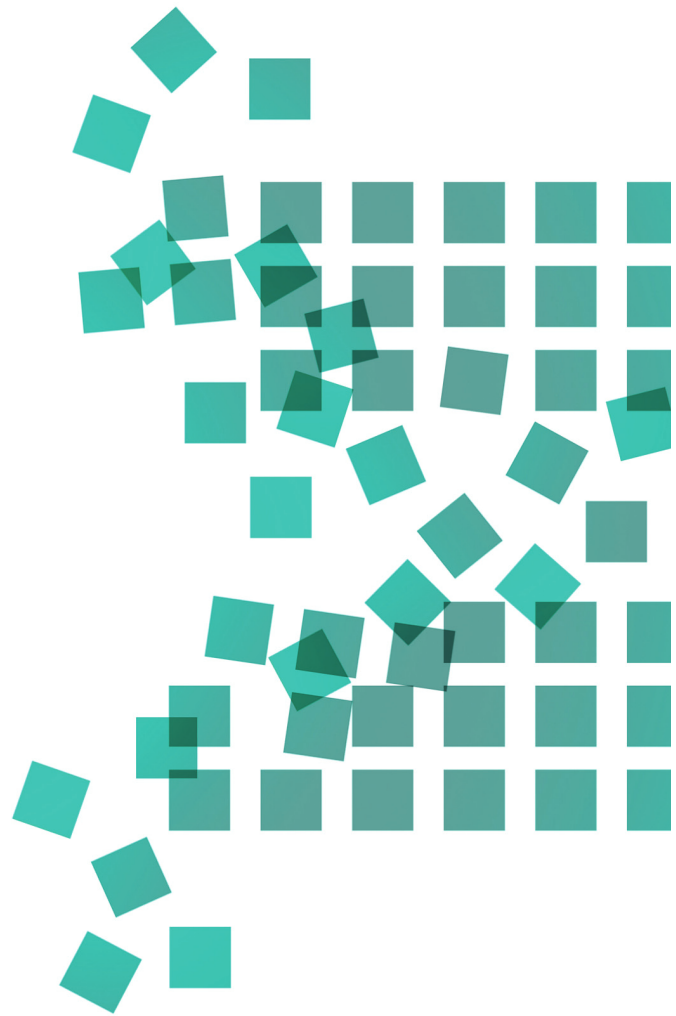


Heidi Dickerson, DDS, LVIM, FIAPA

Nitric Oxide & Mouth Breathing

PHYSIOLOGY YOU WANT TO UNDERSTAND



In 1998, The Nobel Peace Prize was awarded jointly to Robert F. Furchgott, Louis J. Ignarro and Ferid Murad. The title of the Nobel Prize was **"Nitric Oxide as a Unique Signaling Molecule in the Cardiovascular System."**

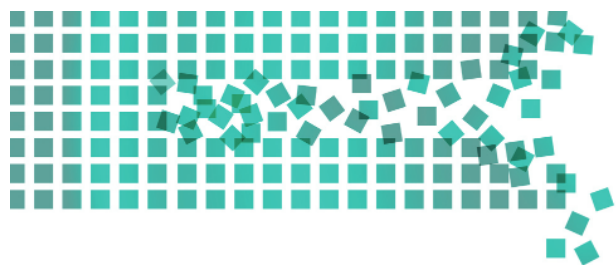
Today, it is recognized that **NO** is a widespread signaling molecule in all organs of the body, not only the cardiovascular system.

Their contributions to the understanding of this gas and its effect on the human body are of major importance in our understanding of the regulation of our bodily systems and of ultimate health.

Enzymes have been found in the nose and in the paranasal sinuses that produce Nitric Oxide. Nitric Oxide levels in the sinuses are even much higher than what is produced in the nose. These findings show that the main site for Nitric Oxide production is the paranasal sinuses. [Lundberg JO, Farkas-Szallasi T, Weitzberg E, Rinder J, Lidholm J, Anggaard A, Hokfelt T, Lundberg JM, Alving K. High nitric oxide production in human paranasal sinuses. Nat Med 1995;1:370-373.]

A decorative graphic consisting of a grid of teal squares. In the center-left area, several squares are tilted at various angles, creating a sense of movement or a focal point within the otherwise static grid.

There is a link between low **NO** levels and many diseases.



What does Nitric Oxide do?

**NO plays a role in every organ of your body!
Here are a few things it does:**

- As a vasodilator it decreases blood pressure and improves blood flow to the organs
- Anti-inflammatory action in the arteries
- Prevents blood clotting and obstructions in the arteries
- Immune defense: destruction of viruses and parasitic organisms
- Plays a role in respiration
- Enables erectile function
- Enhances memory and learning
- Protects the skin from harmful ionizing radiation
- Promotes a healthy digestive tract by regulating the secretion of digestive hormones and enzymes
- Hormonal effects: influences secretion of hormones from several glands
- Regulates bladder function
- Acts as a signaling molecule to maintain normal bodily functions
- Regulation of binding/release of O₂ to hemoglobin

There is a link between low NO levels and many diseases. Here are a few of the diseases associated with low Nitric Oxide: high blood pressure, heart disease, heart attack, stroke, digestive tract issues such as Irritable Bowel Syndrome, Alzheimer's disease, dementia, erectile dysfunction, and bladder issues.

Some ways to increase Nitric Oxide are eating foods high in it, exercising and **BREATHING THROUGH YOUR NOSE!** If you ask most people if they are a nose or a mouth breather, the majority will answer that they breathe through their nose. However, this is not true. Observe those around you... a large percentage of the population are mouth breathers. It is imperative that we recognize this sign in our patients and help them to become nasal breathers.

Breathing through your nose is one of the most beneficial things you can do for the overall health of your body and for your longevity.

Let me simplify why mouth breathing is bad. First and foremost breathing should be very passive and with little effort. We should not hear or notice someone breathing. Breathing heavy causes blood vessels to constrict. This is one reason why mouth breathers are tired a lot of the time. There is less delivery of O₂ in mouth breathing. Normal breathing is approximately 4-6 liters/minute and 10-12 breaths per minute. Oxygen saturation would be around 95-98%. If you have a breathing problem you may breathe 10-15 liters/min, you may even take more breaths, but you do not have any more Oxygen.

Carbon Dioxide is key for how Oxygen gets released from red blood cells into our tissues and our organs. When you breathe heavy you lose CO₂, which results in O₂ sticking to the hemoglobin and not getting released. Basically the heavier you are breathing the less that Oxygen is getting released.



With this heavy breathing also comes a vasoconstrictive effect and up to a 50% restriction of our blood flow up to our brain. You can see that chronic hyperventilation is not a healthy situation to be in.

Each hemoglobin molecule carries four Oxygen molecules. And since we know that Oxygen is released by the presence of Carbon Dioxide you can understand that the harder you breathe the less Carbon Dioxide there is, so less Oxygen is released. You may have blood that has a high Oxygen level, but the Oxygen to the organs would be less because it is not being released by the hemoglobin. This is the problem with most mouth breathers.

When we breathe through our nose, nasal resistance increases by approximately 200% and helps in the release of Oxygen. Mouth breathing does not let our bodies take advantage of the sinuses production of Nitric Oxide.

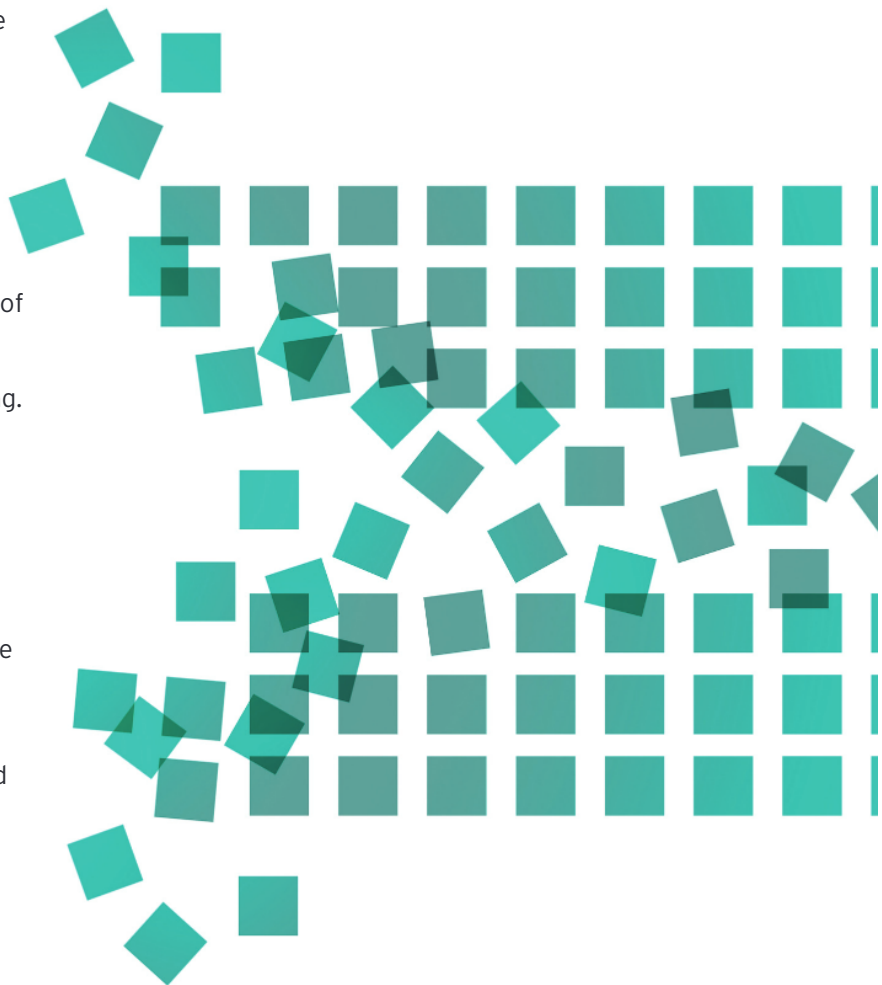
Close to 80% of the population breathes wrong. They may breathe through their mouths, or have shallow breathing, they may not breathe with their diaphragm, and they might breathe heavy and you will notice them breathing or hear them.

The only organ that helps us get ready to breathe correctly is our nose. When we breathe through our mouths it can lead to chronic hyperventilation, reduced blood circulation, lowering of Carbon Dioxide levels, and vasoconstriction of our airways! The continued mouth breathing will have detrimental effects on our overall health such as sleep apnea, high blood pressure, heart disease, asthma, allergies...and more.

Our bodies need supreme oxygenation...this is not happening for our brain, heart, and organs when we are mouth breathers.

If you can keep in mind the function of each of our organs then it becomes quite simple. We use our mouth to eat and talk and we use our nose to smell and breathe! A primary focus we should have for the well-being of all our patients is to help them become nasal breathers through life.

Close to 80
of the population
breathes wrong.



nosefacts

The nose is made up of five muscles:
dilator naris anterior, dilator naris
posterior, depressor septi, nasalis
and procerus.