

# A Review on Functions of Rakt Dhatu and Prana Vayu to Establish Lung Function Capacity

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## Abstract

Lung function tests are useful in assessing the functional status of Respiratory system in both in physiological as well as pathological conditions. These are based on the measurement of volume of air breathed in and out in quiet breathing & forced breathing. Air in lungs is classified in to two divisions' lung volumes & lung capacities. Lung Capacities are the combination of two or more lung volumes. The concept of Rakt Dhatu & Vayu is important in case of respiration because Charaka says that pure blood provides the person with strength, luster & happy life because vital breath follows blood. It represents mechanism of oxygenated & deoxygenated blood & its relation with functioning capacity of Lungs. So In this article attempt has been made to review concepts regarding functions of Rakt Dhatu & Vayu to Establish Lung Function Capacity.

**Keywords:** Rakt dhatu, Prana Vayu, Lung Capacity.

## Introduction

The lungs are simply gaseous Exchange Apparatus. This gaseous exchange occurs within lungs between inspired air & blood. All the alveoli of both the lungs are synchronously filled with air during inspiration and empty during expiration.<sup>[1]</sup> The important sites of Prana Vayu are throat & thorax, and its various functions are related to trachea, salivary glands, Pharynx, stomach, heart & lungs.<sup>[2]</sup> Lung volumes are the static volumes of air breathed by an individual. These are Tidal Volumes, Inspiratory reserve volume, expiratory reserve volume, residual volume.<sup>[3]</sup> Lung Capacities are of four type's Inspiratory capacity, vital Capacity, Functional Residual capacity, total Lung Capacity.<sup>[4]</sup> These are important to see physiological as well as pathological conditions of Lungs as well as Respiratory system.

Blood or Rakt Dhatu is important mediator in gaseous exchange. The direction of Prana Vayu is as inspiration and that of Udana Vayu is opposite i.e. it helps in expiration. So it is necessary to determine role of Rakt Dhatu & Prana Vayu in deciding Functional Capacity of Lungs.

## Methodology

### Rakt Dhatu:

In Ayurveda it is stated that Lungs are made from foam of blood.<sup>[5]</sup> So structurally where oxygenation & deoxygenating of blood taken place at Lungs. Though Rakt is second Dhatu, Sushruta explains Blood as 4<sup>th</sup> important Dosh or basic constitute of body.<sup>[6]</sup> Blood circulation is a

closed circuit system. Functions of Rakt Dhatu- are Dhatunam Puranam i.e. Nutrition, Prana i.e. Oxygen Supply to tissues.<sup>[7]</sup> Rakt bestows color, nourishment to mamasa and maintains life activity.<sup>[8]</sup> Decrease & increase in all another dhatu is caused by shonita.<sup>[9]</sup> By depletion of tissue due to bleeding, the fire (digestive power) becomes weak & vata becomes aggravated.<sup>[10]</sup> Shonit kshaya decrease of blood produces roughness of skin, craving (desire for sour & cold things) looseness of the veins etc.<sup>[11]</sup>

### Prana Vayu

The Vayu - the imparting of motion to the body (Praspadnam), the carrying of sensations of the respective sense organs (Udvahanam) the passing down of food to its proper receptacles (Puranam), the separation of excretions from assimilated food matter (Vivek), and retention & evacuation of urine And semen etc. (Dharanam), should be ascribed to the functions of five kinds of Vayu (nerve) force Which support the body.<sup>[12]</sup> Sushruta samhita narrating 5 functions of vata dosha the word Praspadana,<sup>[13]</sup> though Dalhana has described this term as a movement being the activity of Vyana Vayu, but this should be taken as the activity of heart(diastolic & systolic movement) & Lungs. (inspiration & Expiration). Because these activities provide external lifesaving matter (Prana Vayu- element i.e. oxygen) to the whole body. And it should be considered as the main function of Prana Vayu.

Sharangdhara has described the place of Prana Vayu in hradi (heart) and compared it with the process of respiration which delights (Prinyati) and maintains (Jivayana) the digestive fire when it is essential for life.<sup>[14, 15]</sup>

Internal Prana (life) getting support from the external Prana (strength of the body) maintains the body composed of the five primary elements without opposition.<sup>[16]</sup>

## Discussion

Considering above functions of Vata, Prana Vayu & Rakt Dhatu it can be assumed that these plays important role in maintain inspiration & expiration functions of Lungs & its vital capacity. Because Prana & Udana works simultaneously as inspiration & expiration works. Samana Vayu though it takes part in digestion, when Samana disturbs it affects digestion & annavaha strotas which in turn effects on Pranavaha strotas causing diseases like Shwas & kasa etc. Both diseases considered Origin in Amashaya. Vyana bala is also important for circulation of blood with oxygen all over tissues. Apana gati is Anuloman But when it

disturbs it causes difficulty in prakrut gati of Prana Causes various symptoms.

Rakt Dhatu is essential for oxygenation & deoxygenating of blood as inspired air is travelled through blood to the capillaries & expired CO<sub>2</sub> also travelled through blood vessels up to heart & Lungs. So blood is medium for conduction of Vayu.

Lungs are the organs where the exchange of O<sub>2</sub> & CO<sub>2</sub> occurs, where O<sub>2</sub> is taken from external environment.

Lung Capacities are of four type's Inspiratory capacity, vital Capacity, Functional Residual capacity, total Lung Capacity.<sup>[17]</sup> These are important to see physiological as well as pathological conditions of Lungs as well as Respiratory system.

### Lung capacities in healthy adults<sup>[10]</sup>

Volume	Average value (liters)		Derivation
	In men	In women	
Vital capacity	4.8	3.1	IRV + TV + ERV
Inspiratory capacity	3.5	2.4	IRV + TV
Functional residual capacity	2.3	1.8	ERV + RV
Total lung capacity	5.8	4.2	IRV + TV + ERV + RV

The tidal volume, vital capacity, inspiratory capacity and expiratory reserve volume can be measured directly with a spirometer. These are the basic elements of a ventilatory pulmonary function test.<sup>[18, 19]</sup>

So in process of Respiration Functional capacity of Lungs indicates Physiological as well as Pathological Conditions of Respiratory System Which helps in diagnosing & treating of many diseases.

## Conclusion

As Charaka says 'Prano hi Shonitam Anuvartate', that means blood is essential mediator for Oxygenation & Deoxygenating of blood and as this process Lungs are important organs takes part. So to see the Capacity of Lungs it is important to review concepts regarding functions of Rakt Dhatu & Vayu to Establish Lung Function Capacity

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