

Simply training yourself to breathe through your nose could cut total exertion in half and offer huge gains in endurance. Athletes felt invigorated while nasal breathing rather than exhausted.

**Mouthbreathing, it turns out, changes the physical body and transforms airways, all for the worse.** It causes the body to lose 40% more water. Chronic insomnia is often a breathing problem. No amount of snoring is normal. Mouthbreathing delivers a disturbance of oxygen to the prefrontal cortex, the area of the brain associated with ADHD. It contributes to periodontal disease and bad breath, and was the number one cause of cavities, even more damaging than sugar consumption, bad diet, or poor hygiene

**Inhaling from the nose has the opposite effect.** It forces air against all those flabby tissues at the back of the throat, making the airways wider and breathing easier. After a while, these tissues and muscles get “toned” to stay in this opened and wide position. Nasal breathing begets more nasal breathing. Working together, the different areas of the turbinates heat, clean, slow, and pressurize air so that the lungs can extract more oxygen with each breath. This is why nasal breathing is far healthier and more efficient than breathing through the mouth.

Native Americans train their children to breathe through their noses, all day, every day. It is a habit they carry with them the rest of their lives. Every tribe we visited over several years—dozens of them—shared the same breathing habits. They also shared the same vigorous health, perfect teeth, and forward-growing facial structure.

With nasal breathing, sinuses release a huge boost of nitric oxide and can boost nitric oxide 6-fold, which is one of the reasons we can absorb 18% more oxygen than by breathing through the mouth. By mouth taping, Burhenne and his wife cured their own snoring. Keeping the nose constantly in use trains the tissues inside the nasal cavity and throat to flex and stay open. Using a postage-stamp-size piece of tape at the center of the lips, one man reversed aging through nothing more than stretching and breathing.

A study of Tibetans found that the greatest indicator of life span was lung capacity. Katharina Schroth developed something called “orthopedic breathing” in the 1940s. She ran a bustling institute in rural western Germany. Within a few weeks, Scoliosis patients with hunched backs straightened and many gained inches in height. Women who had been bedridden and hopeless began to walk again and take full breaths.

Emphysema is a gradual deterioration of lung tissue marked by chronic bronchitis and coughing—a disease of exhalation. The typical adult engages as little as 10% of the range of the diaphragm when breathing. Extending those breaths to 50 to 70% of the diaphragm’s capacity will ease cardiovascular stress and allow the body to work more efficiently. Carl Stough would have them hold their breath and count from 1 to 5 as many times in a row as they could. He told them to inhale and exhale *very slowly*. They were training an involuntary muscle—the diaphragm—to lift higher and drop lower. He’d found a way to access the rest of the lungs, the areas still functioning, and engage them on a larger level.

Carl Stough found that elite athletes suffered from the same “respiratory weakness” as everyone else: they got the same colds and flus and lung infections. Most of them breathed way too often, high in their chests. After only a few sessions, all the runners reported feeling better and breathing better. They took half the time to recover between races and were soon breaking personal bests and edging toward world records. Stough moved to South Lake Tahoe to train runners preparing for the 1968 Summer Olympics in Mexico City. Americans were the only runners to not use oxygen before or after a race, which was unheard of at the time. But when he died so did his therapy.

After several rounds of deep breaths to open my rib cage, Lynn Martin asked me to start counting from 1 to 10 over and over with every exhale. “1, 2, 3, 4, 5, 6, 7, 8, 9, 10; 1, 2, 3, 4, 5, 6, 7, 8, 9, 10—then keep repeating it,” she said. At the end of the exhale, when I was so out of breath I couldn’t vocalize anymore, I was to keep counting, but to do so silently, letting my voice trail down into a sub-whisper. The point was to get the diaphragm accustomed to this wider range so that deep and easy breathing became unconscious.

**Big, heavy breaths are bad for us because they deplete our bodies of carbon dioxide.** The best way to prevent many chronic health problems, improve athletic performance, and extend longevity is to focus on how we breath, specifically to balance oxygen and carbon dioxide levels in the body. To do this, **we need to learn how to inhale and exhale slowly.** For every 10 pounds of fat lost in our bodies, 8 ½ pounds of it comes out through the lungs as carbon dioxide mixed with water vapor. Most doctors, nutritionists, and other medical professionals have historically gotten it wrong. The lungs are the weight-regulating system of the body. What our bodies really want, what they require to function properly, is more carbon dioxide.

When breathing at a normal rate, our lungs absorb only about a 1/4 of the available oxygen in the air. The majority is exhaled back out. By taking longer breaths, we allow our lungs to soak up more in fewer breaths. With training and patience, you can perform the same exercise workload with only 14 breaths per minute instead of 47 using conventional techniques.

From 1850 to 1960, the American mean body mass index (BMI), was between 20 and 22. Today it is 29. Medically normal today is between 12 and 20 breaths a minute. Just as we’ve become a culture of overeaters, we’ve also become overbreathers. Practice fewer inhales and exhales in a smaller volume. Occasionally willing the body to breathe way less has potent benefits just as fasting does. Slower, longer exhales mean higher carbon dioxide levels and higher aerobic endurance. What if overbreathing wasn’t the result of hypertension and headaches but the cause? Limiting our inhales while extending exhales far past the point of what feels comfortable, or even safe gets the body comfortable with higher levels of carbon dioxide, so that we’ll unconsciously breathe less during our resting hours.

In the late 1950s Konstantin Pavlovich Buteyko went to Siberia to conduct the most exhaustive breathing experi-

ments ever attempted. He developed techniques to train patients to take in less air. Around this time in Zlin, Czechoslovakia Emil Zatopek was experimenting with breathing techniques. He'd run as fast as he could holding his breath, take a few huffs and puffs and then do it all again. It would become known as hypoventilation training. He won gold at the 1952 Olympics in the 5000 and 10,000 meters. Zátópek would claim 18 world records, 4 Olympic golds and a silver over his career. He was later named the "Greatest Runner of All Time"

In the 1970s, a swim coach name James Counsilman trained his team to hold their breath for as many as 9 strokes. At the Montreal Olympics they won 13 gold medals, 14 silver, and 7 bronze, and set world records in 11 events. Their muscles adapted to tolerate more lactate accumulation, which allowed their bodies to pull more energy during states of heavy anaerobic stress, and, as a result, train harder and longer. Inhaling for 2 steps and exhaling for 5, is a pattern competitive cyclists use.

Asthma is the leading cause of emergency room visits, hospitalizations, and missed school days for children. It can be brought on by overbreathing, which is why it's so common during physical exertion. Many asthma sufferers have trained themselves to breathe less and reported dramatic improvement. Some Olympians used breathing less methods. All claimed gains in performance and blunted the symptoms of respiratory problems by decreasing the volume of air in their lungs and increasing the carbon dioxide in their bodies.

In 2014 Alicia Meuret and a team of researchers at Southern Methodist University measured the effects of practicing breathing less to maintain carbon dioxide level at 5.5% in their exhaled breath. They all breathed better. The symptoms of asthma were either gone or markedly decreased. When people hyperventilate, they take in too much air--but the sensation that they get is shortness of breath. Willing the body to breathe less air appears to correct that system error.

Nobody seems to know exactly why breathing less is so effective in treating asthma and other respiratory conditions or how it works. **When we breathe slower and hold in more carbon dioxide, pH lowers and blood becomes more acidic.** Almost all cellular functions in the body take place at a blood pH of 7.4, our sweet spot between alkaline and acid. When we stray from that, the body will do whatever it can to get us back there. "Buffering" is a process in which an alkaline compound called bicarbonate is released into the urine. Buffering is meant as a temporary fix, not a permanent solution. Weeks, months, or years of overbreathing, and this constant kidney (renal) buffering will deplete the body of essential minerals. Without healthy stores of these minerals, nothing works right. This is why asthmatics are prescribed supplements like magnesium to stave off further attacks. Constant buffering also weakens the bones. Mammals with the lowest resting heart rates live the longest--the same that breathe the slowest. The only way to retain a slow resting heart rate is with slow breaths.

The minute we stopped mouthbreathing, Olsson snored for 3 minutes while I clocked in at 6, a 4,000% decrease from 10 days ago [while mouthbreathing]. Our sleep apnea, which disappeared the first night of nasal breathing, has not returned. My blood pressure dropped 10 points. My carbon dioxide levels consistently rose.

The changes triggered by the rapid industrialization of farmed foods were severely damaging. Within just a few generations of eating this stuff, modern humans became the worst breathers in Homo history. Around 1500, for the first time, humans could spend their entire lives eating nothing but processed food. Urban populations grew sicker and smaller. In the 1730s, before the onset of industrialization, the average Briton stood about 5' 7". Within a century, populations shrank 2 inches, to less than 5' 5". The human face began deteriorating, too. Mouths shrank and facial bones grew stunted. Dental disease became rampant, and the incidence of crooked teeth and jaws increased 10fold in the Industrial Age. Breathing problems skyrocketed.

We have known for a long time that savages have excellent teeth and civilized men have terrible teeth. Societies that replaced their traditional diet with modern, processed foods suffered up to 10X more cavities, severely crooked teeth, obstructed airways, and overall poorer health. Some cultures ate nothing but meat, while others were mostly vegetarian. Some relied primarily on homemade cheese; others consumed no dairy at all. Their teeth were almost always perfect; their mouths were exceptionally wide, nasal apertures broad. They suffered few, if any, cavities and little dental disease. Respiratory diseases such as asthma or even tuberculosis were rare. The constant stress of chewing is lacking from our diets. Even what's considered healthy food today--smoothies, nut butters, oatmeal, avocados, whole wheat bread, vegetable soups is all soft. Our ancient ancestors chewed for hours a day, every day. What looked like human progress had horrible consequences.

The earliest orthodontics devices weren't intended to straighten teeth, but to widen the mouth and open airways. Teeth will grow in naturally straight if they have enough room. The combination of extractions and retractive orthodontics hindered forward facial growth and breathing. In 10 years, nobody will be using traditional orthodontics to correct "oral posture." **We should always breathe slowly through the nose into the abdomen.**

Theodore Belfor had me run my hands along my skull until I felt the web of cracks and ridges, called sutures. Sutures spread apart throughout our lives. This spreading allows the skull bone to flex and expand to double its size from infancy to adulthood. Inside these sutures, the body creates stem cells. Unlike other bones in the body, the bone that makes up the center of the face, called the maxilla, is made of a membrane bone that's highly plastic. It can remodel and grow denser into our 70s, and likely longer. The way **we produce and signal stem cells to build more maxilla bone in the face** is by engaging the masseter-- **by clamping down on the back molars over and over--chewing.**

The more we gnaw, the more stem cells release, the more bone density and growth we'll trigger, the younger we'll look and the better we'll breathe. It starts at infancy. The chewing and sucking stress required for breastfeeding exercises the masseter and other facial muscles and stimulates more stem cell growth, stronger bones, and more pronounced airways. The more time infants spent chewing and sucking, the more developed their faces and airways would become, and the better they'd breathe later in life. There is lower incidence of crooked teeth and snoring and sleep apnea in infants

who were breastfed longer over those who were bottle-fed. The palates of ancient skulls measured an average of 2.37 inches wide. By the late 19th century, mouths had shrunk to 2.16 inches. Whenever people switched from harder foods to soft foods, faces would narrow, teeth would crowd, jaws would fall out of alignment. Breathing problems would often follow. 90% of us have some form of malocclusion. Crooked teeth is a “disease of civilization.”

1 year to the week after I began wearing Belfor’s [upper palate-expanding] retainer, I visited a private radiology clinic. The results were stunning. At 55 years of age I had gained 1.658 cubic mm of new bone in my cheeks and right eye socket, the equivalent volume of 5 pennies. I’d also added .118 cubic mm of bone along my nose, and .178 along my upper jaw. My jaw position became better aligned and balanced. My airways widened and became firmer. The deposit of pus and granulation that had accumulated in my maxillary sinuses, likely the result of mild chronic obstruction, was completely gone.

Simpler intense methods of breathing slowly, less, and through the nose with a big exhale, can also diffuse stress and restore balance. Willing ourselves to breathe slowly opens communication along the vagal network and relaxes us into a parasympathetic state. Breathing really fast and heavy on purpose flips the vagal response the other way, shoving us into a stressed state. I heard dozens of stories. Men, mainly in their 20s, who’d suddenly been diagnosed with arthritis and psoriasis or depression, who, weeks after practicing heavy breathing, no longer suffered any symptoms.

Wim Hof, a Dutch man, ran a half-marathon through the snow above the Arctic Circle shirtless in bare feet. In 2011 researchers at Radboud University Medical Center in the Netherlands began to study Hof. To practice Hof’s breathing method, find a quiet place and lie flat on your back with a pillow under your head. Relax the shoulders, chest, and legs. Take a very deep breath into the pit of your stomach and let it back out just as quickly. Keep breathing this way for 30 cycles. If possible, breathe through the nose; if the nose feels obstructed, try pursed lips. Each breath should look like a wave, with the inhale inflating the stomach, then the chest. You should exhale all the air out in the same order. At the end of 30 breaths, exhale to the natural conclusion, leaving about a quarter of the air left in the lungs, then hold that breath for as long as possible. Once you’ve reached your breathhold limit, take a huge inhale and hold it another 15 seconds. Very gently, move that fresh breath of air around the chest and to the shoulders, then exhale and start the heavy breathing again. Repeat the whole pattern 3 or 4 rounds and add in some cold exposure (cold shower, ice bath, naked snow angels) a few times a week. This flip-flopping—breathing all-out, then not at all, getting really cold and then hot again—is the key to Tummo’s magic. It forces the body into high stress one minute, a state of extreme relaxation the next. Carbon dioxide levels in the blood crash, then build back up. Tissues become oxygen deficient and then flooded again. The body becomes more adaptable and flexible and learns that all these physiological responses can come under our control. Conscious heavy breathing allows us to bend so that we don’t get broken. *Tummo* is for the reconstitution of man’s immune system. It’s a fabulous way for the future of man’s health.

*Holotropic Breathwork* was created by a Czech psychiatrist named Stanislav Grof to rewire the mind. Whenever the body is forced to take in more air than it needs, we exhale too much carbon dioxide, which narrows the blood vessels and decreases circulation, especially in the brain. Blood flow can decrease by 40%, an incredible amount. Consciously sustaining these stress signals long enough may trick the more primitive limbic system into thinking the body is dying.

Some freedivers can hold their breath underwater for 10 minutes. They have trained their chemoreceptors to withstand extreme fluctuations in carbon dioxide without panic. Sleep apnea, a form of chronic unconscious breathholding, is terribly damaging.

Thermal baths contain high levels of carbon dioxide that is absorbed through the skin. Blends of 30% carbon dioxide and 70% oxygen became a go-to treatment for anxiety, epilepsy, and even schizophrenia. With a few huffs, patients who’d spent months or years in a catatonic state would suddenly come to. They’d open their eyes, look around, and begin calmly talking with doctors and other patients. Nobody disproved it. The data, the science, still holds today. Joseph Wolpe rediscovered carbon dioxide therapy as a treatment for anxiety and wrote an influential paper about it in the 1980s. He theorized that the gas might help reset the chemoreceptors in the brain, allowing patients to breathe normally so they could think normally.

Anxiety disorders and depression are the most common mental illnesses in the US. 13% over the age of 12 use antidepressants. Meditation can change the structure and function of critical areas of the brain, help relieve anxieties, and boost focus and compassion. Panic, like asthma, is usually preceded by an increase in breathing volume and rate and a decrease in carbon dioxide. To stop an attack before it struck, subjects breathe slower and less, increasing their carbon dioxide. ‘Take a deep breath’ is not helpful. Hold your breath is much better.

Nobody knows how Maurice Daubard, Wim Hof, and their followers can sit naked in the snow for hours and not get hypothermia or frostbite. They’re able to increase body temperature by double digits and stay steaming hot in sub-zero temperatures for hours. It baffles me how heavy *Breathing+* techniques like *Holotropic Breathwork* can induce such hyper-surreal and hallucinatory effects. Researchers in the US and Europe have spent decades sticking nodes and probes into people trying to understand the hidden mechanism behind these techniques. But no one has found or explained it. Prana translates to “life force” or “vital energy.” The Chinese called it chi. They created acupuncture to open up prana channels and yoga postures to awaken and distribute the energy. Spicy foods contained large doses of prana, which is one of the reasons traditional Indian and Chinese diets are often hot. But the most powerful technique was to inhale prana: to breathe. Western science has never observed prana, or even confirmed that it exists.

When Swami Rama “woke up” from a half-hour in a comatose state, he gave a detailed recap of the conversation in the room that had occurred while he displayed brain waves of deep sleep. He slowed his heart rate from 74 to 52 beats in less than 60 seconds. Later, he increased his heart rate from 60 to 82 beats within 8 seconds. The results of the experiment were

reported in The New York Times. Within 15 minutes, he was able to create a temperature difference of 11 degrees between his little finger and thumb. Rama's hands never moved. Oxygen, carbon dioxide, pH levels, and stress hormones played no part in Rama's abilities. Blood gases and nervous system were normal throughout each of the experiments.

Thérèse Brosse recorded a yogi doing the same thing 40 years earlier: stopping and starting his heart on demand. Other subjects would take a brief inhale and then exhale to a count of 6. As they progressed, they could inhale to a count of 4 and exhale to 8, with the goal of reaching a half-minute exhale after 6 months of practice. Upon reaching this 30 count, Rama promised his students, they "will not have any toxins and will be disease-free."

Nobel Prize winner, Hungarian Albert Szent-Györgyi, in the 1940s headed the National Foundation for Cancer Research. He proposed an explanation for the subtle energy that drives everything in the universe. "Everything around us is composed of molecules, which are composed of atoms. All matter is, at its most basic level, energy."

Medicine has its limitations. Breathing techniques are best suited to serve as preventative maintenance, a way to retain balance in the body so that milder problems don't blossom into more serious health issues. 30 pounds of air passes through our lungs every day and 1.7 pounds of oxygen. The body is not designed to process raw air for hours at a time. One of the first steps in healthy breathing is to extend breaths, to move the diaphragm up and down a bit more, and to get air out of us before taking a new one in. The bones in the human face don't stop growing in our 20s, unlike other bones in the body. They can expand and remodel into our 70s, and likely beyond. In the meantime, lips together, teeth slightly touching, and tongue on the roof of the mouth. to breathe heavily for a short, intense time, however, can be profoundly therapeutic. "It's only through disruption that we can be normal again," The perfect breaths: Breathe in for about 5.5 seconds, exhale for 5.5 seconds. That's 5.5 breaths a minute for a total of about 5.5 liters of air.

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