International Journal of Humanities and Social Science Invention (IJHSSI)
ISSN (Online): 2319 – 7722, ISSN (Print): 2319 – 7714
www.ijhssi.org ||Volume 8 Issue 09 Ser. III || September 2019 || PP 60-65

Scientific Study of the Organs of Speech Sounds

Mr. Virender Kumar Gill
Assistant Professor of English, S. D. (PG) College Panipat, Haryana, 132103

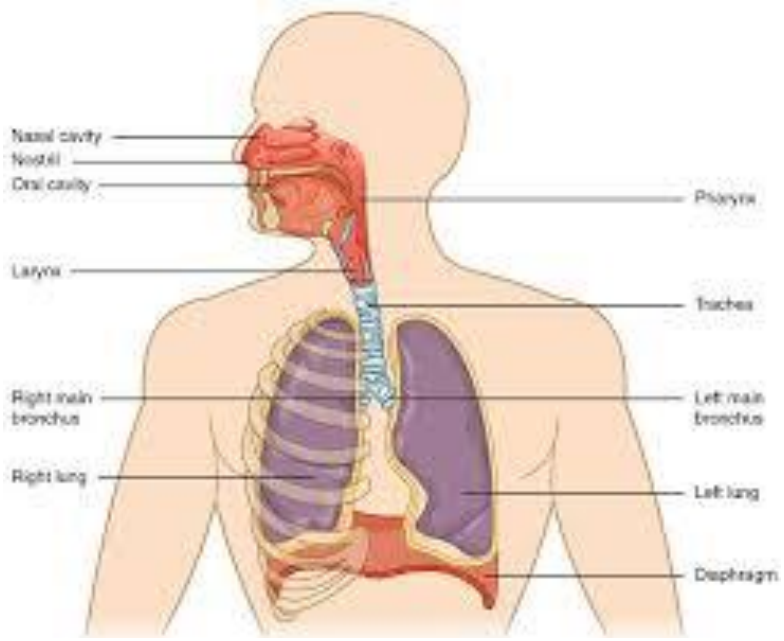
ABSTRACT
The chief purpose of this paper is to present the scientific study of the organs of speech sounds in English. The organs of human body which produce the speech sounds are called organs of speech. For the production of speech sounds of a language, as there must be some disturbance in the air. The present research work is an attempt to exhibit the speech sounds of English how the air is produced after passing through different organs of speech. In the case of any speech sound, the disturbance in the air is provided by the different organs of human body such as the lungs, vocal cords, tongue and lips. Phonetics is the study of speech sounds. It may be defined as the study of production, transmission and reception of speech sounds. The respiratory system, the phonatory and the articulatory system play a very significant role in the production of any speech sound of a language. There may be an important distinction between the active articulators and passive articulators. Active articulators are those organs of speech which move from their actual position whereas the passive articulators are immovable organs of speech in the production of a speech sound. Speech sounds of every language can be divided into two parts vowels and consonants, defining in the context of alphabets. Phoneme is the smallest possible sound unit which is combined with other phonemes to form meaningful units such as words. In phonetics, a vowel is a sound in spoken language that is pronounced with an open vocal tract. A diphthong is a gliding vowel in the articulation of which there is a transition of the sound from one vowel position to another. A consonant is a speech sound that is articulated with complete or partial closure of the vocal tract. Phonetics transcription is the visual representation of speech sounds in accordance with the International Phonetic Alphabet (IPA), which is used extensively by phoneticians all over the world. The chief aim of this paper is to explain the organs of speech sounds of English.

KEYWORDS: *Respiratory system, Phonatory system, Articulatory system, Phoneme, Phonetics, Active and Passive Articulators.*

I. INTRODUCTION

Phonetics is the scientific study of speech sounds. It may be also described as the study of production, transmission and reception of speech sounds. It furthers the classification of these sounds into consonant and vowel sounds. Phonetics is also concerned with the manner and place of articulation of these sounds. It also studies the stress and intonation used in the production of speech sounds by us. Every language has its own system of speech sounds. English speech sounds are produced when the air stream coming from the lungs assumes various shapes in the mouth during the process of breathing. In other words, we can say that speech is as essential a function of these organs as are the other function. Pulmonic Egressive Airstream Mechanism is used while producing sounds of English. The word Pulmonic refers to lungs and Egressive relates to throwing out. English is spoken when we throw air out from our mouth in the process of breathing. All European languages are spoken by employing the Pulmonic Egressive Airstream Mechanism. All the Indian languages, except Sindhi, are also spoken in this way.The organs of body which help in the production of speech sounds are called organs of speech. Most of the sounds are produced from different parts of our mouth. Tongue is also a major organ of speech. Here follows an account the organs that help in the production of speech.

Phonetics is the scientific study of what speech sounds exist in a language. It represents how the speech sounds are produced and perceived and what acoustic properties they have. Thus, it can be described in the class of natural sciences. Phonetics essentially seeks to trace the processes physiologically involved in sound production. It also describes the ways the sounds are produced and the points at which they are articulated. Phonology is concerned with the regularities that govern the speech sounds in words of a language. It looks at and tries to establish a system of sound distinctions relevant to a particular language. It then seeks to determine how the elements of this abstract system behave in actual speech. Phonology actually delineates the functioning of sounds in particular contexts. The organs of speech had been adapted by human beings for speech production. The most important source of speech production is the air stream exhaled from the lungs. It is called the pulmonic Egressive Air Stream. It is also called Mechanism because it is the process of air stream release that works together to form sounds. The English language generally makes use of the Pulmonic Egressive Air Stream Mechanism for the production of speech sounds. However, it should be noted that some languages possess sounds not requiring lung or pulmonic air for their articulation.



1.The Respiratory System consists of The Lungs, The Muscles of the Chest, The Wind Pipe (Trachea) and the Bronchial Tubes. The lungs perform the function of breathing under the action of the chest muscles. The respiratory system is helpful in producing the speech sounds in the sense that it provides the air stream which acts as source of energy. No speech organ can produce speech sounds without the presence of the air which is provided by the lungs. The air released from lungs initiates the speech mechanism. English speech sounds are produced with the help of Pulmonic Egressive Airstream Mechanism. The respiratory system plays the very significant role in the production of speech sounds of a particular language. The respiratory system, also called the gas exchange system, release the carbon dioxide and taking in oxygen. Carbon dioxide, a waste product, goes out of the body. Oxygen, which the body needs, comes in. The Lungs are the main organ to do this. In other words, we can say that the process of inhaling and exhaling oxidation of organic compounds is called as the respiratory system.The first step in the process ofinhaling and exhaling means bringing air rich in oxygen into the human body. The second step of the respiratory system is gas exchange in the lungs where oxygen is diffused into the blood and the carbon dioxide diffuses out of the blood. The third process is cellular respiration, which produces the chemical energy that the cells in the body need, and carbon dioxide. Finally, the carbon dioxide from cellular energy is breathed out of body from the lungs.The Organs of Speech are situated in the respiratory system, phonatory system and the articulator system of human body. According to one view, speech is the secondary function of these organs, their primary function being breathing, chewing, eating, smelling, tasting and so on.

2. The Phonatory System consists of vocal cords which are located in the larynx. These vocal cords are so flexible that they can close or open the air passage.When the need arises, the vocal cords close the air passage and prevent food from entering the wind pipe. The lip-like structure of these vocal cords is horizontally placed in the larynx. These vocal cords are joined at the back. The opening between the vocal cords is called glottis. The vocal cords can assume the following three position.Vocal Cords Drawn WideApart: When the vocal cords are drawn apart, an opening, called glottis, appears between them. The air can pass through this opening without causing any vibration in the cords. This is the normal sounds produced when the vocal cords stand wide apart are called voiceless sounds because no hum is caused in the cords at the time of the production. The voiceless sounds produced in this way are as follows: /p/, /t/, /k/, /ts/, /f/, /Q/, /s/, /h/. When the vocal cords are held apart these nine sounds are produced. The following diagram shows the position of the vocal cords when voiceless sounds are produced. There is a wide gap visible in the vocal cords in this diagram.

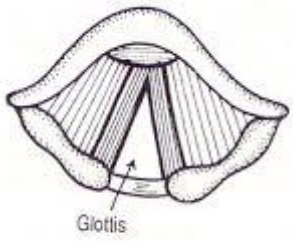
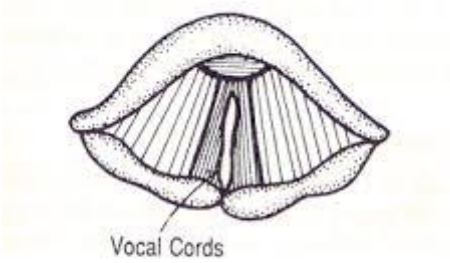


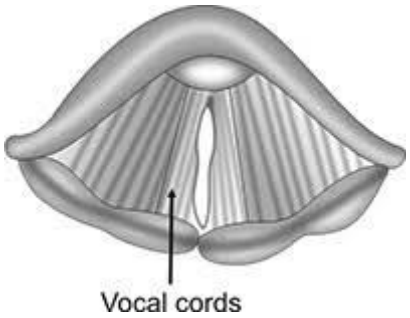
Figure 9. Open glottis (adapted from Setia and Dhamija, 2004)

Vocal Cords Held Loosely Together: When the vocal cords are held loosely together, the air passing through the glottis causes vibration in them. The speech sounds produced when the vocal cords are in this position are called voiced sounds. All the twenty vowel sounds are also voiced sounds. The following diagram shows the position.

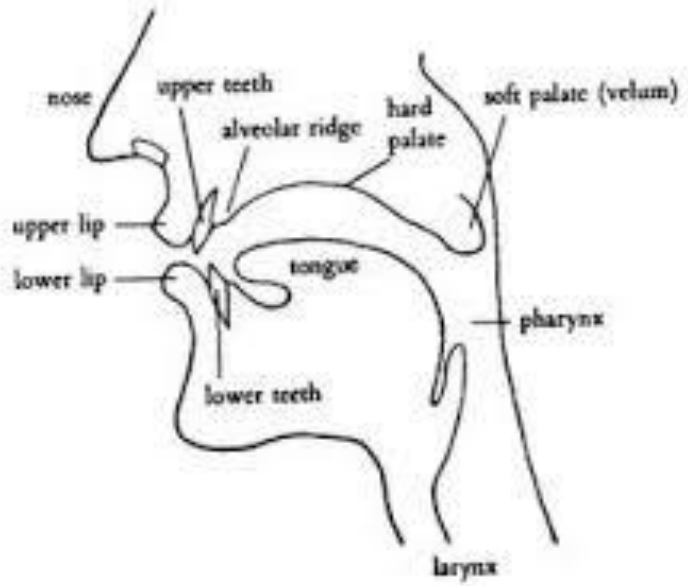


According to Abercrombie (1990:26).

Vocal Cords Held Tightly Together**:** When the vocal cords are held tightly together, the glottis is closed along the whole live. Vocal cords adopt thus position when we eat or drink something. The closure of the vocal, cords prevents the food stuff from going into the wind pipe. The glottal stop is responsible for the mild cough in the throat. The following diagram shows the position of vocal cords when they are held tightly together.

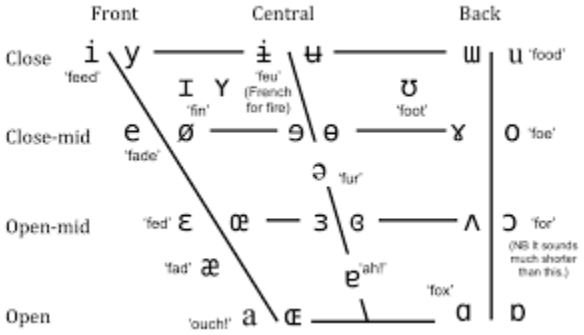


3. The Articulator System consists of those speech organs which are directly involved in the production speech sounds. All these organs of speech are chiefly located at various places in the mouth between the lips and the pharynx. The articulator system thus consists of the lips, the teeth, the teeth ridge, the hard palate, the soft palate, and the uvula. All these organs are situated in the roof of the mouth but the tongue which is the most important organ of speech is situated in the lower part of the mouth. We can understand the working of the articulatory system with the help of the following diagram. The space between the vocal cords is called the glottis. Above the vocal cords, in the vocal tract itself, are several parts that move in various ways to change the size and shape of the open part of the vocal tract and produce all the sounds of English, or any other language. These are called the articulators.



(a) Pharynx: The Pharynx extends from the tip of the larynx to the root of the tongue.
Pharynx and the root of the tongue lie just opposite to each other. The muscles of the pharynx have the capacity to contract and expand in this way. They modify the shape and size of the pharyngal cavity. The position of the pharynx is affected by the movement of the back of the tongue. Each of such modifications affects the quality of the sound performed by an individual.
(b) The Lips: the lips are located at the front of the oral tract. They play an important role in the production of certain speech sounds. The consonant sounds /p/, /b/, are produced when we first close the lips and then release the air abruptly by opening the mouth. When the consonant /m/ is produced, we bring both the lips together and then allows the air to pass through the nose. The lips also assume various shapes during the production of the vowel sounds.
(c) The teeth: The Teeth are responsible for the production of the RP sounds. The sounds /Q/ and /th/ are produced by the tongue at the back of the upper teeth. The sounds /f/ and /v/ are produced when the lower lips come in contact with the upper teeth.
(d) The Teeth Ridge: The Teeth Ridge is also called the alveolar ridge. It is the convex part of the roof of the mouth lying just behind the upper teeth. This hard and raised structure can be felt with the tip of the tongue. The teeth ridge is the articulatory point of certain consonant sounds. The sounds like /h/ and /d/ of the RP are produced when the tip of the tongue comes in the contact with the teeth ridge and then the closure is suddenly released. The /s/ and /z/ sounds of the RP system are produced by narrowing the passageof the air at the teeth ridge and forcing the air out from this narrow passage with some friction.
(e) The Hard Palate: the bone like hard and concave surface located immediately beyond the alveolar ridge in the roof of the mouth is called the hard palate. The initial sound of the word yes /y/ is articulated here.
(f) Soft Palate: The Soft Palate is located in the back part of the roof of the mouth just behind the hard palate. It is also called velum. It is rightly called soft palate because it is soft, flexible and movable. G The velum is responsible for articulating certain RP sounds. The sounds /k/ and /g/ are produced at the velum. In the production of these sounds, the velum acts simultaneously in two ways. First, the back part of the tongue moves towards it and thus it causes complete closure. Secondly, it touches the back wall of the pharynx by raising itself. In this way, it closes the nasal passage which is called velic closure. In this case, the air passes through the mouth and the oral.
(g) The Uvula: The Uvula is a pendent-like structure of flesh hanging at the end of the soft palate. It is situated at the end of the oral cavity in the upper portion. The back part of the tongue touches it to produce certain sounds of other languages. But the RP system has no uvular sound.
(h) The Tongue: The Tongue is the most important and the most flexible of all the articulatory organs. It can easily move from one place to the other place and thus assumes positions which give rise to the articulation of different consonant and vowel sounds. The tongue may be divided into six parts named Tip, Blade, Front, Back, Root and Rims. The part of the tongue that lies behind the lower teeth is called tip of the tongue. The part that lies opposite the teeth ridge is called blade. The front of the tongue lies opposite to the hard palate. The part that lies opposite to the soft palate is called the back of the tongue. Any part of the tongue can be raised to any height to make contact with any part of the roof of the tongue. Vowel sounds are produced when the tongue regulates the air coming from the glottis in a stream that is called the case of open approximation. Consonant sounds are produced when the tongue causes a stricture of complete closure or narrow approximation.Active articulators

are Lips, Tongue, Lower Teeth and certain position of the soft palate. Passive Articulators Upper Teeth, teeth Ridge, Hard Palate and certain parts of the soft palate



Classification of Consonant and vowel Sounds. In English, there are 26 letters which produce 44 sounds containing 20 vowel sounds and 24 consonant sounds. In the production of 12 monophthongs and 8 diphthongs,the tongue's position remains unchanged whereas there should be friction and obstruction in the production of consonant sounds. The description and classification of consonant sounds depend on the place and manner of articulation. According to the place of articulation, consonant sounds can be classified as bilabial, labio-dental, dental, alveolar, post-alveolar, retroflex, palato-alveolar, palatal, velar, uvular and glottal. According to the manner of articulation, they can be divided as plosive, affricates, nasal, rolls, taps, flaps, lateral, fricatives, frictionless, continuants and semi-vowels. The place of articulation of consonant sounds are determined by the passive articulator involved in the production of the sounds. The articulatory system can not be involved in the production of vowel sounds. We can also make a distinction between one vowel and another vowel by mentioning the height of the tongue, raised in various position.

II. CONCLUSION

Thus, the organs of speech play a very significant role in the development of a language. The chief aim of this research paper is to study how speech sounds are pronounced, how they travel from the speaker to the listener, how these sounds function in a language. The sounds of English are produced by inhaling and exhaling air into the lungs. Producing different speech sounds of a language depend on the movement and classification of speech organs. It is essential to know the description and classification of each organ to produce particular sounds of a language. The above classification and description of speech sound of English help us to guide the students to learn the 20 vowel sounds and 24 consonant sounds in a right way. The air mechanism can be modified at certain points which classify the distinct speech sounds of English. The study of the phonetics is based on the organs of speech. A clear understanding of The Respiratory System, The Phonatory System and The Articulatory System can change the style of individual's pronunciation. The lungs, in the position of inhaling and exhaling can create the sound which is turned into vibration by the vocal cords in our larynx. These speech sounds can be studied at three stages: the production, the transmission and the reception. Vowel sounds

are pronounced with the help of the mouth and the pharynx without any obstruction whereas all other consonant sounds are pronounced with friction and obstruction.

BIBLIOGRAPHY

PRIMARY SOURCES

[1]. Adam, C. *English Speech Rhythm and Foreign Learner*. The Hauge: Mouton, 1979.
[2]. Arnold, G. F. *Stress in English Words*. Amsterdam: North Holland, 1957.
[3]. Aslin, R. N., & Pisoni, D. B. *Some developmental processes in speech perception.* 1980.
[4]. Baker, A. *Introduction English Pronunciation Practice*. Cambridge University, 1982.
[5]. Ball, W. J. *Steps to Fluency in Spoken English*. Longmans and Green, 1968.
[6]. Borden, Gloria J and Katherine S. Harris. *Speech Science Primer. Psychology Acoustic and Perception of Speech*. Williams and Wilkins, 1980.
[7]. Fudge, E C. editor, *Phonology*.Penguin Books, 1973.
[8]. Gimson, A C. *An Introduction to the Pronunciation of English*. Edward Arnold, 1994.
[9]. Hill, L. A. *Drills and Tests in English Sounds*. Longman. 1961.

SECONDARY SOURCES

[10]. Jones, Daniel. *English Pronunciation Dictionary*. ELBS and Dent, 1984.
[11]. Kingdom, R. *English Intonation Practice.* Longman, 1958.
[12]. Kingdom, R. *The Groundwork of Intonation*. Longman. 1958.
[13]. Laver, John. *Principles of Phonetics*. Cambridge University. 1994.
[14]. Mortimer, C. *Weak Forms*. Cambridge University. 1978.
[15]. Munro Mackenzie, M, D. *Modern English Pronunciation Practice*. Longman, 1978.
[16]. Pike, K. L. *Phonetics*. Michigan, 1943.
[17]. Stetson, R. H. *Motor Phonetics*. North Holland, 1951.
[18]. Tibbitts, E. L. *Practice Material for the English Sounds*. Cambridge, 1963.
[19]. Wells, J. C. *Accents of English*. Cambridge, 1982.