Breathlessness
Taming the Athlete's Albatross

An *Outside The Box* Breathing White Paper

by Don Gordon
Master Breathing Instructor

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Far too often I hear from athletes that breathlessness is a big deal and they wish they could overcome it.

In fact in a study I did of athletes, 85% of them said their breathing and breathlessness was holding their performance back. Only 15% thought their muscles or physical conditioning was the problem.

As it turns out, breathlessness can be managed and improved. Actually, the correct way to describe this is that the onset and endurance of breathlessness can be improved.

I often talk about the four stages of breathlessness during exercise, going from at rest to where breathing becomes excessive or goes out of control.

In the years that I've been training athletes, I've learned it's possible to delay the progression through each of the four stages of breathlessness and for many, avoid the point where the breath gets out of control.

Imagine going for an uphill run or bike ride at max effort while breathing calm and relaxed?

In this white paper, you'll find an introduction to:

- The science of breathlessness
- The real reason we get breathless
- The impact breathlessness has on athletic performance
- The four stages of breathlessness
- How to measure breathlessness
- An overview of the breathing exercises that delay the onset of and reduce breathlessness.

As you will see, breathlessness can be managed with a bit of work and breathing training. It all starts with how you breathe. Enjoy the rest of the white paper.

The Real Reason We Become Breathless

Breathlessness, or dyspnea, is defined as a shortness of breath or a feeling you can't breathe well enough.

Most people would say they can't get enough air into their lungs given the level of exertion they are doing.

With the onset of breathlessness, breathing becomes labored, the number of breaths taken doubles or triples and the size of each breath increases substantially.

There are three reasons we take a breath:

- A need for oxygen
- A need to expel carbon dioxide
- A build up of hydrogen ions

If I were to ask a room full of athletes which of these three reasons is most prominent, inevitably they'd all say the need for oxygen. And they'd all be wrong.

Studies show that body oxygen reserves will keep most of us alive for four minutes or more. Ama divers in Japan can stay underwater for up to 11 minutes. The world record for holding one's breath is over 15 minutes.

Nope, a need for oxygen is not the correct answer.

The correct answer is the need to get rid of carbon dioxide[1].

Most of us have a very low tolerance of carbon dioxide and as a result we breathe more often than we need to.

A breath will occur if body oxygen pressure drops by 50%. You'd have to work hard to see a 50% drop in oxygen pressure, even an athlete going at maximum effort[2].

However, a tiny 5% increase in body carbon dioxide pressure will double our breathing rate[2].

Breathlessness occurs when carbon dioxide levels get too high. We get to the point that we can't get the carbon dioxide out fast enough. We become breathless.

The good news is that with training, we can increase our tolerance of carbon dioxide, delay the onset of and control the intensity of breathlessness.

The Impact of Breathlessness on Athletic Performance

Breathlessness affects the athlete both physiologically as well as psychologically.

For the later, think of the impact feeling out of breath has on your mind. You're

gassed going up a hill and it's all you think about. It makes you feel awful.

From a physiological perspective, there are two key impacts breathlessness has on performance:

- **Muscle Oxygenation and Energy Production:** With strong breathlessness, the body moves from aerobic respiration to anaerobic respiration. We cross the anaerobic threshold (AT.) Once we cross AT, energy production is slashed and lactic acid is produced. Fatigue is not far behind.
- **Wasted Energy:** Studies show that strong breathing, that accompanies breathlessness, accounts for as much as 15% of total VO2max. Energy that could be used to power active muscles is being robbed to fuel all that breathing[3].

  Another study shows strong breathing draws oxygen and blood away from active muscles to support the diaphragm[4].

The Four Stages of Breathlessness

In working with athletes, I'll first observe their breathing and grade their breathlessness. I look at how they breathe at rest and then as they increase exercise intensity to maximum effort.

I want to see how they progress through the four stages of breathlessness and how quickly they get to each stage.

The four stages of breathlessness are:

1. **Baseline:** Breathing as observed while sitting and before exercise
2. **Slow Break:** Breathing during exercise increases beyond the baseline
3. **Middle Break:** Breathing during exercise is strong but controlled
4. **Fast Break:** Breathing goes out of control – the athlete is gasping for air

Measuring Breathlessness

There are several tools used to measure breathlessness. During the breathlessness assessment I compare

the different stages of breathlessness to the athlete's heart-rate, a suitable “level of effort” measurement.

Over time, the goal is to see the onset of each stage of breathlessness occur at a higher heart-rate, or level of effort.

Once the athlete begins breathing training, a more simple measurement system is employed. There are two tests the athlete can easily do anywhere.

The first measurement tool is the Body Oxygen Level Test or BOLT. BOLT determines the onset of breathlessness.

This test employs a breath hold, causing a buildup of carbon dioxide in the body. BOLT measures the time it takes for the brain's breathing center to initiate a breathing cycle to get rid of the carbon dioxide. To complete the BOLT test:

1. Take a normal breath in and a normal breath out.
2. At the end of the exhale, start a breath hold – pinch your nose closed and close the mouth.
3. Count the number of seconds that transpire from when you started the breath hold until you have the first sensation of wanting to breathe. Keep in mind this is not a test to see how long you can hold your breath, only the time until you get the first desire to breathe.

A BOLT score of 25 seconds is considered a good starting point but breathlessness is still an issue. A score below 25 seconds indicates your tolerance of carbon dioxide is low and needs a fair amount of work.

The goal I give all my athletes is a BOLT score of 40+ seconds. This is where breathlessness is well managed and may only appear sprinting for the finish line.

The second test is the Maximum Breathlessness Test or MBT. MBT measures breathlessness endurance, the maximum carbon dioxide load you can tolerate. This is where breathing goes out of control.

To perform the MBT, do the following. Please **do not do** the MBT if you are pregnant or have high blood pressure, epilepsy, diabetes or sleep apnea.

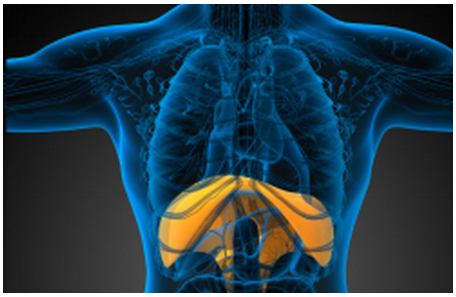
1. Take a normal breath in and a normal breath out.
2. At the end of the exhale, start a breath hold – pinch your nose closed and close the mouth.
3. Begin walking with the breath hold and count the number of steps you take. Each footfall counts as one step.
4. When you can no longer tolerate the breath hold or it becomes uncomfortable, release the breath

hold and allow your breathing to return to normal. Please don't overdo this exercise.

The MBT score is the number of steps you took during the breath hold. A good MBT is 60 steps, although improvement is needed. Eighty to one-hundred steps is the target for my athletes.

An MBT score of less than 60 steps indicates there's breathing work required to improve breathlessness endurance.

Improving Breathlessness



Breathing training is the most efficient and fastest way to improve breathlessness. For most athletes, breathing training is a 4 to 8 week process, although progress is usually seen in the first week or two.

Breathing training involves a number of breathing exercises, which can be easily integrated into daily life and a training schedule.

The following are the three classes of breathing exercises used:

- **Breathing Volume Adjustment:** Trains the breathing center of the brain to correctly balance the need for oxygen and carbon dioxide levels during exercise.
- **Breath Hold Techniques:** A series of breathing exercises that involve breath holds. These exercises cause a body adaption through regular exposure to higher carbon dioxide levels.
- **Intermittent Hypoxic Training:** Another series of breathing techniques that simulate high altitude training and further increase carbon dioxide tolerance.

Conclusion

Breathlessness doesn't have to be every athlete's albatross. Once we understand and accept that breathlessness is a function of too much carbon dioxide and not too little oxygen, the athlete can make the breakthrough, improving breathlessness.

To learn more about breathlessness, please contact me at don@TheBreathingGuy.com, or attend one of my regular information sessions or training classes.

Just imagine your next bike ride, run, triathlon, workout or swim without the breathlessness albatross following you around.

And it's possible because … how you breathe really matters.

References

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2. Journal of Psychosomatic Research 60 (2006)291-298
3. Aaron EA, et all, J Appl Physiol (1985). 1992 May;72(5):1818- 25.
4. The Effects of Inspiratory Muscle Training on Anaerobic Power in Trained Cyclists By Courtenay McFadden

About The Breathing Guy

The mission here at ***The Breathing Guy*** is: Teaching scientifically proven breathing techniques that:

- Relieve the symptoms of dozens of common health problems.
- Improve athletic performance.

For more information, please contact us at:

info@TheBreathingGuy.com

www.TheBreathingGuy.com