Organs of Speech

The production of speech sounds

(Cited and available online at: http://www.personal.rdg.ac.uk/~llsroach/phon2/artic-basics.htm)

Articulators above the larynx

All the sounds we make when we speak are the result of muscles contracting. 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**.

Fig. 1 is a diagram that is used frequently in the study of phonetics. It represents the human head, seen from the side, displayed as though it had been cut in half. You will need to look at it carefully as the articulators are described, and you will often find it useful to have a mirror and a good light placed so that you can look at the inside of your mouth.

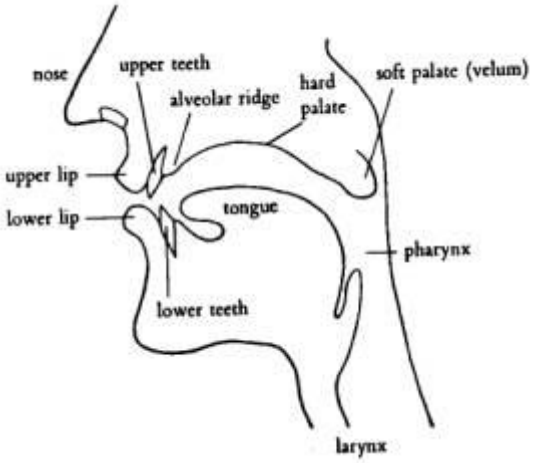

Fig. 1 The articulators

1. The **pharynx** is a tube which begins just above the larynx. It is about 7 cm long in women and about 8 cm in men, and at its top end it is divided into two, one part being the back of the mouth and the other being the beginning of the way through the nasal cavity. If you look in your mirror with your mouth open, you can see the back of the pharynx.

2. The **velum** or **soft palate** is seen in the diagram in a position that allows air to pass through the nose and through the mouth. Yours is probably in that position now, but often in speech it is raised so that air cannot escape through the nose. 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.

3. The **hard palate** is often called the "roof of the mouth". You can feel its smooth curved surface with your tongue.

4. The **alveolar ridge** is between the top front teeth and the hard palate. You can feel its shape with your tongue. Its surface is really much rougher than it feels, and is covered with little ridges. You can only see these if you have a mirror small enough to go inside your mouth (such as those used by dentists). Sounds made with the tongue touching here (such as t and d) are called **alveolar**.

5. The **tongue** is, of course, a very important articulator and it can be moved into many different places and different shapes. It is usual to divide the tongue into different parts, though there are no clear dividing lines within the tongue. Fig. 2 shows the tongue on a larger scale with these parts shown: **tip**, **blade**, **front**, **back** and **root**. (This use of the word "front" often seems rather strange at first.)

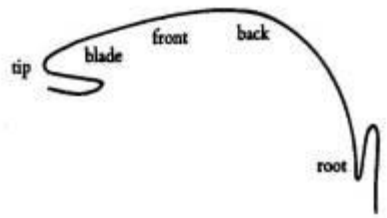

Fig. 2 Sub-divisions of the tongue

6.The **teeth** (upper and lower) are usually shown in diagrams like Fig. 1 only at the front of the mouth, immediately behind the lips. This is for the sake of a simple diagram,

and you should remember that most speakers have teeth to the sides of their mouths, back almost to the soft palate. The tongue is in contact with the upper side teeth for many speech sounds. Sounds made with the tongue touching the front teeth are called **dental**.

7. The **lips** are important in speech. They can be pressed together (when we produce the sounds p , b), brought into contact with the teeth (as in f , v), or rounded to produce the lip-shape for vowels like uù. Sounds in which the lips are in contact with each other are called **bilabial**, while those with lip-to-teeth contact are called **labiodental**.

The seven articulators described above are the main ones used in speech, but there are three other things to remember. Firstly, the larynx could also be described as an articulator - a very complex and independent one. Secondly, the **jaws** are sometimes called articulators; certainly we move the lower jaw a lot in speaking. But the jaws are not articulators in the same way as the others, because they cannot themselves make contact with other articulators. Finally, although there is practically nothing that we can do with the **nose** and the **nasal cavity**, they are a very important part of our equipment for making sounds (what is sometimes called our **vocal apparatus**), particularly nasal consonants such as m , n . Again, we cannot really describe the nose and the nasal cavity as articulators in the same sense as (1) to (7) above.

Speech organs are not created solely (only) for speech; they have other function as well. The nose and the mouth, for example are breath passages, the teeth and the tongue for chewing. Most of Speech organs are in the Chest, throat and head. Speech organs are those organs that take part in the speech act or speech process whether directly or indirectly.

S*ome organs are* ***articulator*** *such as* ***(Lower Lip and five part of tongue):***

1- Lower Lip

• Moves upward to touch the upper lip as in /b , p/

• or touch the upper teeth as in /f, v/

• takes part in rounding process with the upper lip as in /w/.

2- The Tongue

a. It located directly above the pharynx

b. It is a major speech organ.

c. One of the meaning of "tongue" is Language

d. The Tongue have five part :

1- The Apex

It's also called "Tongue tip.

It touches the alveolus as in / t /

Come between the upper and lower teeth as in / θ / think

Curves back as in the American / r /

2- The front

It is the part of the tongue between the apex and the middle of the tongue.

It touches or approaches the parallel part of the palate when producing some sound like /y /.

3- The Center

Between the front of the tongue and the dorsum

4- The dorsum

Back of the tongue. It usually touches or approaches the back part of the palate, i.e. the velum as with / k , g /.

5- The root /tongue back

The farthest part of the tongue.

It has a role in producing pharyngeal sound like /q/ in Arabic but it has no role in English.

1- Apex

3- Center

4- Dorsum

5-Root

2- Front

Lower Lip

Some organs are ***Point of Articulator*** *such as* ***(the Upper lip, upper teeth, lower teeth, alveolus, alveopalate, hard palate, velum and velum):***

3- Upper Lip

4- Upper Teeth

The upper teeth are used more than the lower teeth as a point of articulation (POA)

5- Lower Teeth

The lower teeth co-operate with the upper teeth to make a point of articulation for sound called **interdentals** such as / θ, ð / when the apex comes between the two sets of teeth.

6- The Alveolus (gum ridge) It is the area easily touched by the apex to produce several sound called **alveolar** such as / n,

I, s, z /

It also called the gum ridge or the alveolar ridg**e.**

7- The Alveopalate

The front of the tongue may touch or approach this alveopalatal area to produce sound like /cˇ, jˇ, sˇ, zˇ / which called alveopalatals.

8- The Palate

It consist of three parts

1- Hard Palate (called the Roof of the mouth), it touched or approached by the front of the tongue to produce sound called palatals such as / y / as in yes.

2- Soft Palate or Velum: it touched or approached by the dorsum to produce sound calls velars /k, g, ŋ/

3- Uvula if touched the dorsum to produce sound called uvular such as Arabic / q /

Some organs are ***breath-stream (passages)*** *such as* ***(trachea, larynx, pharynx mouth and nose):***

9 - The Trachea

It is an air passage between the lungs and the larynx.

It also called "Windpipe"

10- The larynx

At the top end of the trachea.

It also called the Voice Box.

It consists of four parts:

1. The Base
2. Adam's Apples أدم تفاحة
3. Vocal Cords *(Most essential organ in the Larynx)*
4. The Glottis

Vocal Cords

a) Man's cords are longer and thicker than the woman's.

b) Responsible for voice and voicelessness of speech sound.

c) If the vocal cords vibrate, the sound is **Voiced**

d) If the vocal cords not vibrate, the sound is **Voiceless**

• The Glottis

a) The glottis may have one of these positions:

1- Opening with voiceless sound e.g., /p/.

2- Narrowing /, with whispered sound.

3- Repeated opening and closing with voiced sound e.g. /b/.

4- Closing, with glottal sound, e.g., the Arabic hamza .ء

11- The Pharynx or (Throat)

• Is a cavity between the larynx and the mouth.

• It is one of the resonance cavities.

13- The Cavities

There are four cavities or chambers related to the speech process:

1. The lung Cavity.

2. Pharyngeal Cavity.

3. Oral Cavity.

4. Nasal Cavity

S*ome organs* ***is energy source***

14- The Lungs

The Lungs are the source of energy, without which no speech can occur.

S*ome organs* ***are merely auxiliary organs (the abdomen, diaphragm and chest muscles)***

15- Abdominal Muscles

• Speech is essentially dependent on the inhalation and exhalation

• It is located below the Diaphragm.

16- The Diaphragm

The (most) speech usually happens during exhalation

Above the abdomen, and between it and the chest.

17- Chest Muscles

There is no speech without exhalation, the longer exhalation is, the longer speech continues.

Classification of Speech Organs

1. Articulator

It is a movable speech organ; it moves to touch or approach another static organ

The Articulator are the tongue and the lower lip.

2. Point Of Articulation (POA)

It is an immovable organ whose function is to receive the articulator such as (the upper lip, upper

teeth, lower teeth, alveolus, alveopalate, hard palate, velum and uvula).

3. Stream source is the lung

also lungs can be called energy source.

4- **Vibrator**

The only vibrator in the speech system is the **vocal cords.**

5- **Auxiliary Organ do not directly take part in speech**

Such as (abdominal muscles, diaphragm and chest muscles)

 Nose, mouth and pharynx have double or multiple functions a passage and resonator.