

Breathe In **Breathe**

An Interview with Steven Sue, DDS, MS, on Mouth Breathing vs. Nose

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It's only recently that I've begun paying attention to how people breathe – nose or mouth. In clinical practice I dealt with the oral effects of mouth breathing, focusing on the increasing risk of gingivitis and caries. Finding out the cause of their mouth breathing and counseling them to switch to nose breathing instead never occurred to me.

Personally, I never considered myself to be a mouth breather, but waking up with a dry throat in the morning is evidence suggesting I was in fact a mouth breather! Not anymore. After completing orofacial myology training and meeting Dr. Steven Sue, my focus is now on nose breathing.

Try it yourself; check if you are mouth breathing or nose breathing during the day and at night. A dry mouth in the morning will answer half the question. Check during the day to see if your mouth is open. If you lick your lips and need lip balm during the day, you are very likely a mouth breather.

What's the difference? Turns out, there's a big difference. My interview with Dr. Sue, a retired orthodontist from Honolulu, Hawaii, changed my mind about breathing techniques and he just might change yours too.



Dr. Sue

Dr. Sue, when did you begin your focus on nose breathing?

Sue: My focus didn't start with nose breathing, but with non-extraction orthodontics. As an orthodontist, I saw the negative impact of mouth breathing on early cranio-facial development in children, leading to narrow palates and malocclusion. The orthodontic solution to this was extractions, treating the symptoms and not the cause of the problem. In the early 1970s I became a strong supporter of non-extraction orthodontics, seeing that the tongue on the palate when swallowing had the ability to shape the palate of a growing child. A well-developed maxilla is essential for the normal cranio-facial development.

The teeth were not too large for the jaws; rather the jaws were too small for the teeth.

We take swallowing for granted, not really analyzing the mechanics of it. Tell me what role the tongue plays in swallowing.

Sue: In normal swallowing, the chewed food is gathered on the tongue, the tongue is raised for full contact with the roof of mouth and peristaltic waves are created that sends the bolus of food straight down the esophagus and into the stomach. When the tongue is down, forward and thrusting as in mouth breathing, it does not generate normal peristaltic activity. Instead, trapped air is taken into the stomach and particles could end up in the trachea and lungs from the partial closure of the epiglottis.

The most effective way to control the tongue during swallowing is through nasal breathing. Nasal breathing places the tongue on the roof of the mouth with a naturally occurring lip seal and tongue suction.

Is there a physiologic difference between nose breathing and mouth breathing?

Sue: The nose and the mouth serve very different functions. Each nostril is innervated by five cranial nerves from different sides of the brain. Each nostril functions independently and synergistically in filtering, warming, moisturizing, dehumidifying, and smelling the air. It's like having two noses housed in one shelter.

The respiratory system of carbon dioxide and oxygen exchange occurs in the alveoli of the lungs. Oxygen absorption depends on the level of carbon dioxide in the lungs. Carbon dioxide is a vasodilator. Mouth breathing takes in more air, but also expels more air quickly reducing the carbon dioxide levels and consequently reducing oxygen absorption. The slower release of air through the nostrils will keep air in the lungs for a



Benefits of Nose Breathing

- Reduces snoring
- Corrects tongue thrust
- Improves orofacial muscle coordination
- Improves speech
- Increases stamina and endurance
- Prevents overtraining
- Decreases mucous production
- Reduces pulse rate
- Places less stress on the heart
- Improves oxygenation of the blood

longer period of time, allowing for more oxygen absorption. When there is proper oxygen-carbon dioxide exchange, the blood will maintain a balanced pH.

Because the breathing mechanism is situated in the nose and not in the mouth, the brain of a mouth breather thinks carbon dioxide is being lost too quickly from the nose and stimulates the goblet cells to produce mucous to slow the breathing. Thus the viscous circle of mouth breathing triggers mucous formation, blocking nasal passages and nose breathing, leading to more mouth breathing.

Infants breathe through their noses, yet they have a tongue thrust. You've said that a tongue thrust and mouth breathing are one in the same. How can that be?

Sue: Yes, this is true for the first six months of life at which time infants start to outgrow the tongue thrust and start to place the tongue on the roof of the mouth at rest and when swallowing to help shape and develop the cranio-facial structures. This is done automatically as determined by genetic codes. This relationship allows a newborn to be an "obligate nose breather" until the descent of the epiglottis is complete. The early cranial development is vital for the normal development of the hypothalamus and pituitary gland.

Infantile tongue thrust serves a useful purpose as it keeps the tongue from falling back into the throat and helps with swallowing because the oropharyngeal region is growing at a rapid rate. "Obligate nose breathing" is not possible in the adult human.

What about the use of pacifiers and sippy cups?

Sue: The rampant use of pacifiers and sippy cups places the tongue low and forward in a tongue thrust that encourages mouth breathing. Soon it becomes ingrained, and the habit is set for a lifetime.



We think of breathing as something restricted to the nose, mouth and lungs. Which general health problems are related to incorrect breathing?

Sue: The list is long: snoring, obstructive sleep apnea (OSA), aerophagia, bloating, burping, flatulence, acid reflux, fibromyalgia, chronic fatigue syndrome, silent aspiration, pneumonia, bronchitis, stridor, colitis, chronic cough, hiccups, asthma, allergic rhinitis, hormonal imbalance, diabetes, bed wetting, frequent urination at night, malocclusion, deviated septum, adenoidal face, recessive chin, heartburn, high blood pressure, stroke, ADHD and SIDS.

Breathing is basic, and every one of our 3 trillion cells needs oxygen to survive. It's not surprising to see connections between breathing and the whole body.

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How can mouth breathing cause so many problems?

Sue: Man swallows hundreds of times a day and mouth breathers are swallowing air each time. Eventually, bloating inside of the stomach puts pressure against the esophageal sphincter and causes it to weaken and leak, resulting in acid reflux. The continuous assault of stomach fluid on the pharyngeal lining causes the throat to lose elasticity and the resulting stiffness will cause the walls to collapse. This is found in moderate to severe OSA. In severe apnea, it is more than the tongue that is causing the blockage. It is the entire pharynx that has collapsed.

Mouth breathers are at risk of aspirating saliva, food and bacteria into the lungs. This may explain the loss of elasticity in the lungs of those with Chronic Obstructive Pulmonary Disease (COPD). Many of the elderly have reverted to mouth breathing in which pneumonia has been a major cause of death for the ageing. We are dealing with a myriad of problems that are connected to each other. Studies show that abnormal swallowing, aspiration, gastric reflux, and malocclusion occur together yet are classified as separate diseases. These are not separate diseases.

You've invented a mouthpiece that helps with nose breathing. Tell me more about Nose Breathe Technology.

Sue: After many years in orthodontics, I designed a simple mouthpiece that promotes nasal breathing. By positioning the tongue to the roof of the mouth, a lip seal is created and you are encouraged to breathe through the nose.

How does the Nose Breathe mouthpiece work?

Sue: The Nose Breathe mouthpiece stabilizes completed orthodontic cases by controlling the tongue thrust. It also teaches children proper swallowing patterns, trains athletes for endurance and prevents them from overtraining. The Nose Breathe fits over upper teeth and has a shelf for the tongue. With the tongue on the shelf, it is in contact with the roof of the mouth. There is a naturally occurring lip seal and tongue suction that prevents the tongue from falling into the back of the throat. The tip of the tongue is just posterior to the incisive papilla, and not against the anterior teeth. Relaxed, diaphragmatic breathing is encouraged.

Have you conducted research with your Nose Breathe mouthpiece?

Sue: The research study, "Snoring Control Using a New Tongue-Retaining Oral Appliance" by R. Cartwright, et al. was conducted at Rush University Medical Center in Chicago and also a private practice in Hawaii concluded that nasal breathing can effectively reduce snoring and mild sleep apnea. The study was presented at the Associated Professional Sleep Societies (APSS) 18th Annual Convention at Philadelphia, June, 2004



and the abstract was published in the *Journal of Sleep*, Vol. 27, 2004, 412.

Are other researchers looking at mouth breathing in relation to sleep disorders?

Sue: The terms sleep-disordered breathing (SDB) and obstructive sleep apnea (OSA) imply that breathing disorders occur only during sleep and that if a person didn't sleep, they would not have a breathing problem. I suggest it's the breathing that is the problem and not the sleep.

The majority of sleep researchers overlook daytime breathing and focus on night time treatments including continuous positive airway pressure (CPAP), surgeries, drugs and dental appliances. A recent article in *Sleep Review* reported that children are being afflicted with symptoms of sleep apnea and the same treatment modalities are being recommended for children. Do you know of anyone who has been weaned off CPAP because it cured the breathing disorder? Can you imagine what that could mean to the quality of life to a 10-year-old child on CPAP?

Focusing the research on breathing rather than sleep might identify problems earlier rather than later. This is a dialogue that needs to begin. It is my opinion that the initial mouth breathing had nothing to do with sleep; started during childhood; progressed in severity to adulthood; and manifested most severely during sleep; and therefore, preventive and corrective measures should be started during early childhood development.

Any final words as we wrap up this interview?

Sue: Yes, once people comprehend the significance of nasal breathing, they will realize the benefits are overwhelming. ■