

## SPEECH ORGANS AND THEIR FUNCTION

Brain is mostly involved in cognitive working, thus it brings the origin of language in an abstract form. This abstract form is then brought forward in concrete form through different body organs which receive messages from brain. These body organs give rise to spoken language which was once in form of neurons or signals in mind. Such organs are known as speech organs. All of the sounds we produce are because of muscle contraction or expansion. The muscles in the chest that we use for breathing produce the flow of air that is needed for almost all speech sounds; muscles in the larynx produce many different modifications in the flow of air from the chest to the mouth. After passing through the larynx, the air goes through what we call the **vocal tract**, which ends at the mouth and nostrils. Here the air from the lungs escapes into the atmosphere. We have a large and complex set of muscles that can produce changes in the shape of the vocal tract, and in order to learn how the sounds of speech are produced it is necessary to become familiar with the different parts of the vocal tract. These different parts are called **articulators**, and the study of them is called **articulatory phonetics**.

Speech Organs that belong to **Articulatory system**:

- **LIPS:**

Lips include upper lip and lower lip. They serve for creating different sounds - mainly the **labial**, **bilabial** e.g. /p/, /b/, /m/, and /w/, **labio-dental** consonant sounds e. g. /f/ and /v/rounded to produce the lip-shape for vowels like /u/ and thus create an important part of the speech apparatus.

- **TEETH:**

The small whitish structures found in jaws in front of mouth, immediately after lips are teeth. They are responsible for creating sounds mainly the labio-dental (tongue touching the front teeth) e.g. /f/and /v/and lingua-dental e.g. /ð/and/θ/.

- **ALVEOLAR RIDGE:**

Alveolar ridge is basically hard ridge behind the upper front teeth. It is between the roof of the mouth and the upper teeth. You can feel its shape with your tongue. Its surface is really much rougher than it feels, and is covered with little ridges. For the sound /s/, air from the lungs passes continuously through the mouth, but the tongue is raised sufficiently close to the alveolar ridge to cause friction as it partially blocks the air that passes. Moreover, sounds made with the tongue touching here (such as t and d) are called **alveolar**.

- **HARD PALATE:**

Hard palate is a thin horizontal bony plate of the skull, located in the roof of the mouth. It is often called the "roof of the mouth". Its smooth curved surface can felt with the tongue. The interaction between the tongue and the hard palate is essential in the formation of certain speech sounds, notably /t/, /d/, and /j/.

- **VELUM(SOFT PALATE):**

The velum or soft palate is in a position that allows air to pass through the nose and through the mouth. Often in speech it is raised so that air cannot escape through the nose. Its main function is to separate the nasal cavity from oral cavity in order to produce the oral speech sounds. If this separation is incomplete, air escapes through the nose during speech and the speech is perceived as hyper nasal. The other important thing about the velum is that it is one of the articulators that can be touched by the tongue. When we make the sounds k and g the tongue is in contact with the lower side of the velum, and we call these **velar consonants**.

- **UVULA:**

The hanging ball's full name is the “**palatine uvula**,” referring to its location on your soft palate. It functions in tandem with the back of the throat, the palate, and air coming up from the lungs to create a number of guttural and other sounds. In many languages, it closes to prevent air escaping through the nose when making some sounds.

- **GLOTTIS:**

The combination of vocal folds and space in between the folds is known as glottis. As the vocal folds vibrate, the resulting vibration produces a “buzzing” quality to the speech called voice or voicing or pronunciation. Sound production involving only the glottis is called **glottal**. Example is the sound /h/. The vibration produced is an essential component of voiced consonants as well as vowels. If the vocal folds are drawn apart, air flows between them causing no vibration, as in the production of voiceless consonants.

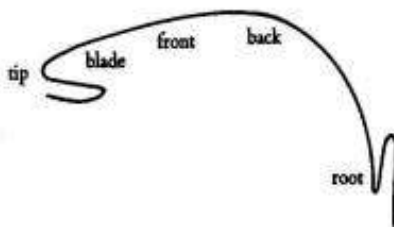
The glottis is also important in the **Valsalva maneuver**.

Voiced consonants include /v/, /z/, /ʒ/, /dʒ/, /ð/, /b/, /d/, /g/, /w/.

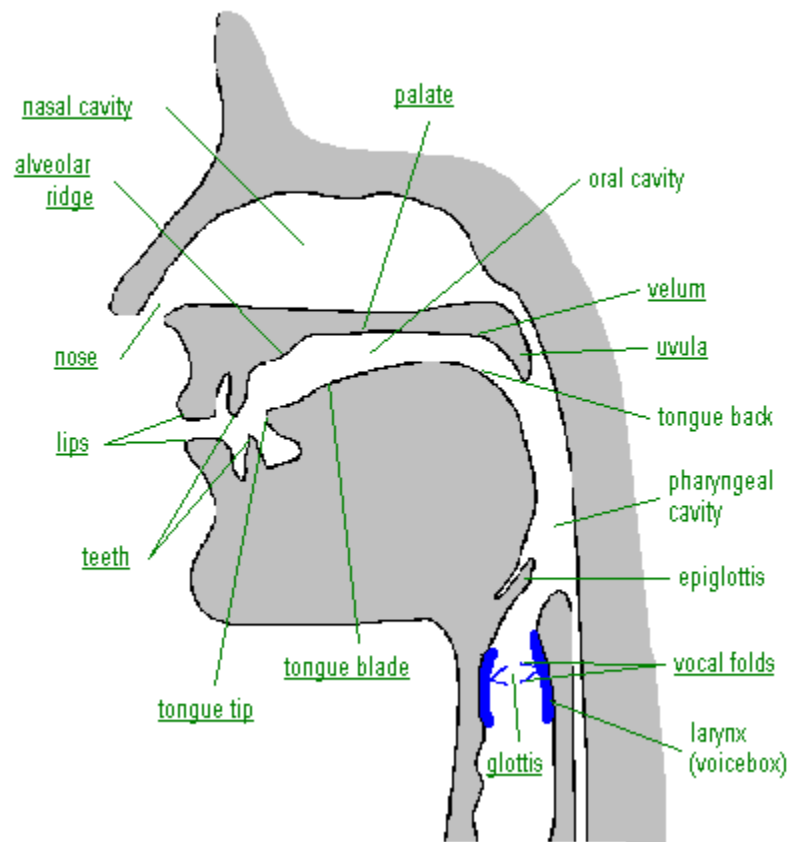
Voiceless consonants include /f/, /s/, /ʃ/, /tʃ/, /θ/, /p/, /t/, /k/, /ʌ/, and /h/.

- **TONGUE:**

The tongue is a very important articulator and it can be moved into many different places and different shapes. Its movement in oral cavity plays important part in production of almost every speech sound. Usually, it is divided into different parts: tip, blade, front, back and root.

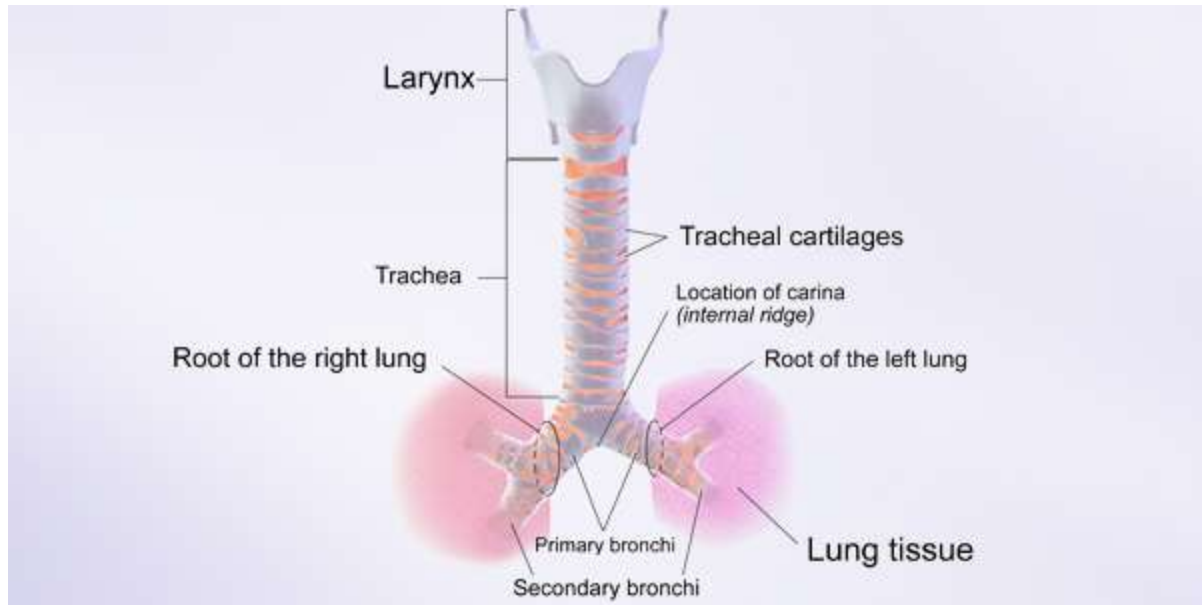


Besides these articulatory organs, other major parts of the body also play an important role in the production of speech sounds which are following:



### **THE LUNGS:**

The function of all of the above mentioned body parts is to produce Speech sounds and speech requires some sort of air source. We produce a majority of speech sounds by forcing air upwards from the lungs, an action that is used in normal breathing. But it is necessary that in order to produce a speech, sound the outward moving airstream must be modified by manipulation of the larynx and articulators in the oral and nasal cavities. The ways in which the airstream is modified is the focus on this module.



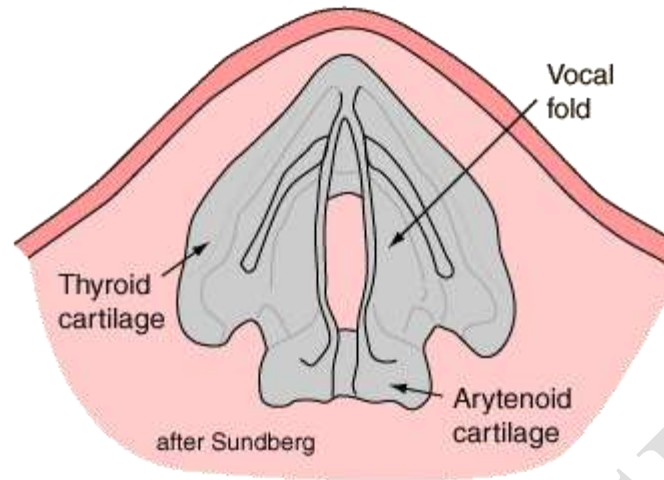
### **The larynx ("voice box") containing the vocal folds and the glottis**

The **larynx**, more commonly known as the voice box or the Adam's apple, is crucial in the production and differentiation of speech sounds. The larynx is located at exactly the point where the throat divides between the **trachea** (the windpipe), which leads to the lungs, and the **esophagus** (the tube that carries food or drink to the stomach).

Over the larynx is a flap called the **epiglottis** that closes off the trachea when we swallow. When the epiglottis is folded back out of the way, the parts of the larynx that are involved in speech production can be seen.

### **The Vocal Folds:**

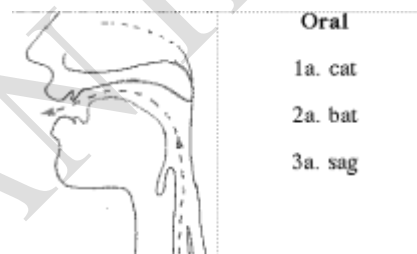
There are two thin sheets of tissue that stretch in a V-shaped fashion from the front to the back of the larynx. These are called the **vocal folds**. (You'll often hear vocal "cords," which doesn't accurately convey the way the muscle works.) The space between the vocal folds is known as the **glottis**. The vocal folds can be positioned in different ways to create speech sounds.



Air passes through the vocal folds. If the vocal folds are open and air passes unobstructed, the vocal folds do not vibrate. Sounds produced this way are called **voiceless**. But if the vocal folds are held together and tense and air doesn't pass unobstructed, the sounds produced this way are called **voiced**.

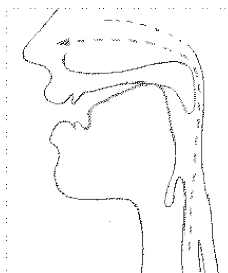
### Nasal Cavity:

In **oral** sounds most air is expelled via the oral cavity (**mouth**). Typically the **velum** is raised at the back of the mouth to block the passage of air into the nasal cavity.



In **nasal** sounds, on the other hand, the velum is lowered, to allow airflow through the **nasal** cavity. In English, nasal consonants are accompanied by the blocking of airflow through the oral cavity.

Notice that the movements of your tongue and lips are identical in the (a) and (b) examples of (1-3). The only difference is that the velum is raised in the (a) examples and lowered in the (b) examples.



**Nasal**

1b. can

2b. mat

3b. sang

CHINTANK. VAGHELA