

## Production of Speech Sound

### 1. Speech Mechanism:

The sound as we have learnt is an air manipulated in many ways by the organs of the vocal tract. The operation starts from the brain which decides to produce a given sound; it sends order to the organs to intervene via the nerve impulses. The **diaphragm** is the first actor here which moves to make the ribs squeeze the lungs that expel the air up to the **wind pipe**. The first obstacle which faces the air expelled is the **vocal cords**, which vibrate to get voiced sounds and don't vibrate to get voiceless ones. After that the air goes to the mouth where it will be manipulated by the **tongue, lips, tooth** and **the roof of the mouth**.

### 2. Organs of Speech:

The production of any speech sound takes place through steps where each of the organs of speech has a particular role.

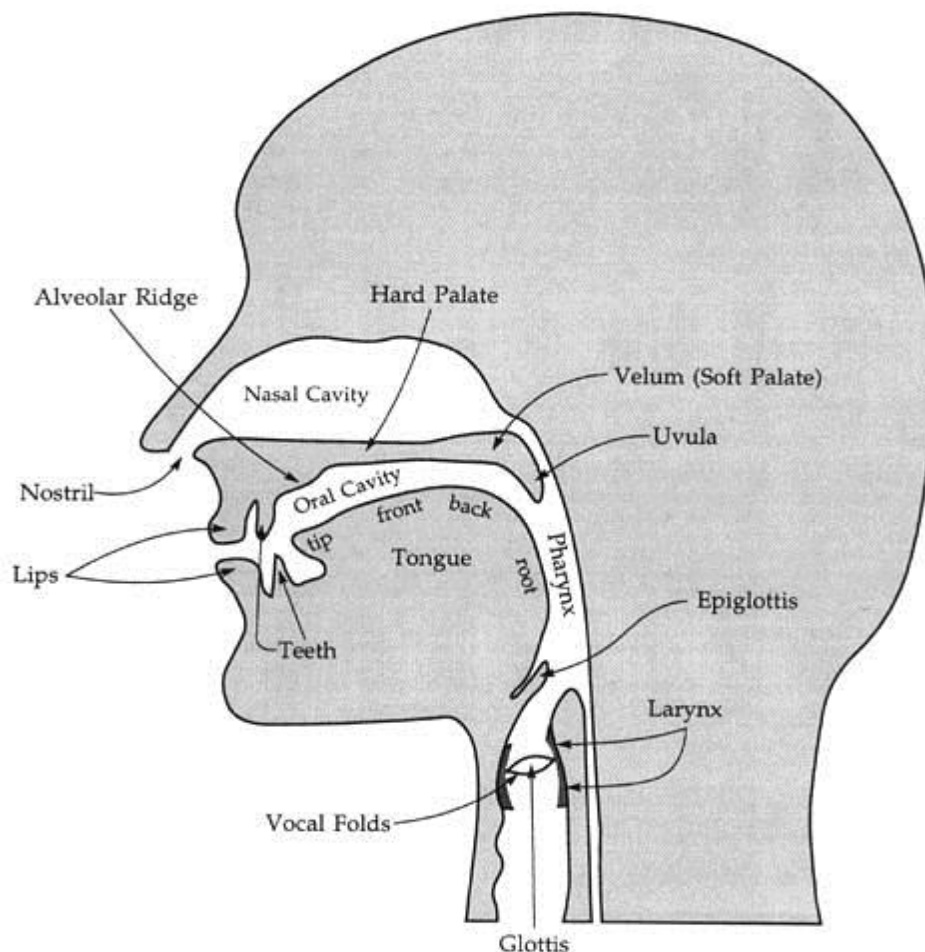
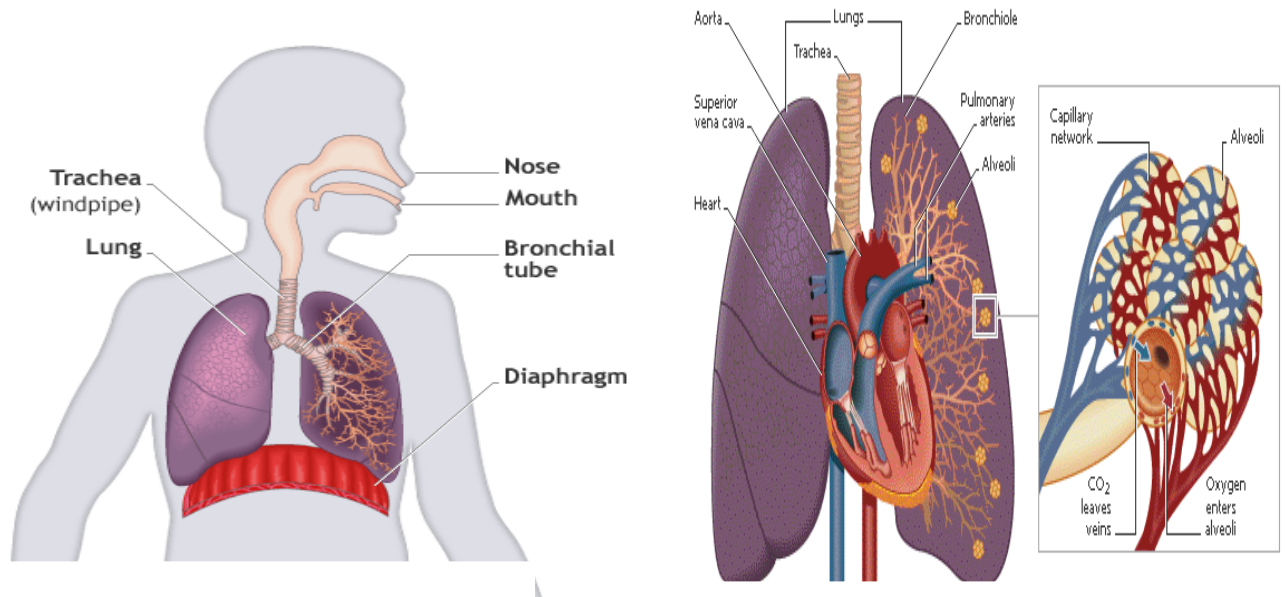


Figure 1: Diagram of the organs of speech above the trachea

↳ **Lungs:** The air stream is expelled from the lungs as we breathe out. The lungs can be described as two bags that can be enlarged and compressed by the muscles of the chest.



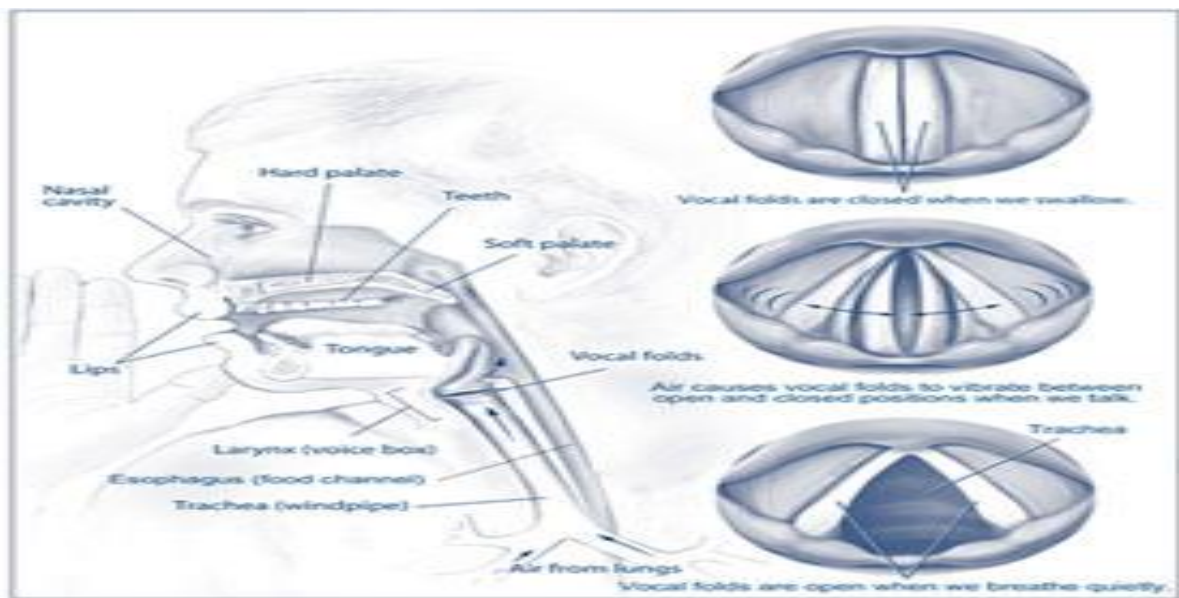
↳ **Trachea:** The air stream comes from the lungs, is thus modified first of all in the wind pipe (trachea) where it is condensed together as the stream then it passes through the next organ.

↳ **Larynx:** It is located at the top of the wind pipe which ends with a bony structure (as the box) called the larynx. It is formed of cartilage and muscle. The front part of the larynx is popularly known as the Adam's apple. The larynx contains two stretched membranous cords called the vocal cords.



Figure3: The Larynx

↳ **The vocal cords:** Are two thick flaps of muscle rather like a pair of lips. They are made of an elastic tissue. As they open and shut, the vocal cords regulate the amount of air that passes to the lungs.

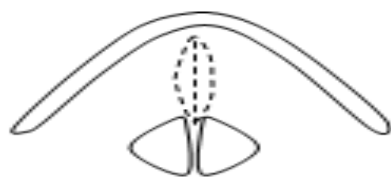
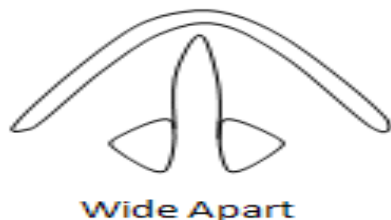


↳ **Glottis:** Is the opening between the vocal cords, it can be in four positions:

✓ **Closed glottis position** (*vocal cords completely brought together*): The closing of the glottis followed by a sudden release of the air stream will produce a glottal stop /ʔ/.

✓ **Open glottis position** (*parted or separated vocal cords*): The glottis is open, so the air passes freely. This is the case of normal breathing and during the production of voiceless consonants such as /p/, /f/, /s/...

✓ **Glottis in vibration** (*vocal cords brought together but not completely*): They are so close that when the air passes through them they vibrate. This is the normal feature of all vowels and voiced consonants like /z/, /b/, /d/, /n/...



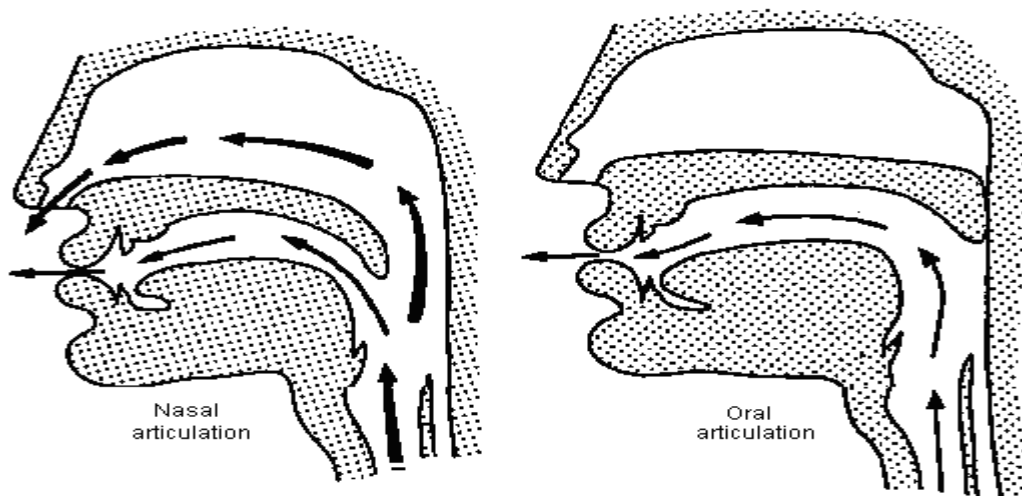
Four different states of the glottis: adapted from Peter Roach

↳ **The pharynx:** The pharyngeal cavity extends from the top of the larynx past the epiglottis and the root of the tongue, to the region of the soft palate. The pharynx is responsible for the quality of the sound produced.

↳ **Soft palate (velum):** Is the moving part of the roof of the mouth. The velum raised and lowered so that the air may escape through the mouth or the nose.

✓ The velum is in raised state in which the entrance to the nasal cavity is blocked so an aggressive air stream can only enter the mouth.

✓ The velum is in lowered state, so that an aggressive air stream may enter the nasal cavity as well as the mouth.



*Figure 7: Air passing through the nasal and oral cavities*

↳ **Uvula:** Is a small lobe of flesh hanging loosely from the center of the soft palate, uvula can be made to vibrate backwards and forwards very rapidly this produces /r/.

↳ **Hard palate:** We can find the hard palate in the front of the soft palate. The difference between them is in texture that can be felt if you touch the hard palate with your finger, you will notice that there is a hard bone underneath the skin.

↳ **Alveolar ridge:** Is between the top front teeth and the hard palate, you can feel a prominent ridge. The ridge forms the roots of themselves.

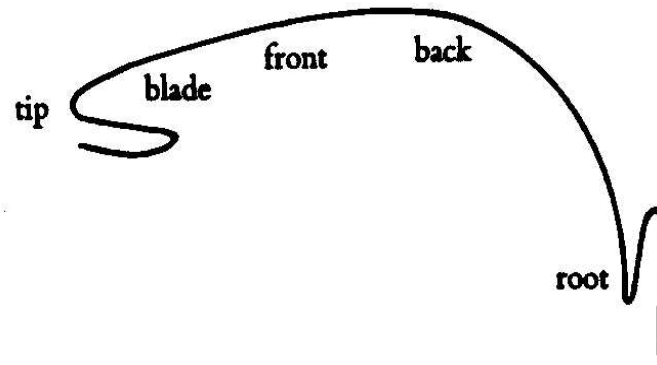
↳ **The tongue:** Is a compact mass of muscular tissue that is capable of moving rapidly and assuming different shapes and positions. It is usual to divide the tongue into different parts, though there are no clear dividing lines within the tongue.

✓ The front part opposes the hard palate.

✓ The back of the tongue faces the soft palate.

✓ The apex refers to: ♦ The blade that facing the side teeth.

♦ The tip is the extremity of the tongue.



*Figure 8: Subdivisions of the tongue*

↳ **The teeth** (*upper and lower*): Are usually shown only at the front of the mouth immediately behind the lips.

↳ **The lips**: They are important in speech, can be pressed together /b/ /p/ brought into contact with the teeth /f//v/, or rounded.