

# Thirty Functions of The Nose

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Back in the 1970s, renowned Ear, Nose and Throat Dr Maurice Cottle stated that the nose performs 30 functions in the human body. I wasn't able to locate this list. Hence my efforts below- a compilation of 30 functions of the nose.

## 1. Helps to Induce Relaxation

Russo MA, Santarelli DM, O'Rourke D. The physiological effects of slow breathing in the healthy human. *Breathe* (Sheff). 2017;13(4):298-309. doi:10.1183/20734735.009817

## 2. Improves cognitive function

Soler ZM, Eckert MA, Storck K, Schlosser RJ (2015) Cognitive function in chronic rhinosinuitis: a controlled clinical study. *Int Forum Allergy Rhinol*. 5(11):1010–1017

## 3. Smell and Partner Choice

Ihara, Yasuo, et al. "HLA and human mate choice: tests on Japanese couples." *Anthropological Science* 108.2 (2000): 199-214.

## 4. Increased Visuospatial Awareness

Bergland, Christopher. "Breathe In! Nasal Inhalations Are Linked to Laser-Like Focus." *Weizmann Institute of Science*. Published March 17, 2019. [www.weizmann-usa.org/news-media/in-the-news/breathe-in-nasal-inhalations-are-linked-to-laser-like-focus](http://www.weizmann-usa.org/news-media/in-the-news/breathe-in-nasal-inhalations-are-linked-to-laser-like-focus) (accessed January 7, 2020).

Perl, Ofer, Aharon Ravia, Mica Rubinson, Ami Eisen, Timna Soroka, Nofar Mor, Lavi Secundo, and Noam Sobel. "Human non-olfactory cognition phase-locked with inhalation." *Nature human behaviour* 3, no. 5 (2019): 501.

## 5. Mediates Olfactory-induced Behavioral response

Kadohisa M. Effects of odor on emotion, with implications. *Front Syst Neurosci*. 2013;7:66. Published 2013 Oct 10. doi:10.3389/fnsys.2013.00066

## 6. Reduced Vocal Effort

Sivasankar M, Fisher KV. Oral breathing increases Pth and vocal effort by superficial drying of vocal fold mucosa. *J Voice*. 2002 Jun;16(2):172-81. doi: 10.1016/s0892-1997(02)00087-5. PMID: 12150370

## 7. Nasal Resonance

Young A, Spinner A. Velopharyngeal Insufficiency. 2023 Jan 12. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan–. PMID: 33085296.

## 8. Improves recruitment of the diaphragm breathing muscle

Trevisan ME, Bouffleur J, Soares JC, Haygert CJ, Ries LG, Corrêa EC. Diaphragmatic amplitude and accessory inspiratory muscle activity in nasal and mouth-breathing adults: a cross-

sectional study. *J Electromyogr Kinesiol.* 2015 Jun;25(3):463-8. doi: 10.1016/j.jelekin.2015.03.006. Epub 2015 Apr 6. PMID: 25900327.

### 9. Increases Oxygen Uptake in the Blood

Swift AC, Campbell IT, McKown TM. Oronasal obstruction, lung volumes, and arterial oxygenation. *Lancet.* 1988 Jan 16;1(8577):73-5. doi: 10.1016/s0140-6736(88)90282-6. PMID: 2891980.

### 10. Production of Nitric Oxide

Lundberg JO, Settergren G, Gelinder S, Lundberg JM, Alving K, Weitzberg E. Inhalation of nasally derived nitric oxide modulates pulmonary function in humans. *Acta Physiol Scand.* 1996 Dec;158(4):343-7. doi: 10.1046/j.1365-201X.1996.557321000.x. PMID: 8971255

### 11. Dilation of blood vessels in the lungs

*Lundberg JO, Settergren G, Gelinder S, Lundberg JM, Alving K, Weitzberg E. 1996d. Inhalation of nasally derived nitric oxide modulates pulmonary function in humans. Acta Physiol Scand 158: 343–347.*

### 12. Redistribution of blood throughout the lungs

Sánchez Crespo A, Hallberg J, Lundberg JO, Lindahl SG, Jacobsson H, Weitzberg E, Nyrén S. Nasal nitric oxide and regulation of human pulmonary blood flow in the upright position. *J Appl Physiol* (1985). 2010 Jan;108(1):181-8. doi: 10.1152/jappphysiol.00285.2009. Epub 2009 Oct 29. PMID: 19875719.

Bartley J., Wong C. (2013) Nasal Pulmonary Interactions. In: Önerci T. (eds) Nasal Physiology and Pathophysiology of Nasal Disorders. *Springer*, Berlin, Heidelberg.

### 13. Defense Against Inhaled Pathogens

Andrew B Lumb MB BS FRCA, in *Nunn's Applied Respiratory Physiology (Eighth Edition)*, 2017

Nonrespiratory Functions of the Lung. *Andrew B Lumb MB BS FRCA, in Nunn's Applied Respiratory Physiology (Eighth Edition)*, 2017

Ritz T, Trueba AF, Vogel PD, Auchus RJ, Rosenfield D. Exhaled nitric oxide and vascular endothelial growth factor as predictors of cold symptoms after stress. *Biol Psychol* 2018;132:116e24.

### 14. Helping maintain elasticity of the lungs

<https://www.sciencedirect.com/topics/medicine-and-dentistry/nasal-breathing>

Accessed: 29<sup>th</sup> March 2023

### 15. Warming

Widdicombe J. Microvascular anatomy of the nose. *Allergy.* 1997;52(40 Suppl):7-11. doi: 10.1111/j.1398-9995.1997.tb04877.x. PMID: 9353554. Geurkink N. Nasal anatomy, physiology, and function. *J Allergy Clin Immunol.* 1983 Aug;72(2):123-8. doi: 10.1016/0091-6749(83)90518-3. PMID: 6350406.

## **16. Humidification of incoming air**

Naclerio RM, Pinto J, Assanasen P, Baroody FM. Observations on the ability of the nose to warm and humidify inspired air. *Rhinology*. 2007 Jun;45(2):102-11. PMID: 17708456.

Rundell KW, Jenkinson DM. Exercise-induced bronchospasm in the elite athlete. *Sports Med*. 2002;32(9):583-600. doi: 10.2165/00007256-200232090-00004. PMID: 12096931.

## **17. Water Balance**

Svensson S, Olin AC, Hellgren J. Increased net water loss by oral compared to nasal expiration in healthy subjects. *Rhinology*. 2006 Mar;44(1):74-7. PMID: 16550955.

## **18. Improves Oxygenation During Sleep**

Hsu YB, Lan MY, Huang YC, Kao MC, Lan MC. Association Between Breathing Route, Oxygen Desaturation, and Upper Airway Morphology. *Laryngoscope*. 2021 Feb;131(2):E659-E664. doi: 10.1002/lary.28774. Epub 2020 May 30. PMID: 32473063.

## **19. Important for Deeper Sleep Quality**

Olsen KD, Kern EB, Westbrook PR. Sleep and breathing disturbance secondary to nasal obstruction. *Otolaryngol Head Neck Surg*. 1981 Sep-Oct;89(5):804-10. doi: 10.1177/019459988108900522. PMID: 6799913.)

Petruson B. Increased nasal breathing decreases snoring and improves oxygen saturation during sleep apnoea. *Rhinology*. 1994 Jun;32(2):87-9. PMID: 7939149.

## **20. Smelling**

Nagappan PG, Subramaniam S, Wang DY. Olfaction as a soldier-- a review of the physiology and its present and future use in the military. *Mil Med Res*. 2017 Mar 15;4:9. doi: 10.1186/s40779-017-0119-4. PMID: 28344819; PMCID: PMC5359863.

Gillman GS, Bakeman AE, Soose RJ, Wang EW, Schaitkin BM, Lee SE, Chang YF, Mims MM. Will nasal airway surgery improve my sense of smell? A prospective observational study. *Int Forum Allergy Rhinol*. 2022 Nov 22. doi: 10.1002/alr.23115. Epub ahead of print. PMID: 36413461

## **21. Sense of smell as a test for neurological injury**

Ruff RL, Riechers RG 2nd, Wang XF, Piero T, Ruff SS. A case-control study examining whether neurological deficits and PTSD in combat veterans are related to episodes of mild TBI. *BMJ Open*. 2012 Mar 18;2(2):e000312. doi: 10.1136/bmjopen-2011-000312. PMID: 22431700; PMCID: PMC3312078.

## **22. Taste Perception**

Rolls ET. Taste, olfactory, and food reward value processing in the brain. *Prog Neurobiol*. 2015 Apr;127-128:64-90. doi: 10.1016/j.pneurobio.2015.03.002. Epub 2015 Mar 23. PMID: 25812933.

## **23. Important in the Control of Asthma**

Peterson B, Theman K. Reduced nocturnal asthma by improved nasal breathing. *Acta Otolaryngol*. 1996 May;116(3):490-2. doi: 10.3109/00016489609137878. PMID: 8790753.

#### **24. Important in the Control of Allergic Rhinitis**

Widdicombe J. Microvascular anatomy of the nose. *Allergy*. 1997;52(40 Suppl):7-11. doi: 10.1111/j.1398-9995.1997.tb04877.x. PMID: 9353554.

#### **25. Nasal Dilation**

Hasegawa M, Kern EB. The effect of breath holding, hyperventilation, and exercise on nasal resistance. *Rhinology*. 1978 Dec;16(4):243-9.

#### **26. Breathing through the nose during exercise helps decongest the nose**

Otolaryngol Head Neck Surg. 1984 Jun;92(3):302-7. Role of the nasal airway in regulation of airway resistance during hypercapnia and exercise. Second-Place Resident Award at 1982 Research Forum.

#### **27. Helps prevent exercise induced bronchoconstriction**

Shturman-Ellstein R, Zeballos RJ, Buckley JM, Souhrada JF. The beneficial effect of nasal breathing on exercise-induced bronchoconstriction. *Am Rev Respir Dis*. 1978 Jul;118(1):65-73. doi: 10.1164/arrd.1978.118.1.65. PMID: 677559.

#### **28. Better utilisation of oxygen during exercise**

Morton, A. R., K. King, S. Papalia, Carmel Goodman, K. R. Turley, and J. H. Wilmore. "Comparison of maximal oxygen consumption with oral and nasal breathing." *Australian journal of science and medicine in sport* 27, no. 3 (1995): 51-55.

#### **29. Physical Training with Nasal breathing Reduces ventilation**

Dallam, George M., Steve R. McClaran, Daniel G. Cox, and Carol P. Foust. "Effect of Nasal Versus Oral Breathing on Vo2max and Physiological Economy in Recreational Runners Following an Extended Period Spent Using Nasally Restricted Breathing." *International Journal of Kinesiology and Sports Science* 6, no. 2 (2018): 22-29.

#### **30. Development of the Face**

Baumann I, Plinkert PK. Der Einfluss von Atemmodus und Nasenventilation auf das Gesichtsschädelwachstum [Effect of breathing mode and nose ventilation on growth of the facial bones]. *HNO*. 1996 May;44(5):229-34. German. PMID: 8707626.