

Review of *Kala Sharir* with Reference to Membranes

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ABSTRACT

Anatomy is science that deals with the different structures of human body like bones, joints, *Twacha*, different sense organs and *kala* etc. Relevant knowledge of anatomy is very important for better understanding of diseases and their cure in form of medicinal or surgical process. In the *Sushrut Samhita*, *Acharya Sushruta* explains *Kala*, a unique *Ayurvedic* concept. In the *Garbhavyakaran Sharir* Chapter of the *Sharir Sthan*, *Acharya Sushruta* mentioned the concepts of *Kala* while explaining the detailed development of body parts. The body has a total of seven *Kala*. Between *Dhatu* and *Aashaya*, there is a limiting membrane or layer in our body called *Kala*. These are extremely small particles that are invisible to the naked eye, just like cells. Their functions in the body can help you understand them. The word *Kala* implies "property" or "quality," so these are unique membranes in the body that play an important role in body physiology. The body has many layers or membranes that form an envelope around the organs. *Kala* refers to the cell membranes that distinguish each cell from the others.

Key Words Cell Membrane, *Kala*, *Sushrut Samhita*, *Acharya Sushruta*, *Dhatu*, *Aashaya*, *Garbhavyakaran Sharir*

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INTRODUCTION

Kala sharir aetiology of the word *Klaa* From- Concise Pali- English Dictionary By – A.P. Buddhatadut Mahatre, Motilala Banasidas Publisher, Reprint 1989 *Kala* – A Sweat Low Sound Indisent & Confused Noise.

klaa: ¹ k: ¹ jala and la: a small part of anything or any single part or portion of whole.¹ All *kala* are included directly or indirectly in *mruduavayava*. *Ayurveda sharir* has many terminologies that are fairly explained in ancient encyclopaedias. The

fifth chapter of *sushruta samhita* describes many terminologies, including *kandara*, *kurcha*, *mansarajju*, *sanghat*, and *simanta*. *Sushruta* describes *kala* as major topic in *sharirsthana*. many *ayurvedic* basic principles, such as *tridosha*, *panchamahabhut*, *dravyaguna*, and others, are used by *Ayurved physician* to manage diseases. according to *Sushrut Acharya*, *kala* is the limiting layer of body organs and tissues that keeps them in their normal position. the word is also used for organs in this context.² According to *ashtang*

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sangraha sharirasthan, *kleda* between *dhatu* and *aashay* becomes *paak* (solid) due to heat and is known as *kala*. There are 7 *kala*.³ *kala* is the innermost limiting lining of *dhatu*s and *aashayas*. *kala* is the structure that exists between *dhatu* and *aashay*, or it is the structure that exists within

the *dhatu* itself. according to anatomy, *kala* can be associated with membrane, fascia, covering, and other structures. membrane – this can be fibrous, mucous, or serous.

AIM AND OBJECTIVES

To find out the applicability of *Kala Sharir* described in *Ayurved* and correlate with membranes in the light of contemporary science.

MATERIALS AND METHODS

From various classical texts i.e *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Sangrah* and *Ashtanga Hridaya* and evidence based resources as journals, books and data based information from various modern texts.

LITERARY REVIEW

Kala is a term used in classical texts with various meanings varying from the indistinct, unit of time, minute, membrane, and so on. In the context of *Sharir*, it can be interpreted as a minute/membranous structure. *Susrutha* described it after *Twak* in *Garbha Vyakarana Adhayaya*, which depicts minute structures in the organogenesis sequence. To illuminate the idea

and structure, the topic is supported by various examples from the environment/lifestyle. *Dalhana*, the compendium's brilliant commentator, also discusses various logical concepts and attempts to provide an exact explanation.

Kala is a thin membranous entity that lines the internal cavities of the *Ashayas* (organs that hold vital elements), blood vessels, and fibrous capsules of the joints, among other places. The *Kala* divides the *Dhatu* (vital elements) from the *Ashaya*.⁴ The *Ashaya* is the cavity that gives the *Dosha*, *Dhatu*, and *Mala Ashraya* (holds) (waste products of the body)⁵.

The *Dhatu* sits in *Ashaya*, and the *Ashaya's* inner lining is known as *Kala*. A cross-section log of wood demonstrates the concept by displaying its internal structures with its various layers and parts. Similarly, we must remove the top layer of *Mamsa* (flesh) to reveal the *Dhatu*. It means that *Dhatu* are principal factors of our body and they are located deeply. We have to incise the coverings, i.e., *Kala* to reveal these *Dhatu*s.

The formation of *Dhatu* occurs in several stages, the first of which is when *Dhatu* is in the form of a liquid called *Dhaturasa*. This *Dhaturasa* is reformed into the very next *Dhatu*. Some *Kleda* remains between *Dhatu* and *Aashay* during this process. This *Kleda*, i.e. *Dhatusara Shesh* or *Dhaturasa Vishesh*, is not converted into *Purva* (previous) *Dhatu* or *Uttar Dhatu*, and thus remains in very small quantities; as a result, they are referred to as *Kala*. *Kala* is covered in a

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muscular layer, which is spread out as a membranous structure (*Snayu*), similar to an amniotic membrane (*Jarayu*), and covered in *Shleshma* (mucus)⁶. All these three structures may or may not necessarily be present in each *Kala*, even one or two of the above-mentioned structures may be found existing in the *Kala*.

- *Snayu* signifies - structural support
 - *Jarayu* signifies - barrier/selective permeability
 - *Shleshma* signifies - lubrication and nutrition
- Susurtha* has used the terms *Asthidhara Kala* and *Majjadhara Kala* in place of *Purishadhara Kala* and *Pittadhara Kala*, respectively, in his description of how the *visa* moves from one *Kala* to another. He clarifies that it is not against the text to refer to them as *Asthi/Pursiha* or *Pitta/Majja Kala* because the signs produced may be linked together⁷.

TYPES OF KALA-

Kala are seven in number and have been identified in Ayurveda as limiting membranes.

MAMSADHARA KALA-

The first *Kala* is *Mamsadhara Kala*, which contains a network of *Sira* (veins), *Snayu* (fibrous tissue), and *Dhamani* (arteries). *Sushrut* compared the anatomical image of *Mamsadhara Kala* to that of a lotus stalk in muddy water. Large visible masses of connective tissue are called fascia. Structurally they are highly variable, but in a broader sense, collagen fibers in fascia tend to intertwine and appear as a compact, parallel alignment in tendons and fascia. The fascia that is performed by compressions on the outer part of the muscles and their endomysial

coverings is called the enveloping fascia⁸. Thus, the functions of *Mamsadhara Kala* to cover the muscles and allow the movement of vessels can be understood.

Raktadhara Kala-

The second *Kala* is *Raktadhara Kala*. This *Kala* is very similar to the endothelial lining of arteries, veins, and lymphatics. The *Raktadhara Kala* allows blood to flow through blood vessels. Blood circulates in arteries and veins. As a result, all blood-producing and hemopoietic organs such as *Yakrit* (liver) and *Pleeha* (spleen) are the seat of *Raktadhara Kala*.⁹ The word *Sira* has been used here to refer to both an artery and a vein.

MEDODHARA KALA-

The third *Kala* is known as *Medodhara Kala*. This *Kala* helps the *meda*. *Meda* is found in *Anu Asthi*, which means short bones, whereas *Majja* is found in *Sthool Asthi*, which means large and heavy bones. *Vasa* (fat) is found in the *udergrah* (abdomen) or peritoneal sac. *Vapavaham* is the term for the peritoneal sac (omentum).

Sushrut has identified *Majja* of 2 types as follows:

Sarakta Meda (red bone marrow).

Peeta Meda (yellow marrow)

found in long bones.

Red bone marrow is found in short bones. *Sushrut* defined the explanation for *Sarakta* and *Peeta Meda*. *Sushrut* describe *Sneha*, which naturally comes out through *Manspeshi* (muscles), as *Vasa* (fat). In most parts of the body there are some adipocytes in the loose connective tissue.

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Each cell consists of a peripheral Rim of cytoplasm in which the nucleus is embedded, surrounding a single large central fat globule composed of glycerol esters of oleic, palmitic, and stearic acids. However, they represent the main component of adipose tissue, where they are embedded in loose vascular connective tissue. Adipose tissue is only found in certain regions. In particular, it is found in the subcutaneous tissue; the mesenteries and oments, etc¹⁰.

Shleshmadhara Kala-

The fourth *Kala* is *Shleshmadhara Kala*, which is found in the synovial membrane. This can be found in almost every sandhi (joints). It has been compared to the lubricant in a wheel axis that allows the (wheel) to move freely. Similarly, the *Shleshma* and *Sleshmadhara Kala* allow all bony joints to move freely on their axes. Synovial fluid lubricates this synovial membrane.

Synovial membrane that surrounds osseous surfaces, intracapsular ligaments, bursae, and tendon sheaths and lines fibrous capsules. The synovial membrane secretes and absorbs fluid, which lubricates the movement of the articulating surfaces. It is made up of a cellular intima made up of pleomorphic synovial cells embedded in a granular, amorphous, fiberless extracellular matrix¹¹.

Purishdhara Kala-

The fifth *Kala* is known as *Purishdhara Kala*. This *Kala* is aimed to assist with faecal matter. It is found in the *Pakvashaya* (large intestine and rectum) as well as the abdominal cavity. *Purishdhara kala* (membrane) has the property of

separating, *Kitta & Sara* bhag right from *Unduk* and extends from *Yakruit* (Hepatic) to whole large intestine or the remaining segments of large intestine which surround other viscera's of abdomen (caecum). Because the majority of food is absorbed in the small intestine, faecal matter is processed from the caecum upwards and passes through the ascending colon, hepatic flexure, transverse colon, descending colon, rectum, and sigmoid colon. As a result, the location of *Purishdhara Kala* in *Pakvashaya* is very specific.

Pittadhara Kala-

The sixth *Kala* is *Pittadhara Kala* it holds all the four type of food intaken by mouth into intestine. *Asit*, *Khadit* (swallowed), *Peeta* (drukliquid), and *Leedh* (licked) are the four types that are brought into *Kshudrantra* (small intestine). It is digested and absorbed in due course by the action of pitta (digestive enzymes) here. The term *Koshtha* is used in this context to refer to *Laghu Antra* (small intestine), where *Pittadhara Kala* is referred to as '*Grahani*.' *Sushrut* has also described *Pittadhara Kala*.

Shurkadhara Kala-

Shurkadhara kala is the seventh and last *kala* identified by *Sushrut*. According to *Shusrut*, its functional presence all over the body in all living beings, and it is found throughout the entire body. The term *Shukra* refers to oestrogenic and androgenic hormones that circulate throughout the body. They were compared to sugar cane juice or *Ghrit* (ghee) found in milk. Because these items cannot be identified in milk or similarly *Shurka* in the form of hormone cannot

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be isolated from the body, their action can be realised by any living being.

CONCLUSION

Kala Sharir teaches us about membranes and layers of the body, both of which play important roles in the body's functions. They also produce and store vital body components such as blood, mucus, and stools. Because the *Kala* are the sites of production and storage for many important body elements, the disease should logically have its origin or at least initial manifestation in the *Kala*. Thus, precise knowledge of *Kala* is essential for physicians to make the right diagnosis at the right time and to know if the disease is at the level of *Kala*. According to *Ayurveda* diseases form only when tissues are contaminated or vitiated by *Doshas*. They would have damaged the *Kalas* even before the disease manifested in the *Ashay* or *Dhatu*. These *Kala* provide early warning signs of an anticipated disease. Thus, knowledge of *kala Sharir* is essential for precise disease diagnosis and for doctors to provide timely treatment.

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