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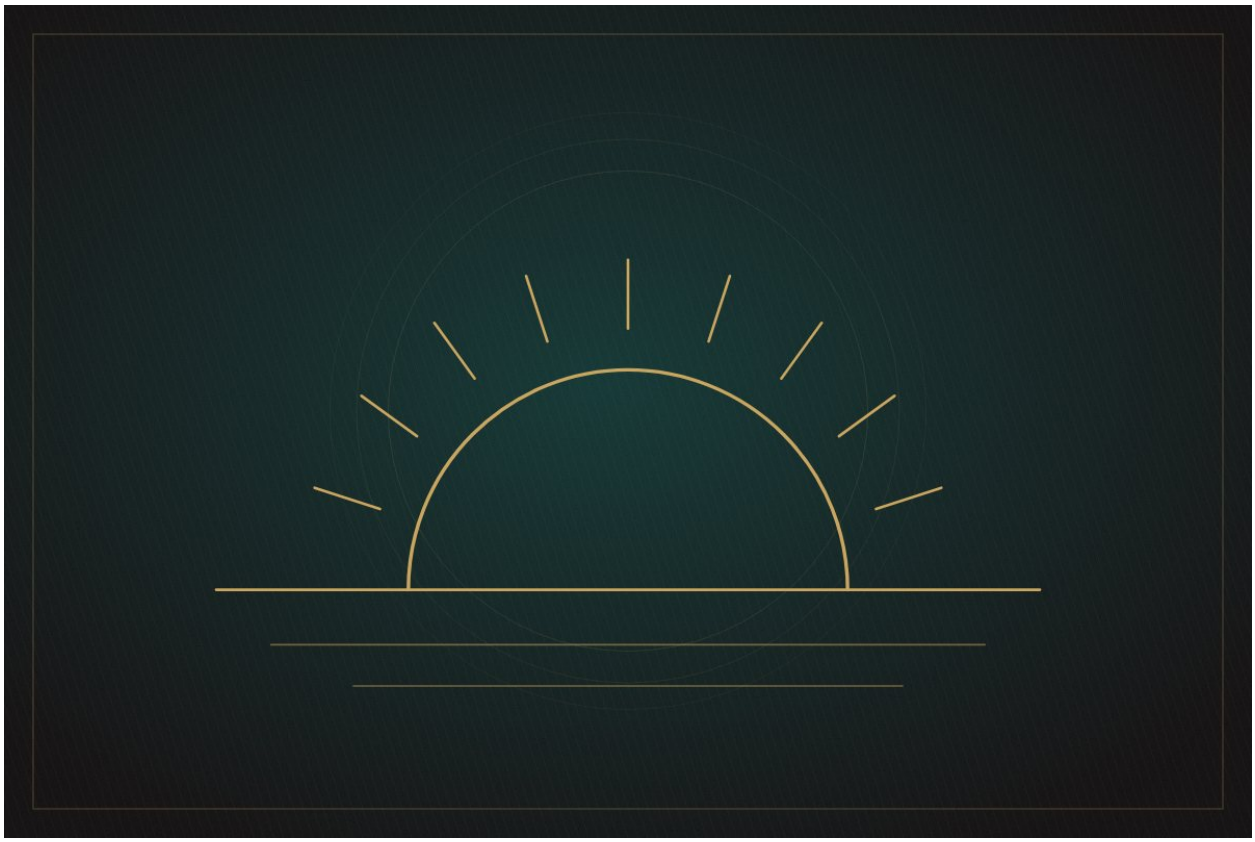
Awareness

Why it matters to breathe through the nose

What the nose does to the air, what Christina Zelano's study (2016) found about memory and where the limits of popular claims lie

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Most of the time we do not think at all about how we breathe. But when we are stressed, when we run or when our nose is blocked, we often switch to breathing through the mouth. The question is: does it matter?

What the nose does

The nose does several important jobs before the air reaches the lungs:

- **It filters the air:** hairs and mucus trap dust, pollen and some microbes.
- **It warms and moistens it:** the air reaching the lungs is warmer and moister, which protects the airways.
- **It produces nitric oxide:** the nasal sinuses produce a gas that helps widen blood vessels and has antimicrobial effects.
- **It slows breathing:** because of greater resistance, nasal breathing is usually slower and deeper.

The nose and the brain

In 2016 the neuroscientist Christina Zelano and her colleagues at Northwestern University studied epilepsy patients who had electrodes placed in the brain for medical reasons. They saw that the rhythm of nasal breathing synchronised electrical oscillations in brain areas linked with emotion and memory, such as the amygdala and hippocampus. This effect weakened when participants breathed through the mouth.

In other experiments with healthy people, participants recognised fearful faces faster and remembered some objects better when they saw them while breathing in through the nose, compared with breathing out. These are interesting findings, but the effects were small and measured in laboratory conditions.

> *The nose is not just an entrance for air. It is part of the way body and brain meet the world.*

Beware of exaggerated claims

Online there are many claims about nasal breathing: that it cures anxiety, boosts intelligence or replaces medical treatment. The evidence does not support these claims. Also, practices such as taping the mouth shut at night are debated and may be dangerous for people with breathing problems during sleep.

The body's air conditioner

The nose works like a small and very efficient air conditioner. According to a 2008 review by David Elad, Martin Wolf and Thomas Keck, the air entering the nose is warmed and humidified so quickly that, by the time it reaches the throat, it is almost at body temperature and almost fully saturated with moisture, even when it is cold and dry outside. This happens thanks to the large surface covered with mucous membrane and blood vessels inside the nose. When we breathe through the mouth, this conditioning of the air is much weaker, which is why the throat dries out more easily.

Nitric oxide in the sinuses

In 1995 Jon Lundberg and colleagues in Sweden discovered that the paranasal sinuses, the air-filled spaces in the bones of the face, produce large amounts of a gas called **nitric oxide**. This gas mixes with the air we breathe in through the nose and reaches the lungs. Nitric oxide has properties that help protect against microbes and may influence the widening of blood vessels in the lungs. When we breathe through the mouth, most of this gas does not reach the lungs, although the clinical importance of this has not been fully clarified.

The nasal cycle

Few people know that we usually do not breathe equally through both nostrils. The tissues inside the nose swell and shrink in turn, so that one side is more open for a few hours and then they switch. This is called the **nasal cycle**. In 2016 Roni Kahana-Zweig and colleagues tracked this cycle for 24 hours with a small device and found that in most people it was present, but with durations that varied a great deal from person to person. This is why we sometimes feel that one side of the nose is slightly blocked.

Breathing and memory for smells

Zelano's study is not the only one. In 2018 Artin Arshamian and colleagues asked participants to learn a number of smells and then rest for an hour, breathing either only through the nose or only through the mouth. Those who breathed through the nose during the rest remembered the smells better later on. In 2019 Ofer Perl and colleagues found that people tended to breathe in precisely when they started a mental task, and that performance was better when the task began during inhalation. Both studies were small and need confirmation.

When the nose is blocked

Some people breathe through the mouth not out of habit, but because they cannot breathe well through the nose. The causes may be allergies, polyps, a deviated septum or enlarged adenoids in children. In these cases, advice to "keep your mouth shut" does not solve the problem and may even be unpleasant or unsafe. Loud snoring with pauses in breathing during sleep can be a sign of sleep apnoea, which needs medical assessment. Before trying new methods, it is worth understanding why you breathe through your mouth in the first place.

Practical advice

1. **Notice how you breathe** a few times a day, especially when you are concentrating or stressed.
2. **During calming exercises**, such as slow breathing, breathe through the nose if you can.
3. **During light physical activity**, try breathing through the nose; during intense effort, mouth breathing is normal.
4. **If your nose is constantly blocked** or you snore a lot, talk to your doctor. There may be a treatable cause.

Sources

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