



& The Business Shed

- A Creative Initiative

Vocal Anatomy – An Overview

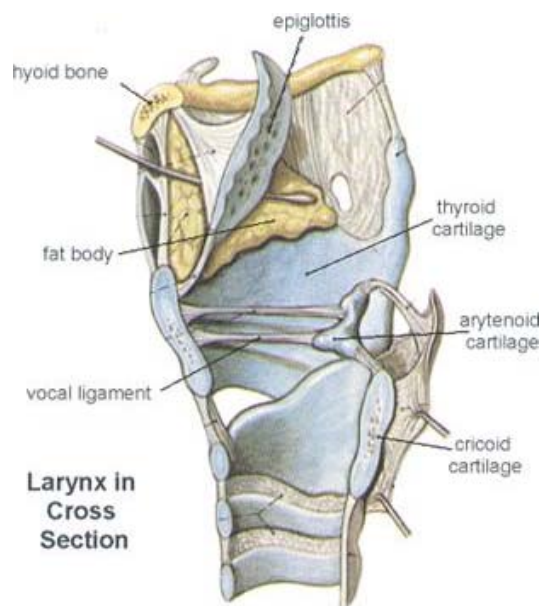
[Close Window](#)

[Download PDF](#)

Any sound we hear is the result of a vibration – and this is the same for the sounds we hear made by the human voice.

The human voice consists of three parts – one is the breath mechanism which acts like a compressor – it compresses the air in the lungs. The second part is the pair of vocal folds which act like a sound generator, chopping the air stream from the lungs as they vibrate together into a series of air pulses. The third part is the cavity system – the pharynx and mouth cavities (the vocal tract) which act as a resonator. Imagine a cello – the bow is drawn across the string and the vibration the string makes is amplified by the box cavity of the cello's body – the resonator.

Simply put, the vocal folds, which are attached at the front of the larynx at the thyroid cartilage (what we sometimes hear referred to as our Adam's Apple) and at the back via arytenoids to the cricoid cartilage, vibrate together as air is released from the lungs. This vibration produces the sound we hear, whether it is a pitched note or a word.



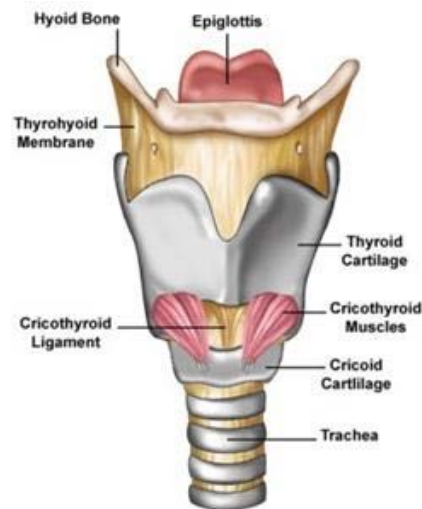
In the image above, the front of the larynx is the left hand side.

One of the main functions of the larynx is to protect the airways and to stop food entering the lungs. Food should pass down the oesophagus into the stomach. As can be seen from the image above, the vocal folds sit over the open space of the trachea and all air that enters and leaves the lungs will pass by them.

There are also what is called vestibular folds (false folds) which sit just above the true folds and both sets close during the acts of swallowing, coughing, exertion (such as lifting heavy objects or giving birth) – which is why we now hear a lot of screaming from tennis players when hitting the ball – the folds are closed and after the exertion are suddenly released and a small (or not so small) sound is heard. The vestibular folds protect the true folds

from damage in these circumstances.

This is another view of the Larynx from the front.



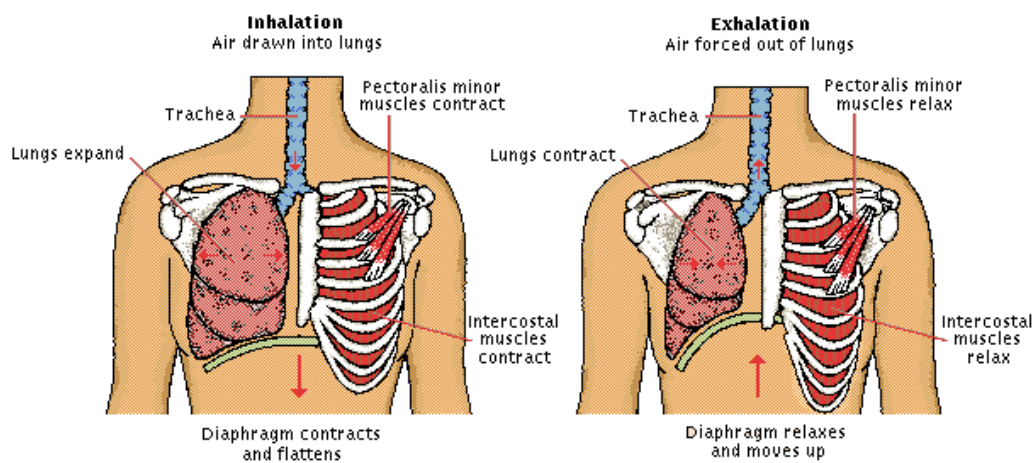
Breath is crucial to the working of the voice – air is the medium which carries the vibration (sound wave) and it is air which powers the voice.

Humans can survive days without water, even weeks without food, but only minutes without oxygen. Similarly, the voice cannot exist without the breath.

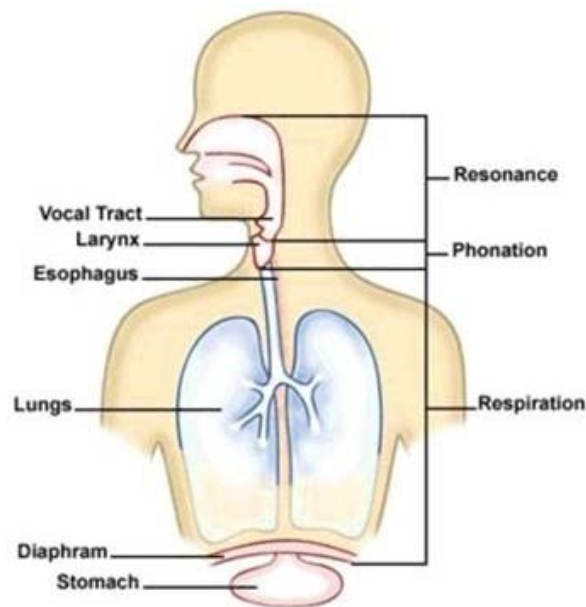
The Thoracic Diaphragm is a dome shaped muscle (rather like an inverted trampoline) which stretches across the abdominal cavity and separates the organs of the chest cavity from those in the abdominal cavity – intestines and such like.

The diaphragm contracts from its dome shape to a flatter shape (moves downwards) and air is pulled into the lungs – inhalation.

As we breathe out, the diaphragm will relax and move upwards reducing the size of the lungs and causing air to be expelled from them – exhalation.



So sound is created by the vocal folds vibrating (and they do so at an incredibly fast rate) as air is exhaled. This sound is then shaped by the manipulation of the various components of the vocal tract – such as the position of the tongue and the position of the larynx.



The full act of breathing is in fact more complicated than simply thinking the diaphragm contracting and involves a whole set of muscles in and around the chest cavity.

Briefly, there are two groups of muscles – the internal intercostals and external intercostals. Inter = between, costae = ribs. These elevate and depress the ribs.

When breathing in, the diaphragm presses on the abdominal viscera through a downward and forward movement – the abdomen “swells” outwards. The chest cavity expands as the lungs fill with air.

When breathing out there is a simultaneous movement in the body cavity and the chest as the diaphragm reverts to its relaxed position, which reduces the volume in the lungs – the chest cavity “collapses”.

Breath control for singers then concerns delaying the collapse of the ribs and the return of the diaphragm to its relaxed state

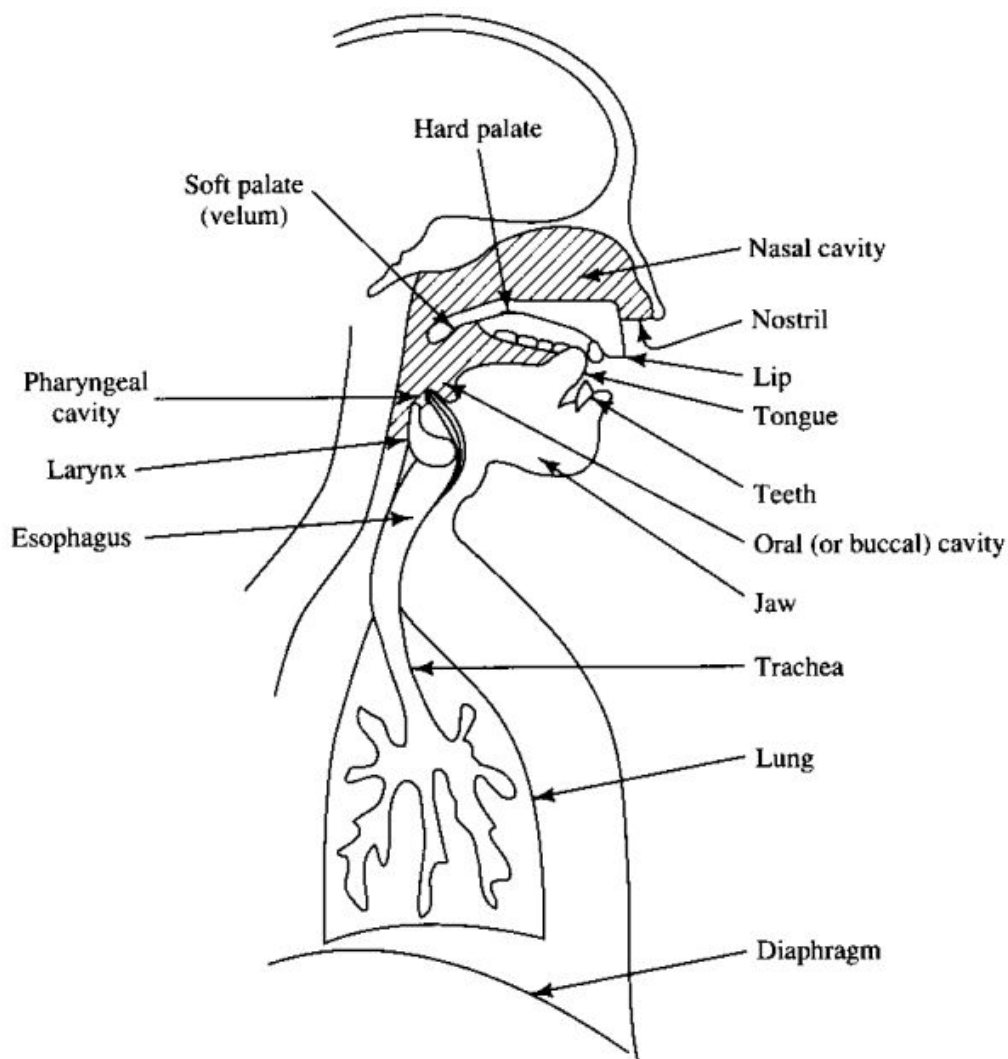
Expiration is achieved by muscles that pull the ribs down or compress the abdominal contents and push them up, making the volume in the thorax (chest cavity) smaller. The principle muscles involved are the intercostal muscles which decrease intercostal space and pull the ribs down, with abdominal, back and other muscles also working.

In fact the primary muscles of active expiration (singers actively exhale) are the abdominal muscles, such as the external and internal obliques, the rectus and transversus abdominus muscles.

The resulting sound is then articulated by the cheeks, the tongue, teeth, lips – vowels and consonants.

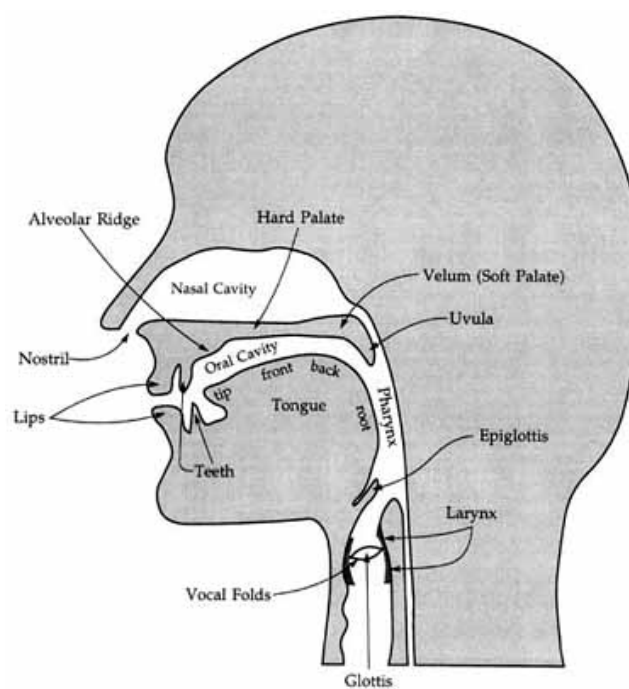
Vowels are shaped in the vocal tract by the tongue (and sometimes to a lesser extent by the lips). Consonants are mostly articulated by the tongue and the lips. It is interesting to note that the lower jaw has very little to do with articulation.

B and M is a bilabial sounds – upper and lower lips moving together. T is produced by the tongue positioning behind the upper teeth and the alveolar ridge – the bony part of the gum into which teeth sit.



In summary, the brain is the centre for ideas, motivation, language and regulation; the upper vocal tract is where resonance and articulation are controlled; the vocal folds vibrate to create the sound wave; and the respiratory system activates the process by getting breath into and out of the lungs.

Resonance occurs primarily in the nasal, oral and pharyngeal cavities, as shown on this last picture.



For further information about phonetics, please read the [Beginner's Phonetics](#) document.

Creating Possibilities and Finding Solutions

© The Music Shed & The Business Shed 2007 -
2008

WebDesign by [The Business Shed](#)