Breathing Practices

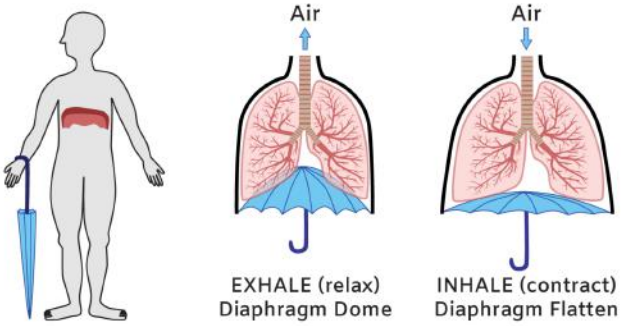
Diaphragmatic Breathing

At rest, you should be using a diaphragmatic breathing pattern, not a chest breathing pattern. To figure out which pattern you are using, place one hand on your chest and one on your belly, and feel which moves. If the chest moves, or if both move, you are using accessory breathing muscles at rest, when they should only be used when you are exerting yourself (exercising or active).

Problems that occur if are not consistently using your diaphragm to breathe:

- Overuse of accessory muscles of breathing in the neck and chest, leading to chest, back and arm pain
- Problems with swallowing and sleep apnea, sleep disturbance
- Asthma, shortness of breath, decreased exercise/activity tolerance
- Lumbar and sacroiliac instability and pain; Increased low back muscle spasm and excessive arch in the back
- Weak hamstring and abdominal muscles
- Decreased heart function
- Decreased lymphatic fluid movement through the body, increased fluid build-up
- Anxiety, psychological stress and increased sympathetic nervous system activity, aggravating POTS
- Migraine, tinnitus (ringing in your ear)
- Gastroesophageal reflux (GERD), irritable bowel syndrome (IBS), hypersensitive gut

(Kocjan, 2017, Bordoni, 2018; Hamasaki, 2020)



The current guide to diaphragmatic breathing is to use an umbrella pattern, where inhalation opens the umbrella by expanding the lower ribs to the sides, front and back (but not up into the chest). This is also called '360 breathing' because the ribs expand in 360º (all directions). The belly may rise some, but not as much as when we used to teach 'belly breathing'. To feel the rib movement, either sit or lie on your back with one hand on each side of your lower ribs. As you inhale, try to expand your lower ribs out to the sides and back. When you exhale, just relax and let your umbrella close. If you are practicing sitting, you may need to *gently* contract your abdominal muscles to pull your belly back in. Diaphragmatic breathing lying down strengthens the diaphragm more, while sitting strengthens the abdominals more.

Slow Breathing

Many people breathe too rapidly, leading to a condition called "over-breathing." Normal breathing rates are 8-12 breaths per minute, but the healthiest rate is 6 breaths/minute (**4 seconds in, 6 seconds out**). Many people therefore benefit from practicing slow breathing. Benefits of slow breathing include: (Russo, 2017)

- Improved diaphragm mobility and function (see benefits of diaphragmatic breathing, above)
- Improved efficiency of breathing
- Increased heart function
- Improved heart rate variability (HRV), a measure of autonomic function, and improved parasympathetic function
- Improved vagus nerve function (improves gut function)
- Improved response to position changes (e.g. standing), which can be helpful for people with POTS

Slow breathing practice: 6 breaths/minute (4 seconds in, 6 seconds out)

- https://youtu.be/PzwTAf2YLh4; Apple Watch & Fitbit also have slow breathing functions
- **4-7-8 breathing** (Video of Dr. Weil explaining: https://youtu.be/p8fjYPC-k2k)
  - Inhale through your nose for a count of 4
  - Hold your breath for a count of 7
  - Exhale through your mouth making a swooshing sound for a count of 8
  - Repeat only 4-8 times per session, 2x/day

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Nose Breathing, not Mouth Breathing

Most of the time, you should be breathing in and out through your nose. During some yoga breathing practices, you may be instructed to breathe in through the nose and out through the mouth. However, most times, you should be nose breathing. Tables 1 & 2, below, are from an article by Ruth, 2015.

Table 1: Possible adverse consequences of chronic mouth breathing

Chronic mouth breathing may contribute to:

- Introduction of unfiltered, poorly humidified air into the lungs
- Upper-chest breathing (inefficient and tiring)
- Chronic over-breathing
- Greater incidence of snoring and sleep apnoea
- Bad breath, dental decay, gum disease
- Dysfunction of the jaw joint (temporomandibular joint disorders)
- Narrowing of the dental arch, jaw and palate
- Crowded and crooked teeth
- Open bite, malocclusion (teeth not fitting together properly)
- Greater potential for relapse of orthodontic corrections
- Dysfunctions of the muscles around the jaw and lips
- Loss of lip tone with the lips becoming flaccid
- Noisy eating, speech and swallowing problems
- Trauma to soft tissues in the airways
- Enlarged tonsils and adenoids

Adapted from Graham T (2012)

Table 2: Benefits of nose breathing

Nose breathing is beneficial because it:

- Warms, moistens and filters the air
- Traps large particles with the nose hairs and small particles via mucous membranes
- Facilitates inhalation of nitric oxide – a vasodilator and bronchodilator that increases oxygen transport throughout the body
- Helps prevent colds, flu, allergic reaction, hay fever, irritable coughing
- Retains some moisture from exhaled air, preventing nasal dryness
- Provides a sense of smell
- Regulates (slows) airflow because of the nose's intricate structures
- Facilitates correct action of the diaphragm
- Promotes activity of the parasympathetic nervous system, which calms and relaxes the body, slows the breathing and the heart, promotes digestion
- Allows the correct position of the tongue (against the upper palate) and lips (together), assisting formation of the natural dental arches and straight teeth
- Reduces likelihood of snoring and apnoea

Adapted from Graham T (2012)

To clear the sinuses: (if you are hypermobile, do the head nod very gently, or move your body instead)
"To decongest the nose, instruct the student to perform the following:

- Take a normal breath in and out through your nose;
- Pinch your nose with your fingers to hold your breath;
- As you hold your breath, move your body or gently nod your head up and down;
- Hold your breath for as long as you can—until you feel a strong air hunger;
- Let go of your nose and breathe through it as calmly as possible.
- Repeat 6 times with a 30–60 s rest between each repetition." (McKeown, 2021)

(Video of this clearing the sinus exercise: https://youtu.be/vKKO8DC3cgo)

Learning a new way to breathe may be difficult, but should never cause discomfort. It is normal to feel a little light-headed when you start slot breathing – if so, don't go quite so slowly yet, ease into it.

Resources:

- Andre C. Proper Breathing Brings Better Health. *Scientific American*. Jan, 2019. Available at: https://www.scientificamerican.com/article/proper-breathing-brings-better-health/ (popular science article)
- Nestor J. ***Breath: The New Science of a Lost Art*** (book focuses on research findings, with breathing exercises at the end)
- Buteyko breathing: https://innovativemedicine.com/wp-content/uploads/2017/04/Buteyko-Breathing-Guide.pdf.
- Bordoni B, Morabito B. Symptomatology Correlations Between the Diaphragm and Irritable Bowel Syndrome. *Cureus*. Jul 23 2018;10(7):e3036.
- Hamasaki H. Effects of Diaphragmatic Breathing on Health: A Narrative Review. *Medicines (Basel)*. Oct 15 2020;7(10).
- Kocjan J, Adamek M, Gzik-Zroska B, Czyżewski D, Rydel M. Network of breathing. Multifunctional role of the diaphragm: a review. *Adv Respir Med*. 2017;85(4):224-232.
- McKeown P, O'Connor-Reina C, Plaza G. Breathing Re-Education and Phenotypes of Sleep Apnea: A Review. *J Clin Med*. Jan 26 2021;10(3).
- Russo MA, Santarelli DM, O'Rourke D. The physiological effects of slow breathing in the healthy human. *Breathe (Sheff)*. Dec 2017;13(4):298-309.
- Ruth A. The health benefits of nose breathing. Nursing in General Practice. 2015. Available at: https://www.lenus.ie/bitstream/handle/10147/559021/JAN15Art7.pdf. Accessed 7/1/20.

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