



# Nose Breathing

## for Good Health, Fitness and Correct Craniofacial Development

by Patrick McKeown

In 1704, a racing stallion by the name of The Darley Arabian arrived in Britain from Syria and is responsible for 95 percent of today's male thoroughbreds.<sup>1</sup> Geneticist Patrick Cunningham and colleagues from my alma mater, Trinity College, Dublin traced the lineage of nearly one million horses from the past two centuries and determined that 30 percent of variation in performance in thoroughbreds is due to genetics alone.<sup>2</sup> In the nature versus nurture debate, these results suggest that nature plays a significant part of our athletic abilities.

Could humans be similar to race horses in this way? Could our genetic makeup strongly dictate our athletic prowess?

There is one area in particular where a combination of genetics and behavior has considerable influence on athletic performance, and that is the way the face and jaws develop during childhood. For example, take a look at the structure of the face and jaws of former Olympic successes including Usain Bolt, Sanya Ross Richards, Steve Hooker and Roger Federer. What is strikingly apparent for this group, and for the vast majority of top-class athletes, is the forward growth of the face and width of the jaws. Athletic success depends on having good airways, which in turn is dependent on normal facial structure. Spend a

lot of time with your mouth hanging open or sucking your thumb during childhood and the face grows differently than how nature intended.

In fact, Michael Phelps, the most decorated Olympian of all time, is one of very few top-class athletes who does not exhibit forward growth of the jaws and a wide facial structure. Based on his facial profile, there is a high likelihood that he was a mouth breather during childhood, possibly requiring orthodontic treatment in his early teens. It is also possible that Phelps chose swimming, either consciously or unconsciously, as it was the one sport at which he could excel. The very act of swimming restricts breathing to help offset any negative effects that have developed from mouth breathing or an inefficient breathing pattern.

Although the natural order of things is to breathe through the nose, many children – especially those with asthma or nasal congestion – habitually breathe through the mouth. Children who regularly breathe through their mouth tend to develop negative alterations to their face, jaws and the alignment of their teeth. Mouth breathing affects the shape of the face in two ways. Firstly, there is a tendency for the face to grow long and narrow. Secondly, the jaws do not fully develop and are set back from their ideal position, thus reducing airway size. If the jaws are not positioned

1. Charlie Cooper. Friday 26 October 2012. <http://www.independent.co.uk/sport/racing/the-stud-why-retirement-will-be-a-fulltime-job-for-frankel-8228820.html> (accessed 10th June 2013).

2. Cunningham, E. P., Dooley, J. J., Splan, R. K. & Bradley, D. G. Microsatellite diversity, pedigree relatedness and the contributions of founder lineages to thoroughbred horses. *Animal Genetics* 32, 360 - 364 (2001)

forward enough on the face, they will encroach on the airways. See for yourself: close your mouth, jut out your chin and take a breath in and out through your nose, noting the way air travels down behind the jaws. Now do the same but pull your chin inward as far as you can. You will probably feel as if your throat is closed up as you try to breathe. This is exactly the effect poorly developed facial structure has on your airway size. It is no wonder that those with restricted airways tend to favor mouth breathing.

The forces exerted by the lips and the tongue primarily influence the growth of a child's face. The lips and cheeks exert an inward pressure on the face, with the tongue providing a counteracting force. When the mouth is closed, the tongue rests against the roof of the mouth exerting light forces which shape the top jaw. Because the tongue is wide and U-shaped, it follows that the shape of the top jaw should be wide and U-shaped also. In other words, the shape of the top jaw reflects the shape of the tongue. A wide U-shaped top jaw is optimal for housing all our teeth.

However, during mouth breathing, it is very unlikely that the tongue will rest in the roof of the mouth. Try it for yourself: open your mouth and place your tongue on your upper palate. Now try to breathe through your mouth. While it is possible to draw a wisp of air into the lungs, it will not feel right. It follows therefore that the tongue of a mouth breather will tend to rest on the floor of the mouth or suspended midway. Since the top jaw is not then shaped by the normal pressures of the tongue, the end result is the development of a narrow V-shaped top jaw. Aesthetically, this contributes to a narrowing of the facial structure, crooked teeth and orthodontic problems. It has been well-documented that mouth-breathing children grow longer faces.<sup>3,4,5</sup>

The second way facial structure is affected by the way we breathe during childhood is the position of the jaws. The way the jaws develop has a direct influence on the width of the upper airways. Our upper airways comprise the nose, nasal cavity, sinuses and the throat. High athletic performance requires large upper airways which will enable air to flow freely to and from the lungs. While effective breathing is crucial for high performance, having airways that function with little resistance is also very advantageous. For example, a marathon runner who

has efficient breathing but airways the width of a narrow straw is not going to get too far.

The normal growth of the face is forward, and this is achieved by the forces exerted by the tongue as it rests in the roof of the mouth. Since a mouth-breathing child does not rest his or her tongue in the roof of the mouth, the jaws are unable to be properly shaped by the tongue, and the natural forward growth of the jaws is impeded. This results in jaws that are set back from their ideal position, compromising airflow. For correct development of the jaws, face and airways, it is imperative that a child habitually breathes through the nose. Breathing through the nose with the tongue resting in the roof of the mouth helps to establish the ideal conditions for normal development of the face.

Note the forward position of the jaws, high cheekbones, airway size and width of the face in figure 1. The jaw is strong and positioned forward so that the chin is nearly as far forward as the tip of the nose. When cartoonists draw illustrations of a dominant male, his strength is often conveyed by a rugged and exag-

Fig. 1



Fig. 1: The facial characteristics of a nasal breather. Based on Irish International and LA Galaxy soccer captain Robbie Keane.

Fig. 2

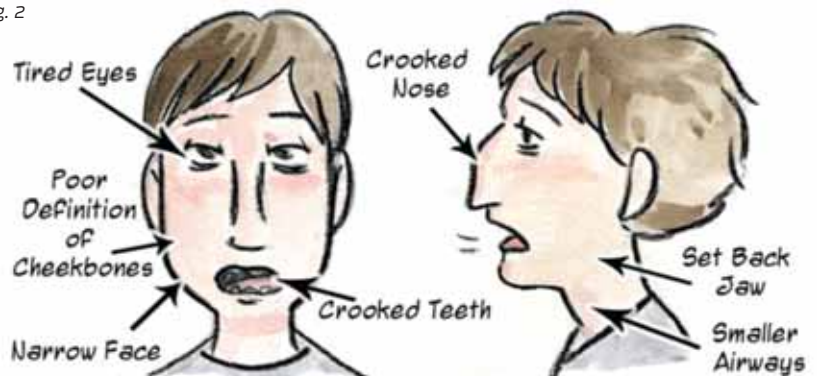


Fig. 2: The facial characteristics of a mouth breather.

3. Tourne. The long face syndrome and impairment of the nasopharyngeal airway. *Angle Orthod* 1990 Fall 60(3) 167- 76  
 4. Care of nasal airway to prevent orthodontic problems in children" *J Indian Med association* 2007 Nov; 105 (11):640,642  
 5. Harari D, Redlich M, Miri S, Hamud T, Gross M.. The effect of mouth breathing versus nasal breathing on dentofacial and craniofacial development in orthodontic patients. *Laryngoscope*.2010 Oct;120(10);():2089-93

gerated jaw. Socially, a strong jaw line is considered healthier and more attractive than a recessed chin.

In figure 2, because the jaws are set back, the airways are smaller, resulting in diminished athletic performance. Had the jaws been in a more forward position, the nose would be straighter and smaller. The eyes look tired and there is poor definition of the cheekbones as the face sinks downward. Chronic and habitual mouth breathing is also associated with postural changes which result in decreased muscle strength, reduced chest expansion and impaired breathing.<sup>6,7,8</sup> Interestingly, researchers have found that mouth breathers are more likely to be male.

While the above image is exaggerated somewhat, these features are identifiable in thousands of children and adults who have fallen between the cracks of our health-care system and were not encouraged to breathe through their noses. These same individuals often suffer from poor health, low energy and reduced concentration. In the words of dentist Dr. Josh Jefferson: "These children do not sleep well at night due to obstructed airways; this lack of sleep can adversely affect their growth and academic performance. Many of these children are misdiagnosed with attention deficit disorder (ADD) and hyperactivity."<sup>9</sup>

I recently collaborated in a study at the University of Limerick, Ireland to investigate the Buteyko Method as a treatment for rhinitis (irritation and inflammation of the nose) in asthma. The results were a 70 percent reduction of symptoms such as nasal stuffiness, poor sense of smell, snoring, trouble breathing through the nose, trouble sleeping and having to breathe through the mouth.<sup>10</sup> Below is one of the exercises which I taught to participants of the study:



## Nose Unblocking Exercise

- Take a small, silent breath in and a small, silent breath out through your nose.
- Pinch your nose with your fingers to hold your breath.
- Walk as many paces as possible with your breath held. Try to build up a large air storage without overdoing it.
- When you resume breathing, do so only through your nose. Try to calm your breathing immediately.
- After resuming your breathing, your first breath will probably be bigger than normal. Make sure that you calm your

breathing as soon as possible by suppressing your second and third breaths.

- You should be able to recover normal breathing within two to three breaths. If your breathing is erratic or heavier than usual, you have held your breath for too long.
- Wait for a minute or two before repeating the breath hold.
- Repeat this exercise five or six times until the nose is decongested.

Generally, this exercise will unblock the nose, even if you have a head cold. However, as soon as the effects of the breath hold wear off, the nose will likely feel blocked again. By gradually increasing the number of steps you can take with your breath held, you will find the results continue to improve. When you are able to walk a total of 80 paces with the breath held, your nose will be free permanently. Eighty paces is actually a very achievable goal, and you can expect to progress by an additional 10 paces per week.

Each week I teach this exercise to groups of five- to 10-year-old children, many of whom have pretty serious breathing difficulties. Within two to three weeks, most children are able to walk 60 paces with their breath held, with some children quickly achieving up to 80 paces. Try it yourself, and see how you do.

Finally, according to American research, 95 percent of head circumference growth for the average North American child takes place by the age of nine. Development of the lower jaw, however, continues until approximately age 18.<sup>11</sup>

Based on these observations, for correct craniofacial growth to take place, early intervention with nasal breathing and tongue posture is essential. The negative effects of mouth breathing on the structure of the jaws and face will have the most impact when they occur before puberty, so there is only a brief window of opportunity to avoid significant changes in a child's facial structure.<sup>12</sup> ■

## Author's Bio

**Patrick McKeown** was educated at Trinity College, Dublin, and later studied under the auspices of the founder of the Buteyko Method; the late Dr. Konstantin Buteyko. Patrick has been teaching the Buteyko Method to health-care practitioners in Australia, USA and throughout Europe since 2002. He has penned eight books, including the self-help DVD set for children and teenagers titled *ButeykoKids Meet Dr. Mew*. Visit [ButeykoClinic.com](http://ButeykoClinic.com) or [ButeykoKids.com](http://ButeykoKids.com) for more information.

6. Okuro RT, Morcillo AM, Sakano E, Schivinski CI, Ribeiro MÂ, Ribeiro JD. Exercise capacity, respiratory mechanics and posture in mouth breathers. *Braz J Otorhinolaryngol*.2011;(Sep-Oct;77(5):656-62

7. Okuro RT, Morcillo AM, Ribeiro MÂ, Sakano E, Conti PB, Ribeiro JD. Mouth breathing and forward head posture: effects on respiratory biomechanics and exercise capacity in children. *J Bras Pneumol*.2011;(Jul-Aug;37(4):471-9

8. Conti PB, Sakano E, Ribeiro MA, Schivinski CI, Ribeiro JD. Assessment of the body posture of mouth-breathing children and adolescents. *Journal Pediatrics (Rio J)*.2011;(Jul-Aug;87(4):471-9

9. Jefferson Y. Mouth breathing: adverse effects on facial growth, health, academics and behaviour. *General dentist*.2010 Jan- Feb; 58 (1): 18-25

10. Adelola O.A., Oosthuizen J.C., Fenton J.E. Role of Buteyko breathing technique in asthmatics with nasal symptoms. *Clinical Otolaryngology*.2013, April;38(2):190-191

11. Meredith HV: Growth in head width during the first twelve years of life. *Pediatrics* 12:411-429, 1953

12. Carl Schreiner, MD. Nasal Airway Obstruction In Children and Secondary Dental Deformities. UTMB, Dept. of Otolaryngology, Grand Rounds Presentation.1996