

ANALYSIS OF PHYSIOLOGY OF SPEECH IN AYURVEDA

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ABSTRACT

Speech is considered as one of the highest function of brain and is defined as the expression of thoughts by production of articulate sound, bearing a definite meaning. It is a multiphase phenomenon and is an outcome of combined effort of acoustic signals, articulatory system and the muscles attached to respective organs along with nervous assistance. The combined effort of all the system leads formation of verbal notations. In Ayurveda it is believed that *Vata* when it circulates in the *shabdavaha dhamani* (channels for carrying sound) is responsible for production of sound. *Vayu*, which one of the three types of *tridosha*, along with physical and psychological factors were believed to be responsible for production of sound. This paper is aimed to summarize and analyze the physiology of speech in Ayurveda in parlance with contemporary medicine.

Keywords: Speech, *Shabdopati*, *Udan Vayu*, *Vaka Pravritti*.

INTRODUCTION

Ayurveda, the Indian system of medicine documented and practiced since 1500 BC deals with systemic approach towards the understanding of health and diseases. The three biological humors known as *Tridosha* viz. *Vata* (kinetic), *Pitta* (metabolic) and *Kapha* (potencial) that works in conjunction with each other and respond to the external environment and maintains homeostasis.¹ Ayurveda proclaims with the production of speech as a function of *Vata dosha* amongst which precisely *Udana Vayu* (sub type of *Vayu*) is held responsible for production of speech. In contemporary science Speech is considered as one of the highest functions of human through which we all communicate with one another, expression of thoughts and propagation of views are also carried out. Speech

production is a multiphase phenomenon. It is an outcome of combined efforts of our acoustic signals, articulatory system and musculature attached to respective organs and which is not possible with nervous assistance. An appropriate and well assisted outcome of all the above structure is transferred through into verbal notations.

In Ayurveda it is stated that when *Vayu* circulates in the *sabdavahi dhamani*, sound or words are produced. The subtype of *Vayu* which is held responsible for production of speech is *Udana Vayu*. *Sushruta* proclaims that speech in the form of language, music or any other characterized pronunciation is the function of *Udana Vayu*. The *Udana Vayu* along with the func-

tion of exhalation is responsible for production of sound.

DISCUSSION

Production of Speech on Classical Literature:-

Speech is combination of motor response through which humans express one's own thoughts and ideas. Ayurveda deals with holistic approach towards completion of physical as well as psychological activities in body which is believed to be well propagated through *Mana* (psyche), *Indriya* (Sense and Motor organs) and *Indriyarthā* (subject of perception). Speech is the result of the complex activity of *doshas* but the ultimate perception of the subject is done with the help of *Mana* (Psyche)²

Vaka pravritti (initiation of speech) is through the thoughts that emerged in mind is expressed as a Speech. In Ayurveda the desire to speech is initiated by *Udan Vayu* (one of the subtype of *Vata dosha*) with help of *Prana Vayu*. The *Prana Vayu* perform functions like sustenance of intellect, *hridaya*, *Indriya* (sensory and motor organs), *chitta* (Psychic) so as to complete the process of perception of Speech.

Ayurveda believes speech production being the attribute of *Akasha* element is produced in the vacuum or space which is the expression of the fundamental elements. The *akasha mahabhuta* allows the action of speech to complete without hindrance. Sushruta has mentioned the *swaravaha srotas* while describing *swarabheda roga*. The organs viz. chest, throat, vessels (*nadi*), *swaravaha srotas*, oral cavity and nasal passage display certain amount of open or free space and this is precisely where speech is produced.

Another theory by Panini in his literary work encapsulates the mechanism of speech as a complete phenomenon. The decision to speak out certain words is taken by intellect with the instigation from the *Atma* (soul). Accordingly the *Atma* stimulates the *Mana* (intellect) to produce sound in form of speech. The *Mana* in turn instigates the *kayagni* and *kayagni* instigate the *Vata*. The *Vata* thus provoked generates speech while being expelled from the chest. The *Vayu* which carries voice only in the form of neutral sound enters the oral cavity

and produces sound in the form of words or alphabets from the oral cavity.³

Speech Production in Contemporary Science

Speech is defined as the expression of thoughts by production of articulate sound, bearing a definite meaning. It is one of the highest functions of brain. Speech depends upon coordinated activities of central speech apparatus and peripheral speech apparatus. Central speech apparatus consists of higher centers, i.e. the cortical and subcortical centers. Peripheral speech apparatus includes larynx or sound box, pharynx, mouth, nasal cavities, tongue and lips.

Formation of speech in case of modern science reveals formation of new neuronal circuits as it is associated with memory. The words heard are stored as memory and are recalled back when appraised with due to memory. For such speech or word production or rather speech development, the necessary auditory and visual centers are thus connected by a pathway by formation of new neuronal circuits. The major areas thus involved in speech are- Wernicke's area-area of understanding of words or ideas developed and send it to next area viz. Broca area-which is the major of all speech area. It is motor area indeed but regulates the movements of peripheral structures as like-tongue, lips, larynx and vocal cords. Both these areas are connected by neuronal tracts namely arcuate fasciculus. The other major supporting areas for speech production are- secondary visual and secondary auditory areas. This are important as the words, thoughts, ideas which are needed to be expressed are first understand and developed very well here. The command of motor activities is received by the peripheral speech apparatus which results in systematic coordination of movements of tongue, lips, larynx and vocal cords. Thus any defect, abnormality or impairment in the morphology and or functioning mechanism of centre located in brain leads to speech related disorders. Majority of it includes inability to speak-Aphasia having defect in central speech apparatus others include Dysarthria-defect in articulation at laryngeal region.

Development of speech

First Stage

First stage in the development of speech is the association of certain words with visual, tactile, auditory and other sensations, aroused by objects in the external world. Association of words with other sensations is stored as memory.

Second Stage

New neuronal circuits are established during the development of speech. When a definite meaning has been attached to certain words, pathway between the auditory area (Heschl area; area 41) and motor area for the muscles of articulation, which helps in speech (Broca area 44) is established. The child attempts to formulate and pronounce the learnt words.⁴

Relevance of *shabda* (words) in classical literature

Shabda being the attribute of *akasha* element is produced in the vacuum or space which is the expression of this fundamental element. It is an exclusive attribute perceived by the sense organ of ear. *Shabda* is considered as group of alphabets and vowels which conveys meaning from one person to another person.

Acharya Charaka mentions 4 divisions of *sabda*:-

1. **Drsthartha**:- This type of word reminds happening in the past or happenings we have already known or experienced.
2. **Adrstartha**:- This type of word indicates happenings which we may know but cannot demonstrate.
3. **Satya**:- It is indication of appropriate meaning. For eg:- The advice given to a patient by Ayurvedic Physician is after deciding choice of drug depending upon diagnosed disease. All these events are done with utmost perfection. This type of *Shabda* is 'Satya'.
4. **Anrta**:- This type exactly opposite to *satya* type.⁵

Tarkasangraha describes types of *shabda* according to cause-

1. **Samyogaja**:- By combination of two or more objects. Ex- Clapping
2. **Vibhagaja**:- By separation of two or more objects. Ex- Logging wood, separating paper sheets
3. **Shabdaja**:- By actual speech or talk of an individual

Types of *shabda* according to nature-

1. **Dhwanyatmaka/ Ghosharupa sabda**:- The sound produced by hitting on certain objects.
2. **Varnatmaka/ Bhasarupa sabda**:- The sound is produced in form of different syllables with the contact of the tongue at six different places in the oral cavity. The tongue established contact with specific places for the pronunciation of different words, these places are pharynxes, palate, posterior nasal pharyngeus, teeth and lips.⁶
 - a. **Kantha** (Throat or Guttural sound):- *a, ka, kha, ga, gha*
 - b. **Talavya** (palate or Palatal sound):- *e, cha, chha, ja, jha, sha, ya*
 - c. **Murdhna** (Cerebral sound) :-*ta, tha, da, dha, na, ra, sha*
 - d. **Dantya** (Teeth, Dental sound) :-*ta, tha, da, dha, na, la, sa*
 - e. **Osthya** (lips, labial sound):- *da, pa, pha, ba, bha, ma*
 - f. **Anunasik** (Nose, Nasal sound):- *na, na, ma*⁷

Tongue as *Karmendriya*- Organ of Speech

In Ayurveda five *karmendriya* (motor organs) were described to perform specific function which correspond to specific *Indriya*. This mainly serves as the response which is to be seen after proper combination of *mana indriya* and its object along with intellectual decision taken with the help of *buddhi*.

The '*Vagindriya*' or tongue is a *karmendriya* which performs the function of Speech. It is also known as *jihva, vani* and *vaka*. The *vagindriya* includes all the organs that are apparatus for the organ of speech. The entire oral cavity includes organs which play specific role in performing the function of speech. In oral cavity at the base of tongue is situated a '*Kantha nadi*' which is the location of *swaravaha srotas*. *Dalhana* elucidates that the *swaravaha srotasa* constitutes the two pairs of *sabdavaha dhamani* located bilaterally at two sides of the '*kantha nadi*'.⁸

CONCLUSION

Speech is a multiphase unique phenomenon and is believed to be outcome of combined effort of acoustic signals, articulatory signals and muscles coordination

along with nervous assistance. Ayurveda proclaims with the production of speech as a function of *Vata dosha*, precisely *Udana Vayu* (subtype of *Vayu*) which is held responsible for production of speech. Speech is the result of the complex activity of *doshas* but the ultimate perception of the subject is done with the help of *Mana* (Psyche). The initiation of Speech is through the thoughts that emerges in mind and is expressed as a speech.

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