

## A SHAREERA KRIYATMAKA (PHYSIOLOGICAL) UNDERSTANDING OF UDANA VATA

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### ABSTRACT

*Dosha, Dathu, Mala* together form the basis of the body. The balance of these entities represents the healthy state and imbalance will cause various diseases. In normalcy, *Dosha* will be performing their own functions and individual *Dosha* will be having their own specific site. There are five types of *Vata* namely *Prana, Udana, Vyana, Samana, Apana*. The *Visesha Sthana* of *Udana Vata* is said to *Uraha*(thorax) and also said to move in nose, umbilical, throat region. The functions of *Udana Vata* is said to be *Vak Pravruithi* and *Prayathna, Urja, Bala, Smriti* needed for the same. Sound is generated in the larynx, and that is where pitch and volume are manipulated. The strength of expiration from the lungs also contributes to loudness. Manipulation of the larynx is used to generate a source sound with a particular fundamental frequency, or pitch. Innervation to muscles of speech and also nerve supply to the structures necessary for the process of respiration, Phonation, articulation and cranial nerves which assist for speech production can be related to the *Karma* of *Udana Vata*.

**Keywords:** *Udana, Vata, Shareera, Kriya, Laryngeal Plexus*

### INTRODUCTION

The individual is an epitome of the universe. All the material & spiritual phenomenon of the universe are present in the individual. Similarly all those present in the individual are also contained in the universe.<sup>[1]</sup> Originating in cosmic consciousness, this wisdom was intuitively received in the hearts of the ancient scholars. They perceived that consciousness was energy manifested into the five basic principles or elements. Man is microcosm of the nature and so the five basic elements present in all matter also exists within each individual. Thus out of the womb of the five elements, all matter is born. The five basic elements exist in all matter. Water provides the classic ex-

ample: - the solids of iced water are manifestation of the *Prithvi Mahabhuta* (earth principle). Latent heat in the ice (*Agni*) liquefies it, manifesting into *Jala Mahabhuta* (water principle). And then eventually it turns into steam expressing the *Vayu Mahabhuta* (air principle) the steam disappears into *Akasha* or space.<sup>[2]</sup> *Bhuta* is that which is not born out of something, but out of which something is born. It is the material cause of substances in the world. When we say *Bhuta* we mean that subtle level of existence, whereas *Mahabhuta* refers to gross level of existence.<sup>[3]</sup> *Panchikarana* is the process through which invisible *Bhutas* combine with each other and form the visible *Maha-*

*bhutas* in such a way that all *Bhutas* are present together in each *Drisyā Bhuta* in varying degrees of predominance. Thus in the physical world everything is a combination of *Pancha Mahabhutas* & we cannot see them independently.<sup>[4]</sup>

*Dosha, Dathu, Mala* together form the basis of the body.<sup>[5]</sup> The balance of these entities represents the healthy state and imbalance will cause various diseases.<sup>[6]</sup> In normalcy, *Dosha* will be performing their own functions and individual *Dosha* will be having their own specific site. By mentioning the various *Sthana* of the each *Dosha* the different function performed by individual *Dosha* in different sites has been emphasised. The sub-types of *Dosha*, its location and function have also been mentioned.<sup>[7]</sup>

Regarding the *Sthana* of various *Dosha* authors have different opinion. Later authors have added some more *Sthana* of *Dosha*. For example, ears among the location of *Vata*; umbilicus, eyes and skin among the location of *Pitta*; *Kloma*, nose, tongue among the location of *Kapha*.<sup>[8]</sup>

There are five types of *Vata* namely *Prana, Udana, Vyana, Samana, Apana*. The *Visesha Sthana* of *Udana Vata* is said to *Uraha*(thorax) and also said to move in nose, umbilical, throat region. The functions of *Udana Vata* is said to be *Vak Pravruithi* and *Prayathna, Urja, Bala, Smriti* needed for the same.<sup>[9]</sup>

Brief Physio- anatomical understanding of the larynx, speech production and its central control is necessary to understand physiology of *Udana Vata*.

The larynx commonly called the voice box, is an organ in the neck of amphibians, reptiles, and mammals involved in breathing, sound production, and protecting the trachea against food aspiration. It ma-

nipulates pitch and volume. The larynx houses the vocal folds (vocal cords), which are essential for phonation. The vocal folds are situated just below where the tract of the pharynx splits into the trachea and the esophagus.<sup>[10]</sup> The muscles of the larynx are divided into *intrinsic* and *extrinsic* muscles.

The intrinsic muscles are divided into respiratory and the phonatory muscles (the muscles of phonation). The respiratory muscles move the vocal cords apart and serve breathing. The phonatory muscles move the vocal cords together and serve the production of voice. The extrinsic, passing between the larynx and parts around; and intrinsic, confined entirely. The main respiratory muscles are the posterior cricoarytenoid muscles. The phonatory muscles are divided into adductors (lateral cricoarytenoid muscles, arytenoid muscles) and tensors (cricothyroid muscles, thyroarytenoid muscles).

The intrinsic laryngeal muscles are responsible for controlling sound production. Cricothyroid muscle lengthen and tense the vocal folds. Posterior cricoarytenoid muscles abduct and externally rotate the arytenoid cartilages, resulting in abducted vocal folds. Lateral cricoarytenoid muscles adduct and internally rotate the arytenoid cartilages, increase medial compression. Transverse arytenoid muscle adduct the arytenoid cartilages, resulting in adducted vocal folds. Oblique arytenoid muscles narrow the laryngeal inlet by constricting the distance between the arytenoid cartilages. Thyroarytenoid muscles - sphincter of vestibule, narrowing the laryngeal inlet, shortening the vocal folds, and lowering voice pitch. The internal thyroarytenoid is the portion of the

thyroarytenoid that vibrates to produce sound.

Notably, the only muscle capable of separating the vocal cords for normal breathing is the posterior cricoarytenoid. If this muscle is incapacitated on both sides, the inability to pull the vocal folds apart (abduct) will cause difficulty breathing. Bilateral injury to the recurrent laryngeal nerve would cause this condition. It is also worth noting that all muscles are innervated by the recurrent laryngeal branch of the vagus except the cricothyroid muscle, which is innervated by the external laryngeal branch of the superior laryngeal nerve (a branch of the vagus). The extrinsic laryngeal muscles support and position the larynx within the trachea. Extrinsic laryngeal muscles are Sternothyroid muscles depress the larynx. Omohyoid muscles depress the larynx. Sternohyoid muscles depress the larynx. Inferior constrictor muscles Thyrohyoid muscles elevate the larynx. Digastric elevates the larynx. Stylohyoid elevates the larynx. Mylohyoid elevates the larynx. Geniohyoid elevates the larynx. Hyoglossus elevates the larynx. Genioglossus elevates the larynx.<sup>[11]</sup>

The larynx is innervated by branches of the vagus nerve on each side. Sensory innervation to the glottis and laryngeal vestibule is by the internal branch of the superior laryngeal nerve. The external branch of the superior laryngeal nerve innervates the cricothyroid muscle. Motor innervation to all other muscles of the larynx and sensory innervation to the subglottis is by the recurrent laryngeal nerve. While the sensory input described above is (general) visceral sensation (diffuse, poorly localized), the vocal fold also receives general somatic

sensory innervation (proprioceptive and touch) by the superior laryngeal nerve.

Injury to the external laryngeal nerve causes weakened phonation because the vocal folds cannot be tightened. Injury to one of the recurrent laryngeal nerves produces hoarseness, if both are damaged the voice may or may not be preserved, but breathing becomes difficult.

Sound is generated in the larynx, and that is where pitch and volume are manipulated. The strength of expiration from the lungs also contributes to loudness.

Manipulation of the larynx is used to generate a source sound with a particular fundamental frequency, or pitch. This source sound is altered as it travels through the vocal tract, configured differently based on the position of the tongue, lips, mouth, and pharynx. The process of altering a source sound as it passes through the filter of the vocal tract creates the many different vowels and consonant sounds of the world's languages as well as tone, certain realizations of stress and other types of linguistic prosody. The larynx also has a similar function to the lungs in creating pressure differences required for sound production; a constricted larynx can be raised or lowered affecting the volume of the oral cavity as necessary in glottalic consonants.

The vocal folds can be held close together (by adducting the arytenoid cartilages) so that they vibrate (see phonation). The muscles attached to the arytenoid cartilages control the degree of opening. Vocal fold length and tension can be controlled by rocking the thyroid cartilage forward and backward on the cricoid cartilage (either directly by contracting the cricothyroids or indirectly by changing the vertical position of the larynx), by manipulating the tension of the muscles

within the vocal folds, and by moving the arytenoids forward or backward. This causes the pitch produced during phonation to rise or fall. In most males the vocal folds are longer and with a greater mass than most females' vocal folds, producing a lower pitch.

The vocal apparatus consists of two pairs of mucosal folds. These folds are false vocal folds (vestibular folds) and true vocal folds (folds). The false vocal folds are covered by respiratory epithelium, while the true vocal folds are covered by stratified squamous epithelium. The false vocal folds are not responsible for sound production, but rather for resonance.<sup>[12]</sup>

**AIMS & OBJECTIVES:** To critically analyze the *Udana Vata*

**MATERIALS & METHODS:** The *Bruhat Trayi* were scrutinised regarding the references for the *Guna* and *Karma* of the *Udana Vata*. Later, physiologico-anatomical aspects of the central nervous system were studied from modern physiology books. Later, supportive correlation was done between *Ayurvedic* and modern views to build valid and reliable hypothesis regarding *Udana Vata* in relation to the various anatomical and physiological aspects of the central nervous system.

## DISCUSSION

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