



Review Article

Volume 13 Issue 10

October 2024

## ANATOMICAL APPLIED ASPECT ON KALA SHARIR - A REVIEW ARTICLE

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### ABSTRACT

**Introduction-** Anatomy is the study of the structures of the human body, including its bones, joints, skin, and sensory organs. Understanding diseases, medical and surgical procedures used to treat them requires an understanding of anatomy. In the ancient Indian medicinal system known as Ayurveda, the concept of *Kala* is unique and important. In the Sushrut Samhita, Acharya Sushruta elaborated on the subject. **Methodology-** Using internet databases like Scopus, PubMed and Google Scholar, a complete study of the classic literature on anatomy, Ayurveda, the idea of *Kala* was carried out. The information was analysed and collective to give a comprehensive rundown of the subject. **Findings** - The idea of *Kala* is explained as a restricting layer or membrane that is situated between *Aashaya* (cavities that contain the essential components) and *Dhatu* (essential elements). The body has seven *Kala*, each has a purpose that may be comprehended. These are extremely small particles that resemble cells and can be thinking of as unique bodily membranes that are vital to the operation of human physiology. **Conclusion** - In Ayurveda, the thought of *Kala* is distinct and important, with function to both anatomy and physiology. Gaining knowledge concerning *Kala* can aid with getting better comprehension of illnesses and medical interventions. New understanding of how the human body workings and the formation of novel treatments may result from additional study in this field.

**Keywords-** *Kala*, *Pittadhara*, *Purishadhara*, *Aashaya* Limiting membrane etc.

**INTRODUCTION** - A thorough comprehension of Rachna Sharir is essential for any Vaidya who wants to become a competent doctor. (Ch.sha.6/19). Many concepts included in the Ayurvedic texts - such as *Tridosha*, *Dhatu*, *Malas*, *Kloma*, *Marma*, *Kala*, and so forth - are incomprehensible to us in light of modern science<sup>1</sup>. To understand these concepts in light of Ayurvedic science, we need to closely examine the texts and their commentary, as well as the *Shlokas*, and draw conclusions. *Kala* is one among the concepts that modern science is yet unable to explain.<sup>2</sup> Acharya Sushruta mentioned the significance and originality of the Ayurvedic idea of *Kala* in the Sushrut Samhita. The word *Kala*, derived from a Pali -English dictionary, denotes a solitary part, or a little part of something.<sup>3</sup> The restricting membrane or layer known as *Kala* is said to be located between *Dhatu*, or essential elements, and *Aashaya*, or cavities that include the essential components. The body is made up of seven *Kala*, which are the vital components or substances of the elements. These consist of urine, bile, semen, phlegm, blood.<sup>4</sup> Even though Ayurveda *Sharira* describes a number of terminologies, as well as *Kandara*, *Kurcha*, *Mansaraju*, *Sanghata* and *Simanta*. *Kala sharira* has not been shown to have any standard therapeutic value. On the other hand, comprehending the plan of *Kala* can help us understand how the human body mechanism and help us locate novel treatments.<sup>5</sup> Our goal in writing this paper is to provide readers a thorough clutch of the Ayurvedic concept of *Kala*, as well as its physiological and anatomical importance and therapeutic consequences.

## METHODOLOGY

A review of some classical works, such as *Charak Samhita*, *Sushrut Samhita*, *Ashtang Sangrah*, *Ashtang Hridaya*, *Bhav Prakash* and *Sharangadhar Samhita*, was one of the study's resources and methodologies. A review of evidence-based materials was conducted, as well as books, journals, and data-based information from modern literature. Since *Kala Sharira* was the study's key focus, journals, publications, online content and previous research papers on the topic as well as contemporary anatomical literature - particularly those pertaining to histology - were also evaluated. The principle of this assessment of the literature and resources was to enhance comprehension of *Kala Sharira* and its importance within the Ayurvedic framework.

## CONCEPT OF KALA

The concept of *Kala Sharir* is covered in several classic Ayurvedic texts, including the *Sharangadhara Samhita*, *Susrutha Samhita*, *Ashtanga Sangraha*, *Ashtanga Hridaya*, and *Bhav Prakasha*, according to the literature review. The word "Kala" has multiple meanings in these works, including membrane, ambiguous, and unit of time. In the context of *Sharir*, *Kala* refers to the thin membrane that separates the necessary components from the holes that hold them. The vital components are kept within these cavities, which have an interior lining termed as *Kala*. The literature also explains the multi-step process of *Dhatu* creation.<sup>7</sup> *Dhatu* is first liquid known as *Dhaturasa*, which is then convert into the next *Dhatu*.<sup>8</sup> A small amount of *Kleda*, known as *Kala*, stay between *Dhatu* and *Ashaya* in this process; it is not transformed into the preceding or subsequent *Dhatu*. The coating of muscle covering *Kala* is mucous - covered (*Shleshma*), resembles an amniotic membrane (*Jarayu*), and is spread like a membranous structure (*Snayu*).<sup>9</sup> Amniotic membrane indicates selective permeability, membrane structure indicates structural support, and mucus indicates lubrication and feeding. *Acharya Sushrut* has substituted the terms *Asthidhara* and *Majjadhara* for *Purishadhara* and *Pittadhara Kala*, respectively, in her clarification of how the *Visa* shifts from one *Kala* to another. According to the research, *Kala Sharir* has not yet been confirmed to have any clinically significant effects.<sup>10</sup>

## THE SEVAN KALA

The inside linings of various body cavities and tissues are referred to in Ayurvedic medicine as the seven *Kala*, or limiting membranes. According to the Ayurvedic scholar *Sushrut*, *Kala* are structures that have the appearance of sheaths and are covered in mucoid material, called *Shleshma*. In modern anatomy, these structures are referred to as mucous membranes. The epithelium is the layer of cells that covers body cavities and tissue surfaces that are exposed to the external environment.<sup>11</sup> All three germinal cells give rise to epithelium in an embryological manner. Mesothelial cells line internal cavities and the proximal lining of the urogenital tract, including the pericardial, pleural, and peritoneal cavities. Endothelium lines blood and lymphatic vessels.

## ACCORDING TO ACHARYA SUSHRUTA ABOUT KALA

1. **Mamsadhara Kala:** This *Kala* has a complex of veins, fibrous tissue and arteries. It has been compared to anatomical images of a lotus stem found in cloudy water.
2. **Raktadhara Kala:** This *Kala* resembles the endothelium lining of veins, arteries and lymphatics. The *Raktadhara Kala* supports blood to flow through blood arteries, and it is housed in all blood producing and hemopoietic organs such as the liver and spleens.<sup>12</sup>
3. **Medodhara Kala:** This *Kala* promotes the *Meda* or fat. Fat is located in the belly or peritoneal sac, and *Acharya Sushrut* has discovered two forms of *Meda*: *Sarakta Meda* (red bone marrow) in short bones and *Peeta Meda* (yellow bone marrow) in long bones.
4. **Shleshmadhara Kala:** This *Kala* is found in the synovial membrane and approximately every joint. It has been compared to the lubricant in a wheel axis, which allows the wheel to move freely. Similarly, *Shleshma* and the *Shleshma dhara Kala* allow all bone joints to move freely along their respective axes. The synovial membrane is lubricated with synovial fluid.
5. **Purishdhara Kala:** This *Kala*, which supports faeces, may be found in abdominal cavity and in large intestine, rectum. This membrane divides *Kitta* and *Sara* bhag directly from the *Unduka* (caecum) and stretches from the liver to the whole large intestine.<sup>13</sup>
6. **Pittadhara Kala:** This *Kala* has the four forms of food intake that contact the intestine. *Asit*, *Khadit* (swallowed), *Peeta* (druk-liquid) and *Leedh* (licked). These are digested and absorbed over time by the activity of *pitta*, or digestive enzymes. The *Pitta dhara Kala* is found in the *Laghu antra* (small intestine), which *Acharya Sushrut* also refers to as "*Grahani*."
7. **Shurkadhara Kala:** The final and seventh *Kala* recognized by *Acharya Sushrut* is *Shurka dhara Kala*, which functions throughout the body in all living beings. *Shukra* is utilized for estrogenic and androgenic hormones that circulate throughout the body. They have been compared to sugarcane juice and ghee found in milk. As these components cannot be detected individually in *milk*, *Shukra* in the form of hormones cannot be extracted from the body, but its effects may be seen.

**APPLIED ASPECT OF KALA SHARIR**

<b>Kala</b>	<b>Dhatu</b>	<b>Applied aspect</b>
<b>Mamsadhara Kala</b>	Mamsa, Rasa dhatu	As previously said, all Dhatu have tone, flexibility, and functional normality because to this physical holding membrane.
<b>Raktadhara Kala</b>	Rasa, Rakta Dhatu	Its optimal function may be in charge of the regular circulation of bodily fluids and is characterized as occurring inside the Mamsa dhara Kala, in the liver, and in circulating veins.
<b>Medodhara Kala</b>	Meda dhatu	Because it is located in the belly and tiny bones, it may be connected to conditions affecting the body's soft tissues and regions where fat accumulates.
<b>Shleshmadhara Kala</b>	Meda, Majja, Dhatu	Synovial fluid is necessary for all joints to function properly; this can be connected to this Kala
<b>Purishdhara Kala</b>	Asthi dhatu with its upadhatu	Since Asthi's bones are supposed to have originated at this Kala, treating Asthi ailments would involve taking medications that affect this, Kala.
<b>Pittadhara Kala</b>	Majja Dhatu (organs related to Majja Dhatu; Nervous system, Eyes, Brain)	Since Majja is said to have originated at this Kala's location, medicine that acts at this location will be necessary to treat Majja Dhatu's illnesses.
<b>Sukra DharaKala</b>	Rasa, Rakta, Shukra, Oja	It is connected to the cellular level nutrition supply to every region of the body, hence in order to boost one's energy and stamina, one must address this, Kala.

**DISCUSSION**

The following anatomical structures are associated with the Seven Kala. It is believed that *Mansadhara Kala*, the first *Kala*, is related to deep fascia and intermuscular septa. This makes sense because these tissues are responsible for providing protection and support to the

body's muscles and organs. *Rakta Dhara Kala* comes next; it is linked to the endothelium of the liver and spleen, which borders the sinuses and blood vessels. This *Kala* is associated with regulating and distributing blood throughout the body.<sup>14</sup> The omentum and deep fascia are said to be associated with *Medodhara Kala*, the third *Kala*. The body's capacity to retain fat and maintain body temperature depends on these tissues. Next, we have *Shleshmadhara Kala*, the fourth *Kala*, which is related to the synovial membrane. This membrane, which covers the joints, lessens wear and tear and friction. *Purishdhara Kala*, the fifth *Kala*, is said to be associated with the mucous membrane of the colon and the rectum. This membrane aids in the body's absorption of nutrients and water from waste products. The small intestine's mucous membrane is connected to *Pittadhara Kala*, the sixth *Kala*. Nutrients from meals are absorbed by this membrane and transferred into the circulation. Last but not least is *Shukradhara Kala*, which is said to have something to do with the mucous membrane of the seminalis, vas deferentia, and other reproductive organs. This *Kala* is linked to sexual vigor and fertility.<sup>15</sup> All things considered, the *Seven Kala* offer an intriguing perspective on the relationship between the body's energy centers and the structures that sustain and govern them. These theories offer an insightful viewpoint on the human body and its operations, even if they may not be supported by science.

## CONCLUSION

The information *Kala Sharir* gives us about the body's layers and membranes—which are essential to many essential physiological functions - is invaluable. According to Ayurveda, diseases can only occur when tissues are vitiated or polluted by *Doshas*. Thus, in order to diagnose patients at the right moment and ascertain whether the ailment is at the *Kala* level, physicians must possess a thorough understanding of *Kala*. Understanding the physiological and anatomical relevance of *Kala* can help develop new therapeutic strategies and enhance our understanding of how the human body works. We can gain insight into its practical application by consulting the unique Ayurvedic principles of its origins and relationship with different *Dhatus*.

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