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# A CRITICAL STUDY STUDY OF *RAKTADHARA KALA* WITH SPECIAL REFERENCE TO ATHEROSCLEROSIS

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## ABSTRACT

There are numerous *Ayurvedic* terms that are fairly discussed in numerous ancient sources compendia. In the fifth chapter of *Sushruta Samhita*, numerous terminology, including *Kandara, Kurcha, Mansarajju, Sanghat,* and *Simanta,* are described. One of the main topics *Sushruta* discusses in Sharirsthana is *kala*. *Ayurvedists* use a variety of fundamental *Ayurvedic* concepts, including *Tridosha, Panchamahabhut, Dravyaguna*, and others, to treat illnesses. However, the clinical importance of *kalasharir* has not yet been proven. To determine the relevance of *Kalasharir* as stated in *Ayurveda* in the context of modern science. Material & Methods: *Ayurvedic* and contemporary scientific literature on *Kala* was thoroughly reviewed and critically analysed.

**KEYWORDS:** Atherosclerosis, *Raktadhara Kala, Pleeha, Sira, Yakrut.*

## INTRODUCTION

An *Ayurvedic* discipline known as *Rachana Sharir* studies the anatomy and physiology of various body parts. Another significant notion that the ancient *Acharyas* discussed in their various compendia is *kala-sharir*. The notion of *Kala* was stated by *Acharya Sushruta* in the *Garbhavyakaran Sharir* chapter of *Sharirsthan* when he was detailing the specific development of bodily parts. The body contains a total of seven *Kala*. Between *Dhatu* and *Aashaya* in our body is a restricting membrane or layer known as *Kala*.[1] These membranes provide a variety of important bodily functions beyond their simple role as restricting or covering membranes. The definition of *Kala* is:- These particular membranes play a significant role in carrying out bodily physiology, hence they are considered to be distinctive in some way. The body's various membranes and layers surround and protect the organs in

the form of an envelope. For the organs, they offer assistance and defence. You can think of *Kala* as the cell membranes that separate every single cell. Between the seven *Kala Raktadhara* It is believed that *Kala* is the body's second-prime *Kala.* Its location in *Mansa* and possession of the *Rakta* found in *Sira,* Yakrit, and *Pleeha*.[2] The primary function of this *Kala* is to assist *Rakta* and aid in its circulation throughout the body. According to what is currently known about modern science, the *Raktadhara.* The Ayurvedic term "*Kala*" refers to the endothelium lining of blood arteries and the sinusoids of the liver and spleen. According to the *Ayurvedic* perspective, the *kala* performs some essential bodily tasks, and any distortion or dysfunction results in pathology. The *doshas* are constantly moving throughout the body in both their regular and aberrant forms, but if they encounter a favourable environment, they become fixed to the appropriate body component, which ultimately leads to the development of disease.[3] If this Ayurvedic idea is applied to *Kala,* it can be claimed that *Kala* can likewise be a pathological site. If *Kala* does its routine task then it will hold the body's physiology, but if it is unable to do so, then a sickness will result.

## MATERIALS AND METHODS

To learn about the course of therapy in the antiquated system of *Ayurveda,* the *Charaka Samhita*, *Sushruta Samhita, Ashtanga Sangrah*, and *Ashtanga Hridaya* were consulted as research sources. For the most latest information, search engines were used to refer to evidence-based resources including journals, books, and data-based information. This study was started in order to examine the relevance of the Kala described in *Ayurveda* in the context of current contemporary understanding. *Kala* carries out a number of specific activities in the body, and when those functions are not functioning properly, ailments might result.

## OBSERVATION

There are a total of seven *Kala* in the body. Our body has a restricting membrane called *Kala* that is located between *Dhatu* and *Aashaya*. They are more than just limiting membranes; they also help the body in a number of important ways. The word "*Kala"* means "property" or "quality," therefore these particular membranes in the body play a significant role in carrying out bodily physiology.[4] The three *Kala* groups—*Snayu Pratichanna, Jarayu Santat,* and *Shleshma Vestita* — are further divided into subgroups.

*कलाः खल्वपि सप्त संभवन्ति धात्वाशयान्तर– मर्यादाः//*
*यथा हि सारः काष्ठेषु विद्यमानेषु दृश्यते।*

*तथा धातुर्हि मांसेषु विद्यमानेषु दृश्यते॥*
*स्नायुभिश्च प्रतिच्छन्नान् सन्ततांश्च जरायुणा।*
*श्लेष्मणा वेष्टितांश्चापि कलाभागांस्तु तान् विदुः॥* ***सु.शा.4/4–5***

*द्वितीया रक्तधरा नाम मांसस्याभ्यन्तरतः।*
*तस्यां शोणितं विशेषतश्च सिरासु यकृत्प्लीह्नोश्च तृती भवति॥*
*वृक्षाद्यथाभिप्रहतात् क्षीरिणः क्षीरमावहेत।*
*स्थूलमिांसादेवं क्षतात् क्षिप्रं शोणितं संप्रसिच्यते॥* ***सु.शा.4/9–10***

I. *Snayu pratichanna kala* – membrane of connective tissues such as facia, apponeurosis, ligaments, tendons, external layer of wall of organ of digestive, respiratory, circulatory, urinary, reproductive systems etc.
II. *Jarayu santata kala* - membranes made from fibrous connective tissue that provide for superficial and deep facia forming part of muscles, dividing them into functional units, or even joining the parts together, as well as generating body cavities, etc.
III. *Shleshma veshtita kala* - or mucous membrane and serous membranes, are two types of membranes made of fibrous epithelial tissues that release fluids.

The following is a relationship between the seven kala.

1. *Mansadhara Kala*, the layer of connective tissue found inside muscles, including the aponeurosis, intramuscular septa, and ligaments. *Snayupratichanna Kala* is speaking.
2. *Raktadhara Kala*, a thin mucous membrane that forms epithelial tissue inside arteries, veins, the liver, and the spleen. *Shleshmadhara Kala* is the name.
3. *Medodhara Kala*: Membranes made of adipose tissue (fat), including the omentum and subcutaneous facia.
4. *Shleshmadhara Kala*: Synovial membranes are serous membranes made from epithelial tissue, and they are found in the joints of bones. *Shleshmavestita kala* has arrived.
5. The large intestine's mucous membranes, or *Purishdhara kala*, are made of epithelial tissue. *Shleshmavestita kala* has arrived.
6. *Pittadhara Kala* - mucous membranes found in the duodenum, small intestine, and stomach. *Shleshmavestita kala* also applies.

The *Kala* of today (Membrane) Membranes are primarily generated from three types of primary cells throughout the embryonic phase,epithelial, connective, and adipose tissues.[5] [6]

1. Epithelial tissue produces two types of secretory membranes: mucous and serous. Mucous secretory membranes are found inside all the organs of the digestive, respiratory, circulatory, urinary, and reproductive systems. A thin watery fluid is secreted by serous membranes, which surround some organs (heart, lungs, testes etc.)
2. Connective tissue. Membranes made of this tissue take on a variety of shapes, including long, cylindrical, flat, etc. These membranes create ligaments, tendons, cartilages, ligaments, and facia, some of which are highly elastic while others are only somewhat elastic. They are located in the skin, the walls of the digestive, circulatory, urinary, muscular, and hemopoietic systems' organs, among other places.
3. The storing tissue known as adipose tissue is fat. At different regions, it creates membranes or layers that can be thin or thick. It produces cushioning around some organs like the kidneys and eyeballs and is found in the bone marrow, abdominal wall, omentum, and subcutaneous tissue. The three different types of kala can be classified as fallows using the information provided.

## DISCUSSION

*Kala* is a crucial *Ayurvedic* idea that deserves more attention. The body's *kala* membranes are specialised membranes that carry out certain tasks and help to sustain physiology. *Snayu Pratichanna, Jarayu Santat*, and *Shleshma Vestita*, the three varieties of *Kala* mentioned in Ayurved, can be associated to the body's fibrous, serous, and mucous membranes.

The second kala is known as *Raktadhara kala*, which is found in *Mamsa* (muscle tissues), particularly in *Sira, Pleeha* (spleen), and *Yakrut* (Liver). *Rakta*, like milky fluid when plants are chopped, spills from the wound when muscles are sliced.[7] [8]

In contrast to *Acharya Sharangadhara*, who believes that *Yakrut* (Liver) and *Pleeha* (Spleen) are the fourth and fifth *kalas*, respectively, where *Sleshma dhara* kala is present. Originally thought to simply a semi-permeable barrier separating the lumen from the artery wall, the endothelium is now understood to be a complex endocrine organ in charge of a number of physiological processes crucial for maintaining vascular homeostasis. Vascular homeostasis is crucially maintained by the endothelium.[9]

Although endothelial cells were formerly thought of only as a semi-permeable membrane, they are capable of transducing a variety of physiological inputs.

Several signalling molecules that have both autocrine and paracrine functions are produced in response. To maintain vasomotor tone, haemostasis and thrombosis, inflammatory processes, platelet and leucocyte vessel-wall interactions, and managing vascular permeability, the endothelium is consequently a crucial endocrine organ.

An independent predictor of cardiovascular events, arterial stiffness is controlled by the endothelium and occurs before overt atherosclerosis.

Consequently, a number of techniques have been developed to evaluate endothelial health and major artery stiffness. Dysfunction of the endothelium may be thought of as an early and perhaps reversible step in the process of atherogenesis.[10]

Arteries get obstructed and hardened as a result of the gradual disease atherosclerosis. It is the primary factor in the majority of heart attacks, strokes, and Vascular dementia affects 80 to 90% of people. Americans who are above 30. Plaque that accumulates in arteries is made up of components including fat, cholesterol, calcium, and others. Blood flow via the passageway is restricted by hard plaque. This results in the hardening of the arteries, a condition known as atherosclerosis, making them rigid and inflexible. The biggest cause of death for persons over 45 is cardiovascular disease, which is a result of it. Blood clots that can obstruct blood flow to essential organs are more likely to form from soft plaque because it is more susceptible to separate from the artery wall. Several scientists think it starts with damage to the endothelium, the artery's innermost layer.[11] There are many similarities between the Raktadhara Kala described in Ayurveda and the endothelial lining of blood vessels. Every malfunction results in development of illnesses. In modern research, endothelium and other layers of vessels are linked to atherosclerosis.[12] With these Kala notions in mind, a treatment strategy for this potentially fatal illness can be found. It's likely that using herbal treatments that work on the Raktavaha Srotas or Rakta dhatu will help to reverse the pathology in the blood vessels by restoring Raktadhara Kala's normal functioning.[13] In this light, a clinical investigation is planned to evaluate the contribution of Raktaprasadana Dravya to atherosclerosis cases. The research looks at anti-lipolytic and these medications' anti-inflammatory properties in albino rats. The study is still in progress, thus no findings have been seen.

Given that this is the innovative component of Ayurvedic treatment.

Gunachikitsa, Panchabhautika Chikitsa, Tridosha Chikitsa, Nadichikitsa, etc., are all inventions of numerous persons. Similar to that, this could be a fresh impulse to make Kalachikitsa Rachana Sharir's area of expertise.

## CONCLUSION

The unique membranes in the body located between Dhatu and Aashaya identified in Ayurved as "Kala" carry out the body's essential activities. Snayu Pratichanna, Jarayu Santat, and Shleshma Vestita are three groups that correspond to the fibrous, serous, and mucous membranes, respectively. Endothelial linings seen in blood arteries and sinusoids of the liver and spleen are comparable to the Raktadhara Kala described in Ayurveda. You may think of Kala as one of the treatment centres for the illnesses connected to each Kala.

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