

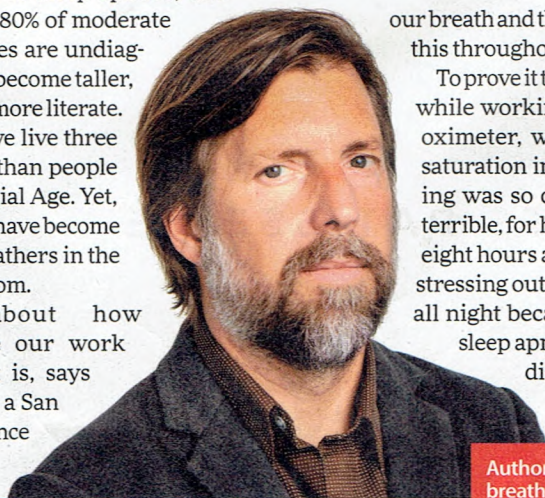
BREATHERS OF THE LOST ART

Good breathing is the key to living longer, says US science journalist and author James Nestor, but humans are among the worst breathers on the planet. **by MARK BROATCH**

Humans are in a mess. We live sedentary lifestyles, eat poorly and too much, and we sit in our workplaces for eight hours a day hunched over our keyboards, all of the time hardly ever taking a proper breath. A large percentage of the population suffers from chronic nasal obstruction, and perhaps half of us are habitual mouth breathers. Most children have some degree of deformity in their mouths and noses. Forty-five percent of adults snore occasionally, and a quarter of the population snores constantly.

Twenty-five percent of US adults aged over 30 choke due to sleep apnoea, and an estimated 80% of moderate or severe cases are undiagnosed. We've become taller, stronger and more literate. On average, we live three times longer than people in the Industrial Age. Yet, somehow, we have become the worst breathers in the animal kingdom.

Think about how uncondusive our work environment is, says James Nestor, a San Francisco science journalist.



"We sit for eight hours, stooped over, so even if we wanted to take a deep, enriching breath into the lower lobes of our lungs, we can't. Then we're stressed out by Twitter and by phone calls and by email, so our unconscious brain views this as a threat, so we start holding

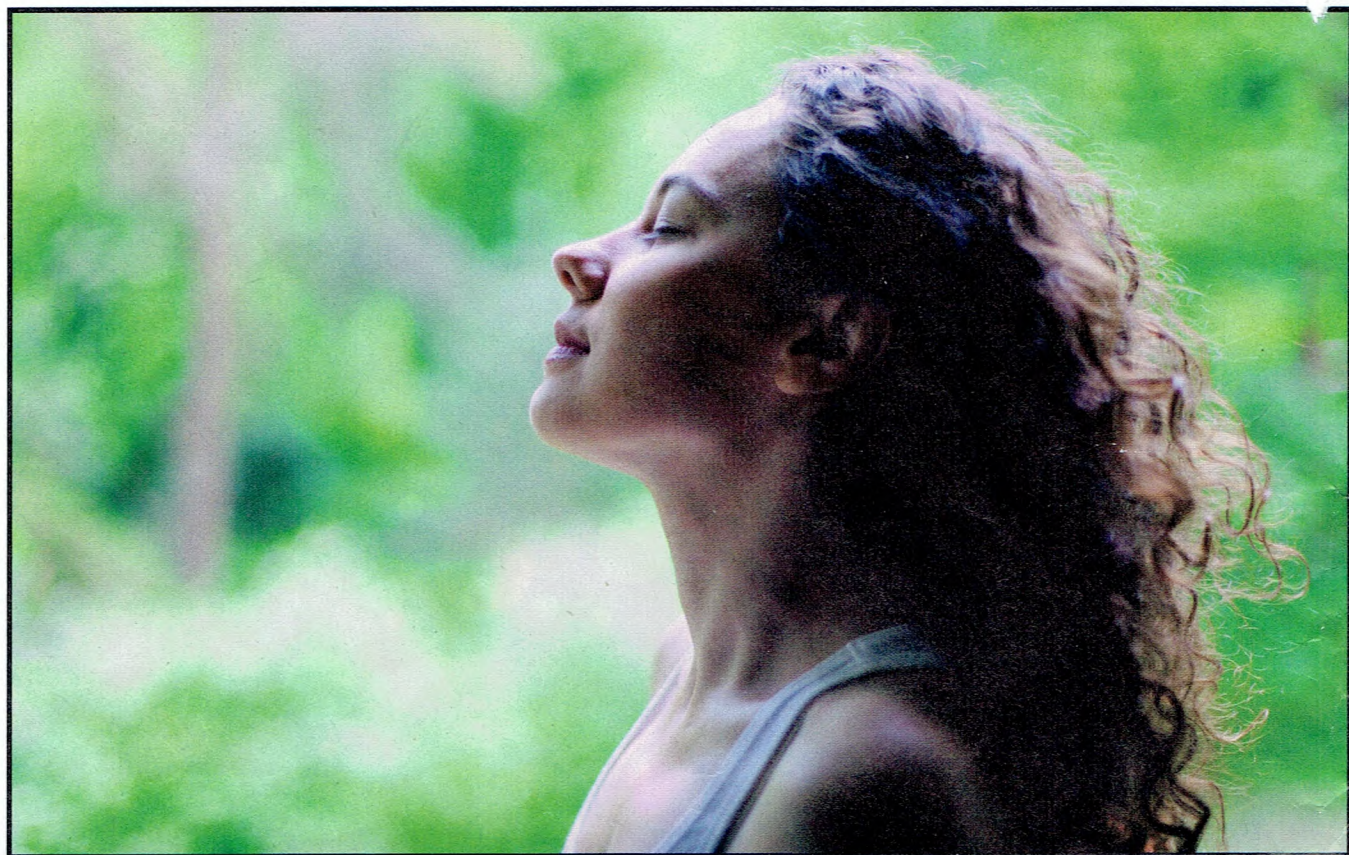
A large percentage of the population suffers from chronic nasal obstruction, and perhaps half of us are habitual mouth breathers.

our breath and then fast-breathing. We do this throughout the day."

To prove it to himself, for several days while working, Nestor wore a pulse oximeter, which measures oxygen saturation in blood. "And my breathing was so dysfunctional, it was so terrible, for hours at a time." We spend eight hours at work stooped over and stressing out and then breathe poorly all night because we snore and have sleep apnoea. "That is a recipe for disaster and a reason every disease for modern

Author James Nestor: "My breathing was terrible for hours at a time."





humans is attached to inflammation and chronic low-grade stress."

A big reason for our breathing difficulties, says Nestor, is that the human face has changed so dramatically in just the past few hundred years. "Our mouths are too small,

"The quickly growing brain needed space to stretch out, and it took it from the front of our faces, home to sinuses, mouths and airways."

so teeth grow in crooked. You have a smaller mouth, you have a smaller airway. That's one of the main reasons so many of us are suffering from so many chronic respiratory problems: we can't breathe, the pipe's plugged up."

Yet we can expand our airways and increase our lung capacity simply by breathing better, says Nestor. What's more, he writes in *Breath: The New Science of a Lost Art*, we've known this for thousands of years.

But why have our faces changed? It's a story of evolution – or rather dysevolution,

in the term popularised by the Harvard biologist Daniel Lieberman. What happened is that we learnt how to mash and cook food, says Nestor. Over many thousands of years, our brains got bigger. "The quickly growing brain needed space to stretch out, and it took it from the front of our faces, home to sinuses, mouths and airways. The face shortened and the mouth shrank, leaving behind a bony protuberance that replaced the squashed snout of our ancestors. This new feature distinguished us from other primates: the protruding nose."

This smaller, vertically positioned nose was less efficient at filtering air, and it exposed us to more airborne pathogens and bacteria. Our larynx had already dropped down our throat, which meant we could communicate in complex language, but were at greater risk of choking.

But the big problem was that our diet in the past few centuries required far less chewing. "If you're wandering around with your mouth open and you're eating soft, industrialised foods, you're not getting any exercise in your airways. And so your airways will get flabby, just like any other part of your body." Our ancestors had adapted to those earlier gradual changes over many thousands of years just fine. Cavemen didn't snore.

"If you look at the human species, you

look at the rates of obesity, of autoimmune diseases, of asthma, osteoporosis, we're developing characteristics that are not advantageous to us in any way."

Are we really the worst breathers in the world? "There are some breeds of dogs that

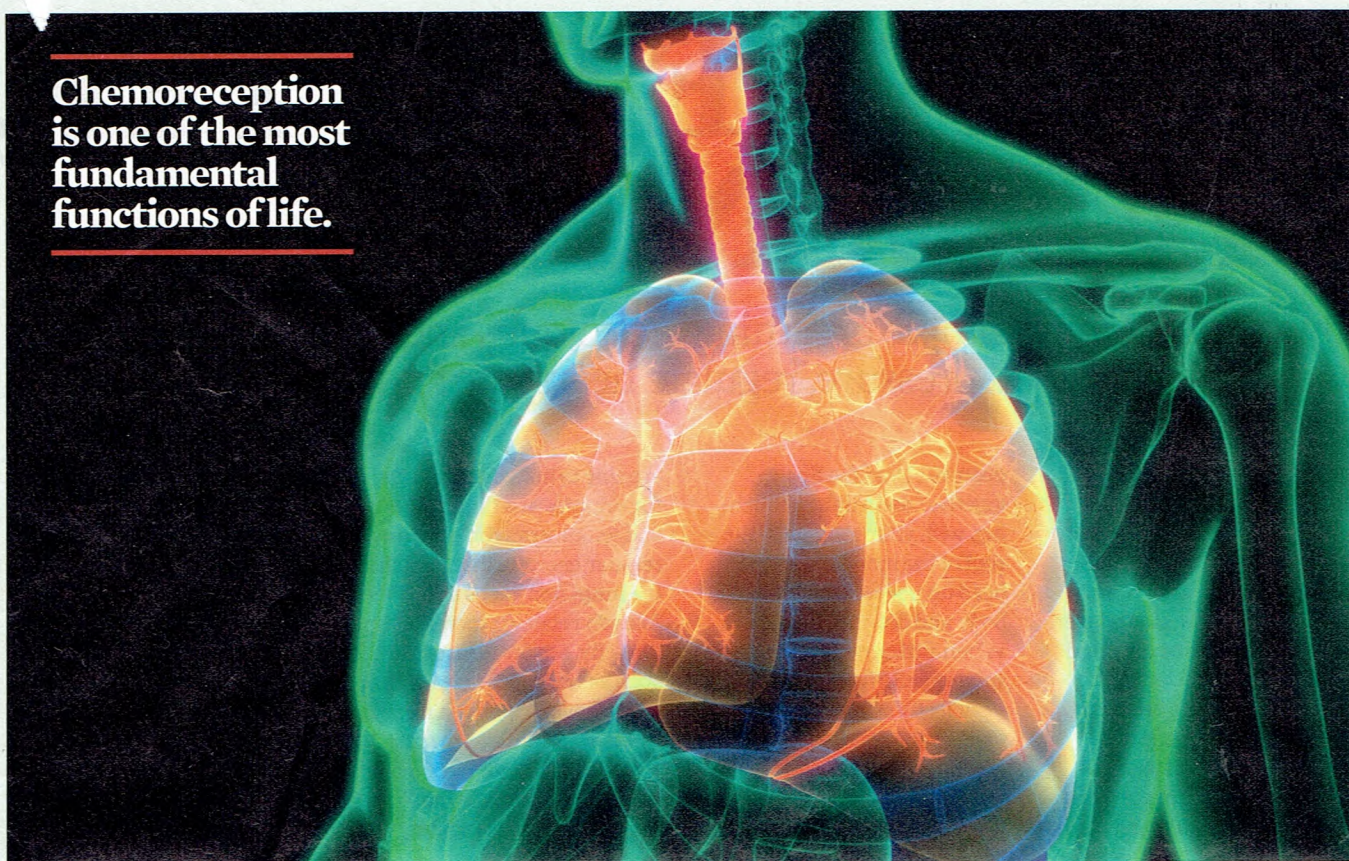
Breathing through your nose is crucial because it clears air, heats it and moistens it. It also triggers hormones and chemicals that lower blood pressure.

are pretty close contenders, if you look at bulldogs or pugs," he says. "But they have been bred to have the same flat face that humans now have."

GOOD SLEEP

Why is breathing through our mouth so bad? Breathing through your nose rather than your mouth is crucial because it clears air, heats it and moistens it for easier absorption. The nose can also trigger a cascade of hormones and chemicals that lower blood

**Chemoreception
is one of the most
fundamental
functions of life.**



Something in the air

Exclusive extract from James Nestor's *Breath*.

The nagging need to breathe is activated from a cluster of neurons called the central chemoreceptors, located at the base of the brain stem. When we're breathing too slowly and carbon-dioxide levels rise, the central chemoreceptors monitor these changes and send alarm signals to the brain, telling our lungs to breathe faster and more deeply. When we're breathing too quickly, these chemoreceptors direct the body to breathe more slowly to increase carbon-dioxide levels. This is how our bodies determine how fast and often we breathe, not by the amount of oxygen, but by the level of carbon dioxide.

Chemoreception is one of the most fundamental functions of life. When the first aerobic life forms evolved two and a half billion years ago, they had to sense carbon dioxide to avoid it. The chemoreception that developed passed up through bacteria to more complex life. It's what stimulates the suffocating feeling you just

**“It’s what stimulates
the suffocating feeling
you just felt holding
your breath.”**

felt holding your breath.

As humans evolved, our chemoreception became more plastic, meaning it could flex and shift with changing environments. It's this ability to adapt to different levels of carbon dioxide and oxygen that helped humans colonise altitudes 245m below and 4850m above sea level.

Today, chemoreceptor flexibility is part of what distinguishes good athletes from great ones. It's why some elite mountain climbers can summit Mt Everest without supplemental oxygen, and why some freedivers can hold their breath underwater for 10 minutes. All these people have trained their chemoreceptors to

withstand extreme fluctuations in carbon dioxide without panic.

All this suggests that for the past hundred years, psychologists may have been treating chronic fears and all the anxieties that come with them in the wrong way. Fears weren't just a mental problem, and they couldn't be treated by simply getting patients to think differently. Fears and anxiety had a physical manifestation, too. They could be generated from outside the amygdalae, from within a more ancient part of the reptilian brain.

Eighteen percent of Americans suffer from some form of anxiety or panic, with these numbers rising every year. Perhaps the best step in treating them, and hundreds of millions of others around the world, was by first conditioning the central chemoreceptors and the rest of the brain to become more flexible to carbon-dioxide levels. By teaching anxious people the art of holding their breath.

BREATHE BETTER, LIVE LONGER

By adopting some simple breathing techniques and doing more exercise, we can lower blood pressure, regulate heart rate and ease digestion.

FOLLOW YOUR NOSE

Breathe through your nose rather than your mouth. Your nose clears air, heats it and moistens it for easier absorption. The nose can also trigger a cavalcade of hormones and chemicals that lower blood pressure, regulate our heart rate and ease digestion. Breathing through your mouth is likely to exacerbate constricted airways and compound any health problems. Says science journalist James Nestor: "To me, the most effective ones are the simplest ones. Breathe through your nose. Breathe slowly. Breathe lightly. Breathe deeply into your lungs. And just be aware of your breathing throughout the day."

CHEW

Hard chewing exercises the powerful masseter and other facial muscles, building new bone in the face and opening the airways, says Nestor. We may even look younger. But most people don't have the several hours of chewing time needed to gain such benefits. Any gum chewing can strengthen the jaw and stimulate stem-cell growth, but harder, textured varieties offer a more vigorous workout. Falim or mastic gums are hard enough, but may be difficult to find. There are devices that stimulate chewing stress or expand the palate, but contact your dentist first.

HEAD AND TONGUE

Maintain correct "oral

posture". Hold the lips together, teeth lightly touching, with your tongue on the roof of the mouth. Hold the head up perpendicular to the body and don't kink the neck. When sitting or standing, the spine should form a J-shape – perfectly straight until it reaches the small of the back, where it naturally curves outward. While maintaining this posture, we should breathe slowly through the nose into the abdomen. Try tongue thrusting or mewing: push the back of the tongue against the back roof of the mouth and move the rest of the tongue forward, like a wave, until the tip hits just behind the front teeth.

EXERCISE

Freedivers have made their lungs larger, some by 40%, and

are able to hold their breath for minutes at a time, by hard and lengthy practice. But any regular exercise that stretches the lungs and keeps them flexible can retain or increase lung capacity. Moderate exercise such as walking or cycling has been shown to boost lung size by up to 15%. Lung capacity, according to a couple of major long-term studies, is the No 1 correlation with longevity.

HUMMING

Nitric oxide widens capillaries, increases oxygenation and relaxes the smooth muscles. Humming increases the release of nitric oxide in the nasal passages 15-fold. This is the most effective, and simple, method for increasing this gas: breathe normally through the nose and hum any song or sound. Practise for at least

five minutes a day, or more if possible. It may sound and feel ridiculous and annoy those nearby, but the effects can be potent.

TRY ALTERNATE-NOSTRIL BREATHING

Our nostrils pulse in a regular rhythm, apparently connecting to different parts of our

Lung capacity, according to a couple of major long-term studies, is the No 1 correlation with longevity.

nervous system and reflecting our general state of health. The most basic alternate nose-breathing technique involves placing an index finger over the left nostril and then inhaling and exhaling only through the right. Nestor tried this one day two dozen times after each meal, which he found heated up his body and aided his digestion. Before meals, and any other time he wanted to relax, he'd switch sides, repeating the same exercise with his left nostril open. To gain focus and a sense of body balance, he followed a technique called surya bhedana pranayama, which involves taking one breath into the right nostril, then exhaling through the left, for several rounds.



◀ pressure, regulate our heart rate and ease digestion.

In his trial of solely mouth breathing, Nestor found his blood pressure spiked, raising his risk of heart attacks, stroke and other serious problems, his pulse increased, his body temperature dropped, and his mental clarity plummeted. Indeed, the slur on mouth breathers may not be entirely wrong, if perhaps switching cause and effect. Rats that had their nostrils obstructed developed fewer brain cells and took twice as long to make their way through a maze than nasal-breathing controls.

“You’ll find that 50% of insomniacs are suffering from serious breathing dysfunction.”

Another study, on humans, found that mouth breathing delivered a disturbance of oxygen to the brain’s prefrontal cortex. Nasal breathing had no such effects.

Good breathing and good sleep are closely tied. “If you look at the data, and you find that 50% of insomniacs are suffering from serious breathing dysfunction, you wonder why so many people aren’t sleeping well; why they’re waking up tired, why they’re waking up with dry mouths and fatigue and feeling like they had just slept a few hours. The quality of sleep is so important. You can use any sort of hacks – essential oils, music in the background, any bed you want – but none of that matters unless you’re breathing properly when sleeping. And such a huge chunk of the population is not. They suffer from very severe breathing dysfunction while sleeping.”

DIABETES AND SLEEP APNOEA

Overweight people breathe more, says Nestor, and often have very obstructed airways. “Here’s what we know: if you are obese or overweight, you are going to have a harder time taking deeper, lighter breaths. You will tend to be breathing more into your chest, which will make it harder for you to lose weight.” Also, obese people are more likely to have sleep apnoea and metabolic issues, because they are stressing their bodies out throughout the night and spiking their blood sugar, he says, which is why diabetes can be caused by sleep apnoea.

During the deepest, most restful stages of sleep, the brain’s tiny pituitary gland secretes hormones that control the release of adrenaline, endorphins, growth hormone and other substances, including vasopressin, which communicates with cells to store more water. This is how animals can sleep through the night without feeling thirsty or needing to relieve themselves.

“But if the body has inadequate time in deep sleep, as it does when it experiences chronic sleep apnoea, vasopressin won’t be secreted normally. The kidneys will release water, which triggers the need to urinate and signals to our brains that we should consume more liquid. We get thirsty, and we need to pee more.” Snoring and sleep apnoea can lead to bed-wetting, attention deficit hyperactivity disorder, diabetes, high blood pressure and cancer.

Much of the blame for so many people suffering from chronic nasal obstruction and being habitual mouth breathers can be placed on our shrinking airways. “When mouths don’t grow wide enough, the roof of the mouth tends to rise up instead of out, forming what’s called a V-shape or high-arched palate. The upward growth impedes development of the nasal cavity, shrinking it and disrupting the delicate structures. The reduced nasal space leads to obstruction and inhibits airflow.” ▶

Feel the weight

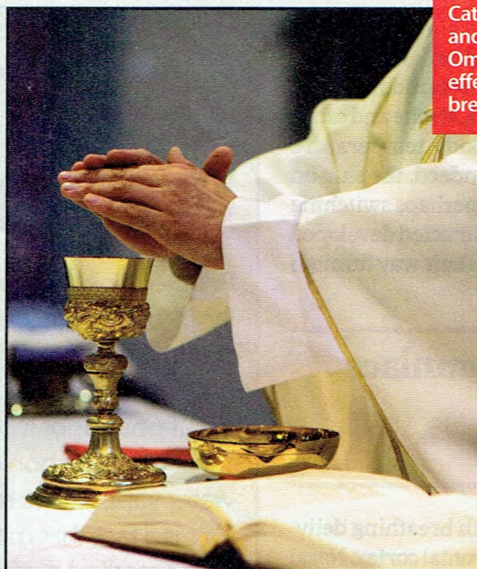
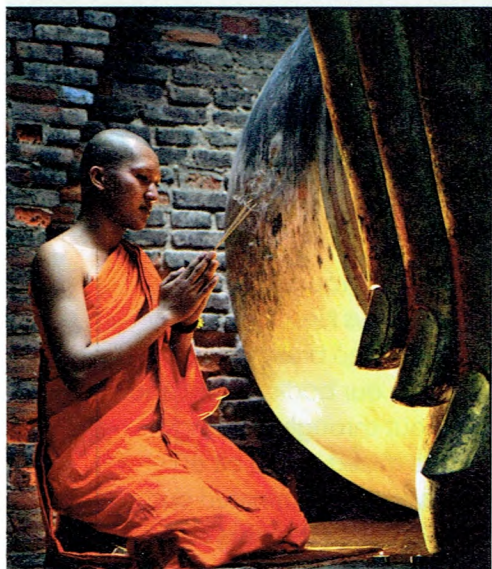
People think they lose weight through “burning it off” or profusely sweating, says Nestor, but they don’t. They do it through exhaled breaths. “For every 10 pounds of fat lost in our bodies, eight and a half pounds of it comes out through the lungs; most of it is carbon dioxide mixed with a bit of water vapour. The rest is sweated or urinated out. This is a fact that most doctors, nutritionists and other medical professionals have historically got

“For every 10 pounds of fat lost in our bodies, eight and a half pounds of it comes out through the lungs; most of it is carbon dioxide mixed with a bit of water vapour.”

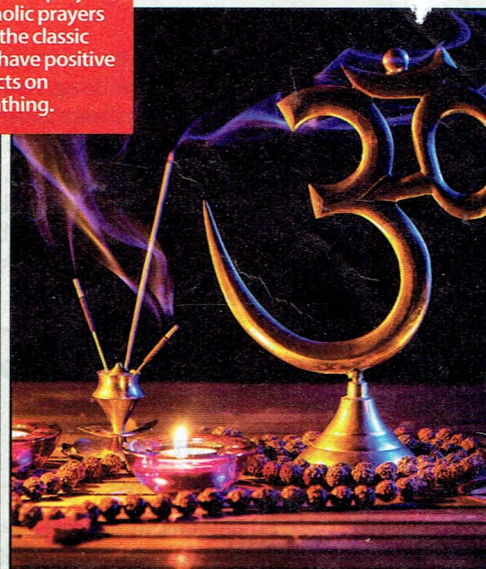
wrong. The lungs are the weight-regulating system of the body.”

The question is whether better breathing helps weight loss. “Man, I’d be a billionaire if my book was about how to lose weight by breathing, but unfortunately it doesn’t work that way. You lose weight by increasing your metabolism, right? So, by just breathing more and more quickly, you’re going to do nothing to help yourself lose weight.” Breathing more slowly, more in line with your metabolic needs, is likely to help you burn fat, he says. “The one area where there is a lot of research is that by training to breathe less, way less, something called hypoventilation training, has a significant impact on weight loss.” Be aware: it’s not fun.





Buddhist prayers, Catholic prayers and the classic Om have positive effects on breathing.



The magic number

The optimum breathing rate is about 5.5 breaths a minute. Take a quick test to see how you measure up.

It turns out the answer to life, the universe and everything is not 42 at all. It's 5.5.

Various religions through the ages, along with more recent scientific researchers, have found that 5.5 is the magic number when it comes to praying or chanting with the ideal breathing pattern, says James Nestor. "By various means, in various ways, in various eras of human history, all these pulmonauts discovered the same thing. That the optimum amount of air we should take in at rest is 5.5 litres per minute. The optimum breathing rate is about 5.5 breaths per minute. That's 5.5-second inhales and 5.5-second exhales. This is the perfect breath."

Researchers found this weird synchrony between so many prayers, he says, not just in Catholic prayers such as the Ave Maria, but also in the Buddhist prayer Om Mani Padme Hum, the Kundalini prayer Sa Ta Na Ma and the old classic Om. They all took 5-6 seconds to vocalise, and when you're vocalising, you're exhaling. And there's about 5-6 seconds' break before you start the next line. They put these people in the lab and covered them with sensors and they found that praying can elicit positive effects.

"You don't need to be religious to really benefit from breathing in this pattern; you can think about whatever you want to think about and just breathing, at a rate of about 5-6 seconds in, 5-6 seconds out, the whole body enters this state of coherence."

Your reporter found that he took about

"By breathing shallowly, you use only about 50% of the breath you take in. This causes you to breathe more and more just to get that oxygen."

six breaths a minute at rest and 9-12 walking. But how to know if it was too shallow, too deep, and using the diaphragm enough?

Says Nestor: "The best measurement for this would be a capnometer [which measures exhaled CO₂] or pulse oximeter [which measures oxygen saturation in the blood], and both those things at once can show you how efficiently you're using air.

If you are breathing six breaths a minute at rest, you are way ahead of the game. Because the average respiratory rate, what is considered "normal", is 12-20 a minute at rest. And if you're breathing that quickly, you have to breathe so much more to get proper oxygen into your body. If you're breathing up into your chest, your mouth, your airways, the bronchi – all of these different structures that cannot absorb oxygen – cannot participate in gas exchange.

"So, by breathing shallowly, you use only about 50% of the breath you take in. This causes you to breathe more and more just to get that oxygen. By breathing at six breaths per minute – they've done various studies in this – you use 85% of each of those breaths. Which is an extraordinary amount. So, if you're not out of breath and you're breathing six breaths per minute, there's a good chance you're breathing correctly. A quick test you can do is very calmly exhale and hold your breath. People who can comfortably hold their breath for 25 seconds have an 89% chance of not suffering from dysfunctional breathing."

For the record, I lasted about 20 seconds. ■

◀ When the nasal cavity gets congested, airflow decreases and bacteria flourish. These bacteria replicate and can lead to infections and colds and more congestion. And more mouth breathing. A study of 50 patients who'd had laryngectomies – a procedure in which a breathing hole is cut into the throat – found that within two months to two years, every patient was suffering from complete nasal obstruction.

BETTER LUNG CAPACITY

It may be surprising to learn that most people can develop their mouths, airways and nasal passages – which have the

Most people can develop their mouths, airways and nasal passages – which have the volume of a billiard ball inside our heads – possibly at any age.

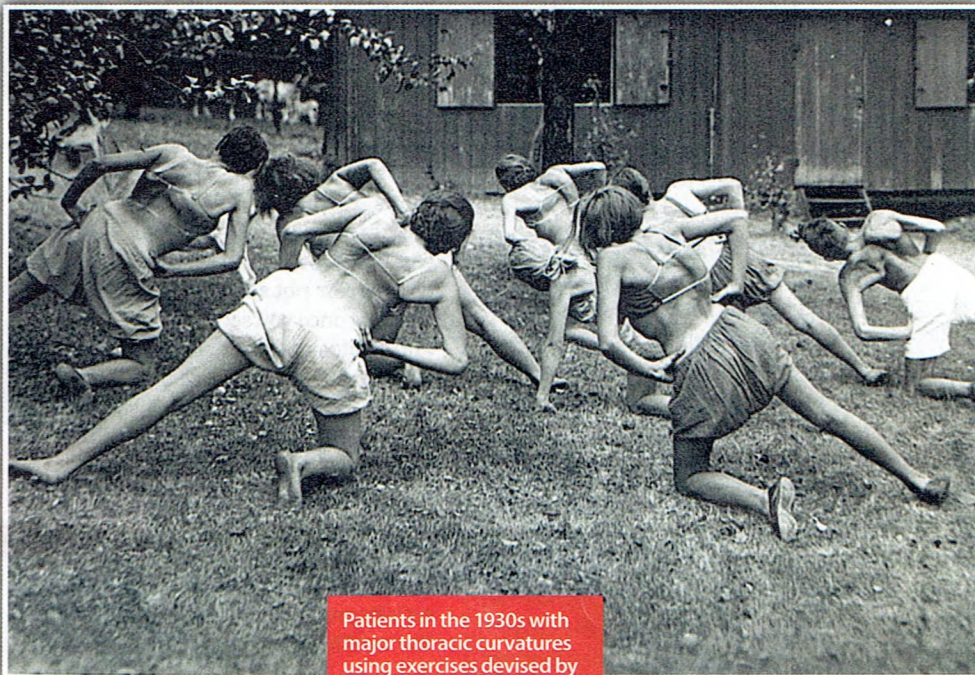
volume of a billiard ball inside our heads – possibly at any age. In a Covid era, many people would be keen to increase their lung power. Freedivers know this is possible, says Nestor, who has met several people who had increased their lung capacity by 30-40%. "Herbert Nitsch, a multiple world record holder, reportedly has a lung capacity of 14 litres – more than double that of the average male. Neither Nitsch nor any of the other freedivers started out like this; they made their lungs larger by force of will. They taught themselves how to breathe in ways that dramatically changed the internal organs of their bodies."



In the Covid era, most people are keen to increase their lung capacity.

The greatest indicator of lifespan? According to a couple of major pieces of US research, including the Framingham Study, a 70-year longitudinal programme focused on heart disease, it isn't genetics, diet or the amount of daily exercise. It is lung capacity.

"We know we can develop our arms and legs or abs by doing proper exercise. These other structures function in the same way.



Patients in the 1930s with major thoracic curvatures using exercises devised by German scoliosis sufferer Katharina Schroth, who "breathed her spine straight again".

They really are a 'use it or lose it' entity. But by doing these simple exercises with your tongue, with your mouth, it has a significant impact on snoring and sleep apnoea. And this was published in *Chest*, one of the top scientific journals out there, so it's not fringing stuff."

There are so many studies into this, Nestor says, but most have been hidden away in academic journals. And we've learnt so much of this before. But we seem to keep forgetting what we've learnt and going back to square one. Many of the early pioneers of breath studies were not scientists, but tinkerers, what Nestor calls pulmonauts, who stumbled on the powers of breathing because nothing else could

help them. "They were Civil War surgeons, French hairdressers, anarchist opera

singers, Indian mystics, irritable swim coaches, stern-faced Ukrainian cardiologists, Czechoslovakian Olympians and North Carolina choral conductors."

That last one was Carl Stough, who in the mid-20th century began training his singers to not only breathe through their nose but to exhale properly, to build up their respiratory muscles and enlarge their

lungs. Within a few sessions, the students were singing more clearly, more

robustly and with added nuance. Stough became so renowned that he moved to New York to retrain singers at the Metropolitan Opera.

In 1958, a veterans' hospital in New Jersey asked him to help emphysema patients. "The nurses, meaning well, had placed cushions

Within a few sessions, the students were singing more clearly, more robustly and with added nuance.

under patients' backs so that their chests were arched up. The idea was to create elevation to ease inhalations. Stough instantly saw that this was making the condition worse. Emphysema, he realised, was a ▶

BLOOD ACIDITY

People worry about having blood that's too acidic or alkaline. Can breathing help?

Breathing is designed to bring the body back into balance, says Nestor. He quotes Ira Packman, a doctor of internal medicine who overcame his own debilitating asthma by breathing less. Packman says when we breathe too much, we expel too much carbon dioxide and our blood pH rises to become more alkaline; when we breathe more slowly and hold in more carbon dioxide, our pH lowers and our blood becomes more acidic. Almost all cellular functions in the body take place at a sweet-spot blood pH of 7.4. The body will do whatever it can to get back to that level. The kidneys, for instance, will respond to overbreathing by "buffering", a process in which an alkaline compound called bicarbonate is released into the urine. But buffering is meant to be a temporary fix. Too much overbreathing and this constant renal buffering will deplete the body of essential minerals such as magnesium, phosphorus and potassium, which leave the body along with the bicarbonate.

◀ disease of exhalation. The patients were suffering not because they couldn't get fresh air into their lungs, but because they couldn't get enough stale air out."

All these pulmonauts succeeded through trial and error, observing what worked and what didn't, ignoring the sceptics. Now we have data, arrived at using fancy equipment and proper scientific studies.

FACT FROM MYTH

Some of the stuff in *Breath* sounds unbelievable, I say: healing World War II veterans of emphysema, people using breathing to straighten scoliotic spines, to fight off autoimmune diseases, or to superheat themselves in subzero temperatures. How did Nestor pick fact from myth?

He heard of a woman with a moderate

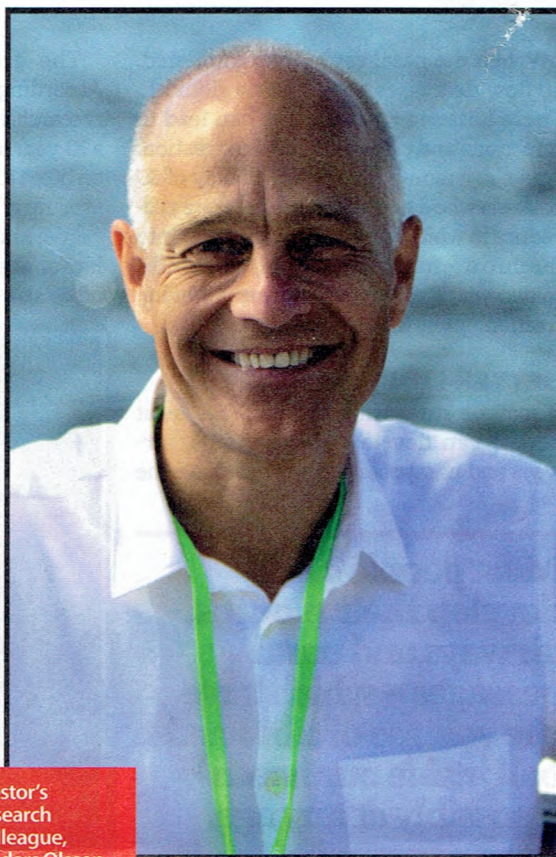
scoliosis, Katharina Schroth, born in 1894 in Germany, who was given a brace and a wheelchair. "She breathed her spine straight again. That's totally impossible, not how it works – until you look at the scientific literature, where there are x-rays, where there are pictures. At the end of her life – she died just shy of 91 – Schroth was awarded a medal by the German Government for her contributions to medicine.

"This practice is used at Johns Hopkins University and throughout Austria. We can have our opinions on whether or not something is real, but once you see the data and photos and studies, then you have to accept that this stuff is real. I had a hard time believing it and that's why I got interested. No way can anyone sit for two hours covered in ice and not suffer from frostbite or hypothermia. Yet there it is on video, and in a study published in *Nature*. A doctor from Harvard Medical School who can dry a wet

"With a deficiency of CO₂, your body has to work a lot harder to get energy. We burn fat with oxygen."

sheet placed on their shoulders in about half an hour in a cold room by breathing. I want people to be sceptical. I want to be sceptical."

You don't need to believe in chakras or ch'i or Tummo breathing (tapping into your "inner fire" through tantric meditation) to respect the results, he says. "We had observational studies for thousands of years. Those are beneficial. But until you can bring people into a lab and measure what's happening, it's only then that you can truly see what the human body is capable of. Did you think anyone could be injected with *E coli* and not suffer any symptoms? There it is published in *Nature*. It's now been proven that humans can take control of their immune function and aspects of



Nestor's research colleague, Anders Olsson.

their autonomic nervous system.

"I had come across this in free-diving. I watched someone take a single breath of air and dive down, without wearing any fins, to [100m] and come back up five minutes later and be totally fine. And I thought, wow, what other mysteries are there? These things should sound impossible, and I've got a pretty good bullshit detector, but the data's there, and in so many instances you can see for yourself by measuring what happens."

SHARPENING OUR MINDS

Nestor's research colleague, Anders Olsson, is a proponent of increasing our CO₂ levels, saying it can sharpen our minds, burn fat and maybe heal us. It seems counterintuitive; what's the theory?

"If we exhale and hold our breath, we're going to feel the need to breathe after a few seconds. It is not an oxygen deficiency that triggers that need. It is an increase of carbon dioxide. I would estimate most of us actually have a slight CO₂ deficiency. Some have a significant CO₂ deficiency. This is why in populations with anxiety, asthma, panic, other fear-based disorders, when you ask people to hold their breath, they do it for about five seconds, then huff and puff. They are so oversensitised to CO₂ that when CO₂ levels rise in the body, they associate that with an attack."

People who fast-breathe thinking they're getting more oxygen are doing the exact opposite. "The reason why slower breathing and so many other breathing techniques work is because they slowly acclimatise your body to accept a normal balance of CO₂ and oxygen. You don't want an overabundance of CO₂ and if you have emphysema or other chronic lung problems, you have too much CO₂ to begin with. You want a healthy balance of CO₂ in your body so that oxygen can do its thing. With a deficiency of CO₂, your body has to work a lot harder to get energy. We burn fat with oxygen. So, if you don't have enough oxygen by means of CO₂, you're causing a lot of wear and tear on your body." It seems counter-intuitive: you need more CO₂ to get more oxygen, but we've known it for 120 years, he says.

Why do we heavy-breathe when stressed or having a panic attack? Half a million years ago, when we were being chased by a predator, we would hold our breath to be quiet, and then need it to run, he says. It was a reaction from our nervous system, the

"I do the Tummo breathing about three times a week. I love it, get a lot of benefits from it. I do something called Sudarshan Kriyā [yoga breathing]."

need to run or fight. We react to a bad email or the boss yelling at us in the same way. "This is why Navy Seals or elite forces control their breathing all the time. Even when they're in states of extreme stress, they're breathing in line with their metabolic needs, because it's fine for short bursts, but when you start puffing all the time, you're going to give your body constant inflammation, you're going to spike your blood sugar, your cortisol, and it's going to destroy your health. Which is exactly what we're seeing in modern populations right now."

Nestor was involved in a battery of tests, which checked his blood gases,



Nestor with his wife, Katie Storey.

inflammatory markers, hormone levels, rhinometry and pulmonary function. Should other people look at doing this? "Well, I did it so other people don't have to. I strongly suggest people not plug their noses for 10 days as part of an experiment."

Some people may need surgery, he says. But in the process of writing the book, he learnt that the more we use our nasal passages the more we can improve them. Experts said most people simply need to focus on their breathing.

Breathing in an efficient way can benefit your heart, vascular system and mind, says Nestor. But it's not a cure-all for everything. "Breathing is not a panacea. It is part of a system of health, right alongside what we eat and how much we exercise. Breathing really should be considered right up there."

HEALTHY PATTERNS

I ask Nestor, who says he is in talks to turn his research into a miniseries and has another book idea but can't quite face sitting down for three years to write it, what practices and exercise he does after a decade of looking into breathing?

"People think because I spent years working on the book that I'm now the best breather on the planet. And I am not. I am much more aware of my breathing, specifically how poor it was. Throughout

the day I will correct it, when I remember. I have a couple of apps that I sometimes use to establish healthy breathing patterns at the beginning of the day, and when I'm exercising I am acutely aware of how I'm breath-

"There was a great study out of Yale Medical School on Sudarshan Kriyā and its effect on anxiety and depression. It has really huge benefits."

ing the whole time. Beyond that, I do the Tummo breathing about three times a week. I love it, get a lot of benefits from it. I do something called Sudarshan Kriyā [rhythmic

breathing cycles], which is pranayama [yoga breathing], a very similar form of breathing. I try to do that once a week. There was a great study out of Yale Medical School on Sudarshan Kriyā and its effect on anxiety and depression. It has really huge benefits." There are dozens and dozens of these different pranayamas and breathing practices, some on his website, mrjamesnestor.com.

One of the benefits of improving his breathing is that he freedives, the absolute antithesis of sitting behind a desk. "I do it as often as I can. I absolutely love it." Years ago, knowing he was into surfing, a magazine sent him to Greece for a couple of weeks to cover a competitive freediving competition.

"It was one of the most beautiful and horrific things I have ever seen in my life." One guy came up dead, to be resuscitated after two minutes, and Nestor saw people with blood all over their face. "I thought this is the stupidest thing I've ever seen in my life." Until he met some who understood freediving not as competition but as a kind of "underwater yoga". He recommends the Netflix series *My Octopus Teacher*. "That's what freediving is, connecting with yourself, connecting with the ocean." ■

Breath: The New Science of a Lost Art, by James Nestor (Penguin, \$38)