*, was one of three recipients of the Nobel Prize in physiology or medicine in 1998. The group of pharmacologists discovered how nitric oxide was produced and how it functions in the body.<sup>27</sup> Nitric oxide is produced in the nasal cavity, but not in the mouth.

This means that those who chronically breathe through their mouth are bypassing production that can be inhaled into the lungs.<sup>28</sup> This direct delivery helps increase air flow and blood flow within the lung tissue, and it inhibits the growth and replication of viruses and other microorganisms. There is a clinical trial currently underway to:<sup>29</sup>

*"... determine whether inhaled NO improves short term respiratory status, prevents future hospitalization, and improves the clinical course in patients diagnosed with COVID-19 specifically in the emergency department."*

You can help boost your NO production at home using a simple, four-minute exercise three times a day. Dr. Zach Bush, whose triple-board certification includes expertise in internal medicine, endocrinology and metabolism, named the exercise the Nitric Oxide Dump. He says it is anaerobically efficient and the more you do it, the better it works.

The exercise can be done at home with no equipment and can accommodate every fitness level. It works by stimulating the release of nitric oxide. You'll find more about the exercise, how to do it and why it's so beneficial at "Fitness Checkup: Why You Need to Try the Nitric Oxide Dump Workout."

## Sources and References

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