

# Breathing for wind players and singers

## Richard Steggall

### Introduction

By the time an average ten-year-old first enters my teaching room, they will have taken around 150 million breaths in their lifetime. After 150 million repetitions of something, you'd think you'd be pretty good at that task. Why would that student need *my* help with breathing? Well, in truth, most ten-year-olds have spent much of that time getting worse at breathing. Their lungs will have grown and increased in capacity, and the muscles associated with breathing will have strengthened, but they will have lost their natural way of breathing – that beautifully effortless and efficient way that sleeping babies breathe without a care in the world.

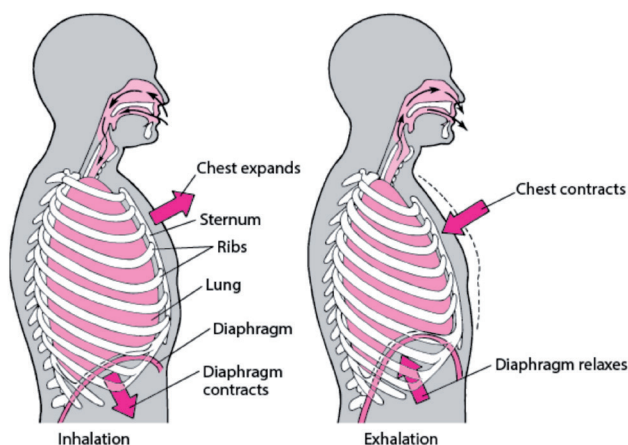
Should a musician's breath be effortless and efficient too? Efficient, certainly. Effortless – well, it might look like that in elite performers, but to get to that point, effort (by which I mean muscular activity, not strain) and conscious control over the breath are needed.

Breathing – along with heart rate, digestion, perspiration and urination – is regulated by the autonomic nervous system. Most of these actions are involuntary (many musicians would surely love to be able to control their perspiration!), but breathing can also be actively controlled by the conscious mind. Our ten-year-old will be blissfully unaware of the vast majority of breaths that they have taken, only occasionally giving thought to holding their breath underwater or blowing out candles on their birthday.

Some of your students may be lucky – they may have retained their natural ability to breathe excellently and efficiently, and find that they can adapt that to making music. But you will need to take many of your students on a breathing journey. You'll need to bring their consciousness to their breath to discover an efficient and simple way of producing the most beautiful sounds they can. Good breathing has to then become habitual, and after a consistent period of practice and awareness, it will once again return to being unconscious, as they allow themselves to focus purely on the music and sound they're making.

### Breathing basics

#### How do we breathe?



To initiate breathing in, your diaphragm contracts and moves downward, which increases the space in your chest cavity, allowing your lungs to expand. The muscles between your ribs also enlarge the chest cavity, contracting to pull your ribcage both upward and outward as you inhale. As your lungs expand, air is sucked in through your nose or mouth. The air travels down your trachea and into your lungs.

Inspiration (breathing in) is always 'active'. That means we need muscular activity to make it happen – in this case, primarily by the diaphragm and external intercostal muscles (found between the ribs).

How you breathe out depends on the needs of the body. Expiration is normally 'passive', which means it takes no muscular effort, but can be 'active' in certain circumstances. We can call these two types of breathing 'quiet' and 'forced'.

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- ▶ **Quiet breathing** occurs when we're at rest. After the lungs are stretched during inspiration, their 'elastic recoil', alongside relaxation of the inspiratory muscles, decreases the space in the chest cavity. The difference in air pressure between the air in your lungs and in the atmosphere causes air to flow through the windpipe and then out of your nose or mouth.
- ▶ **Forced breathing** occurs during exercise. To exhale, the abdominal muscles contract with force, pushing the guts against a passive diaphragm. The ribcage is also depressed. The sudden decrease in the size of chest cavity creates a large pressure difference between the air in the lungs and outside the body, and the air whooshes out of the nose or mouth.

Have a think about which method of breathing is best for musicians. Is it quiet or forced – or is there another way?

### Why do we breathe?

We breathe in to provide oxygen to our blood stream – we need that oxygen to survive. Exhaling is essentially ridding the body of a waste product: carbon dioxide.

But most animals have found a way of using air from their lungs for a purpose other than oxygen exchange: communication. Airflow from the lungs vibrates the vocal cords that are found in the larynx (voice box) and allows warnings of impending attack, demands for food, or shows of affection.

Wind players and singers are the ultimate air recyclers: we take a waste product (carbon dioxide-rich air) and turn it into a beautiful product – music. The inhale is usually considered to be the source of energy, but musicians use the exhale as their source – to create the vibrations that release sound waves that are recognised by a listener as music.

### Using the breath to make music

Our exhalations have to work in harmony with whatever vibrating material (vocal cords, lips, reed, etc.) we're using. Air always moves from areas of higher pressure to lower pressure (that's how breathing works) so there is always a difference in air pressure either side of the vibrating surface. The energy provided by the airflow (caused by the differences in air pressure) to that vibrating surface is converted into sound.

It's worth pointing out here that what travels to a listener's ear as music is not the air. Once the air has energised the vibration, what carries on out of the mouth, or through an instrument, is now CO<sub>2</sub> waste gas. Air only travels through a trumpet and out of the bell because there's nowhere else for it to go. That doesn't mean that what happens after the vibrating surface doesn't affect the airflow, but its work is done.

We don't 'project' our air. There's no throwing of molecules of gas to the back of the hall. We may have had teachers who encouraged us to 'project' while gesturing towards a far away spot in a room, but before you repeat this to your own students, just think about the message it's delivering.

### Use of language

Let's take a moment here to discuss use of language. Many musicians use scientifically incorrect language when dealing with breathing. Saying 'use the diaphragm' to blow strongly is a prime example. The diaphragm is passive when breathing out – you cannot 'use the diaphragm' to blow. However, the idea here is correct. You can work on the muscles in the area around the diaphragm (and we'll discuss later why this is an excellent idea), but the instruction is factually incorrect. If a student follows the intention of your instruction, does the end justify the means?

The danger of giving anyone an instruction is that it's misinterpreted. The outward movement of the abdomen during the inhale can also be performed while holding the breath. A student who has heard something like 'breathe into the gut so the abdomen expands' might be performing that movement consciously instead of as a consequence of a large inhalation (notwithstanding the fact that actually breathing into the gut would be extremely bad news for your life expectancy!). The famous tuba player and breathing guru Arnold Jacobs called this 'pseudo-breathing'.

But going back to our word 'project': what does that mean? Focus your sound? Play louder? To a young student it's a rather vague suggestion. I've seen trumpeters physically trying to 'push' the air by jutting their necks forward. Projection is not that. Can you rephrase your own idea of projection? 'Imagine the air whizzing through your lips is carrying on to the back of the hall' might be a better way to express the effect that, as a teacher, you desire for your student.

Another question to ponder is about one of the most abused and misunderstood words in breathing: 'support'. What does that word mean to you? We'll return to it later.

## How to breathe

There's no universal method for *all* musicians to breathe. What I aim to do here, however, is guide you through a discussion where I arrive at my preferred method of breathing, and teaching breathing, based on the information I've gathered as a brass player and teacher. If you reach a different conclusion to me, I hope you understand why it works for you and/or your students.

As outlined above, we are using the breath to communicate. The breath needs to work in synchronisation with the control of the vibration medium (vocal cords, lip, reed, etc.) and control of the airways (throat, oral cavity, etc.) and tongue. We want to make the most beautiful sounds, move effortlessly from one pitch to the next, be able to articulate in many different ways, and use dynamic variations to tell our musical story. To be able to do these things, we need to supply air at a precise pressure to the vibrating medium.

### Air supply: pressure and flow

We supply air at a certain pressure to our vibrating surface. The difference in pressure between each side of the vibrating medium causes airflow. The vibrating surface uses the energy from this flow to create sound waves within our instrument (or the vocal tract for singers).

A steady tone is created from steady airflow through the vibrating surface. To achieve this, the body must maintain a steady air pressure at that vibrating surface. Any change in the vibrating surface (such as an increase in tension in the lips of a brass player to raise the pitch) must also be accompanied by a subtle, sympathetic but instantaneous change in the air pressure, to maintain the tone quality as the pitch changes.

We can change airflow by consciously changing the volume of our lungs. If we use our abdominal muscles to push strongly on our diaphragm, the sudden decrease in volume will cause the air pressure in the lungs to increase. However – and I can't stress this enough – this will not necessarily result in a high air pressure at the vibrating surface. In fact, it could result in no increase in pressure if we close the glottis completely – this is very useful if you're giving birth or stabilising the spine while weightlifting. For music, not so much.

Closing the glottis with full lungs is like blowing up a balloon and then pinching the neck tight with our fingers so that no air escapes. If we then wanted to produce a small airflow, we could gently release the pinch to create a hole for air to escape. But what if we'd like a greater airflow: how would we achieve that? Releasing our pinch further and making the hole for the air to escape larger would seem to be the most efficient way. How many of us would choose to maintain the pinch to keep the hole the same size and push on the balloon with our arms or chest instead? Probably not many, but this inefficient creation of airflow is what many of our students have developed.

### Upper airways

When we consider breathing, we have to consider the upper airways – throat and oral cavity (the nasal cavity is probably less important unless you're playing a nose flute! And there's no space here to consider the various resonances of the body: try searching for 'nasal formants' online to find out more).

Any blockages in the upper airways will require more work around the lungs (the air will have to be at a higher pressure) to create the correct airflow to the vibrating surface. Therefore when dealing with breathing, we must also include the upper airways in our discussion.

There are many ways to get students to experience airways blockages. Here are two exercises that I use:

- ▶ Get your students to exclaim: 'Uh! Oh!' This is particularly effective when done in a loud whisper. Ask them to identify three stages of this phrase (it can be slowed down to help). Hopefully you can help them find that the 'uh' starts with a partial blockage of the airways as the tongue moves back in the mouth. That is followed by a complete block between the 'Uh!' and 'Oh!', before the blockages clear on the 'O'.
- ▶ Say the word 'thick' really slowly – again, an exaggerated whisper works well. Experience the tongue moving from the teeth to the back the mouth.

## Three ways to breathe

### Quiet breathing

Some young wind players and singers breathe ‘quietly’ when they play, just like they do in everyday life. You might wonder: how do their teachers let them get away with that? In the early stages of teaching there are many different things to deal with. If you’re trying to teach a horn student how to read music, and form an embouchure, and hold the instrument, and use the valves (and many other things), but their blowing just seems to work so that they can hit the correct pitches, then why would you start to change an element that seems okay?

Quiet breathing *can* work, but generally only with limited results. We usually start wind players off in the low/middle register, and playing at a comfortable volume. (Although I’ve never taught singing, I think I can safely assume you don’t start the first lesson by getting your student to sing the loudest, highest note they can!) Therefore in a student’s early stages, the natural elastic recoil of the lungs may be enough to provide the correct air pressure and airflow to make a decent sound.

However, we soon encounter problems. If I asked a trumpet player to perform a C major scale (up and down) there would be some obvious indications that they were using quiet breathing:

- ▶ The scale would start off okay, but the sound would get tighter and more pinched as they ascend. (An indication of unconscious blocking of airways using the tongue or throat, to increase air pressure at the lips to generate the airspeed needed for correct frequency of lip vibration.)
- ▶ The student would have to breathe after a few seconds, as once the elasticity of the lungs had half-emptied them, no more air could be pushed out, so breathing in is the only option.
- ▶ Descending, the sound would improve, but it would get quieter towards the end of the scale (as the required airflow could not be maintained).

### Forced breathing

We use forced breathing when we exercise. What’s the motivation to do this? The body needs more oxygen to keep going, so needs faster gas exchange.

Some young musicians use forced breathing. What’s the motivation for this? It’s usually because they’ve been told to ‘push from the abdominal muscles’ when they blow.

They’ve also been told to take a big breath into the gut (not anatomically correct, but good enough advice). The lungs are fully expanded and full of air, and they have huge ‘elastic potential’ (think of our full balloon waiting to let out air). Couple this with a push by the abdominal muscles on the diaphragm and we can create huge air pressure. This pressure creates far too much airflow for most musical tasks, certainly too much for any young instrumentalist – even one playing an instrument needing a relatively high pressure such as the trumpet or oboe. So what does the young player do? They block the air in their airways.

They still ‘feel’ the pressure in their torsos, so they’re convinced they are breathing strongly, but the actual airflow delivery to the vibrating surface is poor. The pressure build-up in the lungs and the work done by the abdominal muscles also create huge amounts of tension creeping up in the body. Eventually, the blockages and tension created when breathing out cannot be released when breathing in. The musician feels as if they can’t take a full breath, and so then they try to force even more, creating a horrible cycle of strain and tension.

The body has created a rigid torso, full of pressure and held by tension, and the abdominal muscles are braced against the throat. Is this the ‘support’ that you associate with good breathing?

There are, however, numerous wonderful musicians who advocate this kind of forced breathing. Their bodies are often well developed, they are often male, and they often play instruments that need higher air pressure, such as the trumpet. They do seem to make it work. They have the strength of embouchure to be able to hold great levels of air pressure and create very controlled or powerful levels of airflow.

But for a student trying to play ‘Hot Cross Buns’ for the first time, quiet breathing is a far better option – although fairly soon they’ll need something a little more developed.

### Enhanced natural breathing

It's difficult to label a style of breathing. I like to call this method 'enhanced natural breathing', but others may call it 'diaphragmatic breathing', and singers might call it the 'Appoggio technique'. It's an extension of the way we could all breathe when we were babies, and it's characterised by keeping the sternum (breast bone) high and buoyant during the exhale (while keeping the shoulders and neck relaxed). Muscles in the back, abdomen and ribs combine to delay the return of the diaphragm and the inward movement of the ribs. (Some teachers describe this as 'sitting' on an air cushion in the belly while exhaling.) The simultaneous contraction of the large muscle groups in the abdomen and back forms what we might term 'support' to the breath, and the focus on contraction of muscles (rather than relaxing, as the diaphragm does on ascent) gives us 'control' over our breathing. Importantly, the support brings great stability to the body, irrespective of demands on the airflow that the music is making.

We have achieved control and support without blocking the airways – this allows 'control' to easily turn into 'power' without forcing a change in technique.

On the inhale, the diaphragm is allowed to contract down to its lowest point, and the expansion of a relaxed abdomen (under the diaphragm and around the lower ribs) can be felt at the front, sides and back of the body. The back will remain engaged and strong as the lungs fill and very little thought needs to be given to any change in abdominal work as the air turns round into the exhale. As long as the sternum and ribs are kept from collapsing, the torso will 'support' any required airflow. The 'flow' and the 'body' are 'connected', and are motivated by one thing – to make the best possible sound. We are now 'managing' the breath, not just letting the lungs collapse or forcing them to exhale.

### Breath management

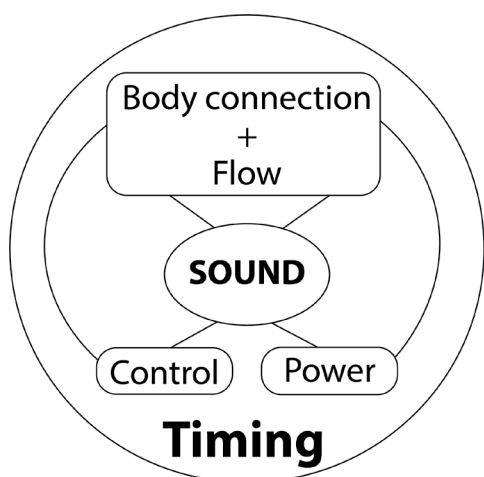
The reason that many of the words in the paragraphs above appear in inverted commas is that 'enhanced natural breathing' allows us to reframe our thinking, relationship and vocabulary when it comes to breathing. We certainly don't have to talk of 'pushing', 'forcing' or 'squeezing' the air, and even the concept of 'support' (and I'm sure most musicians have very different ideas about this) can be redefined. 'Pressure' has been replaced by 'flow', and the body is working efficiently.

The idea of breathing 'low' is probably the one thing that the vast majority of wind and singing teachers agree on. But when you've breathed in low, what happens next? The idea of breathing low gives us the idea that support is just from the abdomen, like a building's foundations supporting from below. But buildings are also supported vertically out of the ground, and likewise the body's support should happen throughout the body, particularly in the back. Rather than 'support', I prefer to think of it as the body's 'connection' with the airflow and the sound.

'Breath management' is motivated by sound. We find a strong connection between the body and breath in all phases of the breathing cycle. The body work is connected to the airflow, and the airflow is connected to the sound, so the body work is therefore also connected to the sound. Because the body is fully connected to the airflow, we're able to play with both control and power according to the needs of the music.

There is one last concept that ties all these things together – timing. Many players struggle with timing because the inhale and exhale are seen as different operations. So many brass students try to 'preform' the necessary air pressure before a note sounds, which leads to blockages and, commonly, the brass musician's nemesis – the split note. By using the breath management associated with 'natural enhanced breathing' the connection between in and out breaths allows the timing of the exhale to be beautifully synchronised with the music.

We have re-found one of our natural uses of the breath – communication.



### Practical application

This resource might not have given you much in the way of practical information as to how to help your students. It may also have left you with more questions than answers. But with the information above, you can start answering those questions for yourself. It's only once we start to understand how breathing works from a scientific point of view, not from sound bites that we used to hear in our own lessons, that we can start to help our students.

Some children have maintained the efficient, easy way of breathing that they were born with, and with a little encouragement, they can adopt it to singing or playing a wind instrument. For others, a change of breathing habits must be found. Unfortunately, without careful nurturing students will use the same breathing habits that they might use for exercise, lifting, or as an emotional response. For students who have lost their natural ability to breathe easily, this will come into even sharper focus when they feel they're under pressure. When a student is rigid with fear just before a performance, breathing well is impossible. If they're instructed, 'Just take a big breath to calm your nerves,' most would want to reply, 'I can't!'

Good breathing runs much further than just basic mechanics and physiology. Most children's loss of easy, natural breathing stems from psychological rather than physiological reasons, especially in performance. As a teacher, that's a harder thing to deal with.

We'll return to the subject of breathing in a future issue of *Music Teacher*, and considering why our students' breathing is far from ideal, with practical information on how to help them.