

CONCEPTUAL STUDY OF KALA WITH SPECIAL REFERENCE TO PURISHADHARA KALA

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ABSTRACT

Ayurveda is also known as Science of Life which not only deals with the curative aspects but also with preventive aspects than any other systems of the universe. *Sharira* is the substratum of the *Indriya*, *Satva* and *Aatma* which make the vital components of „*Ayu*“. *Acharya Sushruta*, the pioneer in the field of *Sharira* has gone through evaluating the anatomical structures in relation to all the stages of life along with the evolution of the Universe under the different chapters in his *Sharira-Sthana*. That is why, the *Sushruta Sharira-Sthana* is considered as *Shrestha* (paramount) among all the *Sharira- Sthanas*.^[1] The *Sharira Rachana* has been described in *Samhita* with their various aspects of principles under one roof as *Sharira* only. *Rachana Sharira* is a subject which deals with the constitution of body. Being fundamental, it is important in building of this ancient medical science. For healthy life, it is necessary that we have a profound knowledge of

the human body. *Kala* is a unique concept explained by *Acharya Sushruta* in *Sushruta Samhita*, *Sharira-Sthana* in *Garbhavyakarana* chapter. These *Kalas* are not only mere anatomical structures but they also perform some specific functions and possess specific properties.

KEY-WORDS: *Ayurveda*, *Kala*, *Purishadhara Kala*, *Snayu*, *Jarayu*.

INTRODUCTION

Ayurveda, the traditional Indian medicinal system remains the most ancient yet living

traditions with sound philosophical and experimental basis. It is a science of life with a holistic approach to health and personalized medicine. It is known to be a complete medical system that comprised physical, psychological, philosophical, ethical and spiritual health.

हिताहितं सुखं दुःखमायुस्तस्य हिताहितम् ।
मानं च तच्च यत्रोक्तमायुर्वेदः स उच्यते ॥

(च.सू. 1/41)

According to *Acharya Charaka*, *Ayurveda* deals with good, bad, happy and unhappy life, its promoters and non-promoters, measurement and time.

Kala is a unique concept explained by *Acharya Sushruta* in *Sushruta Samhita*, *Sharira-Sthana* in *Garbhavyakarana* chapter.

कलाः खल्वपि सप्त भवन्ति धात्वाशयान्तर मर्यादाः ॥ (सु.शा. 4/5)

Kala is defined as a structure between *Dhatu* and *Ashaya*. They are seven in numbers.^[2]

These *Kalas* are not only mere anatomical structures but they also perform some specific functions and possess specific properties.

Kala means layer or membrane in the body which can be understood by the cross section of the wood which shows the different layers and parts of its internal structures.

Similarly, the membrane appears by the cross-section of the fleshy part of the body or any muscular region or any internal part of the organ.^[3]

Total 7 types of *Kala* are described by *Acharya Sushruta*

1. *Mamsadhara Kala*
2. *Raktadhara Kala*
3. *Medodhara Kala*
4. *Shleshmadhara Kala*
5. *Purishadhara Kala*
6. *Pittadhara Kala*
7. *Shukradhara Kala*

We find references in *Ashtang Hridayam*, *Sharira-Sthana* in *Angavibhaga Shariram* chapter as well in *Ashtang Sangraha* and *Sharangdhara Samhita*. All *Acharyas* have explained seven

Kalas which are similar to *Sushruta Samhita* but in *Sharangdhara Samhita* location of fourth *Kala* is stated to be at *Yakrita* and *Pleeha*. This description regarding *Kala* is widely spread in the *Sharira-Sthana* of *Sushruta* and *Vagbhata*.

पंचमी पुरीषधरा नाम, याऽन्तः कोष्ठे मलमभिविभजते पक्वाषयस्था ।।

यकृत्समन्तात् कोष्ठं च तथाऽन्त्राणि समाश्रिता ।

उण्डुकस्थं विभजते मलं मलधरा कला ।।

(सु.षा. 4 / 16–17)

Fifth *Kala* is *Purishadhara Kala*. It is located in the *Pakwashaya* (large intestine) inside the *Kostha*. *Purishadhara Kala* holds stool or faeces. This *Kala*, particularly located in the intestine at the level of *Yakrit* and in *Koshtha*, differentiates the *Mala* situated at the site of *Unduka*. This *Kala* is also called *Maladhara Kala*.^[4]

But the specified anatomical location and its physiological aspect have not been clearly indicated the meaning of *Kala*.

Due to lack of scientific presentations and complexities in its understanding, the fundamentals of the human body are postulated by the oriental anatomists were refuted initially, but the advent of modern biotechnology brought about a drastic change in the scenario. Those facts and features by the ancient *Ayurvedic* scholars were nullified which have been proved and resurrected under the lens of the microscope.

The modern times saw a period of renaissance for the concepts of philosophy and the *Ayurvedic* medicine, especially *Sharira*, applicability and contemporary nature attracted many scholars. The logical and mathematical nature of the basic view, their dependability on scholars of then much advanced sciences. The fundamentals of *Ayurveda* were gaining recognition and footage.

This knowledge no doubt, should be as vivid as possible, with a maximum clarification of concepts, explanation of terms, definition of obscure entities and thus helping to produce clear image of science. There are many concepts in *Ayurveda*, which are not explained in detail. Concept of *Kala Sharira* is one of them. That is why I have selected this topic titled – “Conceptual Study of *Kala* with special reference to *Purishadhara Kala*” which is a literary work, to explore the concept of *Kala* in *Ayurveda* and in modern science along with its exact anatomical position and to associate its relation with the mucous membrane of large intestine.

MATERIALS AND METHODS

1. Literature regarding *Kala* from *Vedas*, *Upanishads*, *Sushruta Samhita*, *Charak Samhita*, *Ashtang Sangraha*, *Dalhan Teeka* and *Ghanekar Teeka*.
2. Modern literature from B.D.C. Human Anatomy, Gray's Anatomy.
3. Review articles, journals etc.

DISCUSSION

Discussion is very crucial part of any work, because it explains the whole study in a systematic way. After *Samudra Manthan*, we get *Amrita*. Similarly, discussion is a process like *Samudra Manthan* after which we get our study in a fruitful way. Without logical thinking we cannot find the facts behind every study. Due to the power of discussion, we can reach our goals. So, discussion is a very important part of our study. Conclusion is pointless until or unless supported by proper justification. So, discussion is the first step to reach any conclusion. It clears our doubts and explains each and every fact behind the study. So, entire research work done shall be discussed here.

Kala Sharira is first explained by *Acharya Sushruta* in *Sharira Sthana* of *Sushruta Samhita*. *Kalas* are seven in number described by *Acharya Sushruta* and other *Acharyas*. Some authors also mentioned *Vishista Kalas*. But *Acharya Sushruta* was very perceptible in his concepts than any other *Acharyas*. He has used the word “*Khalu*” which means without any doubt he has described that *Kalas* are seven in number not more than that, so all the *Vishista Kalas* should fall within one of these seven *Kalas* itself.

The formation of *Kala* has been mentioned by *Acharya Vagbhata* in *Ashtang Sangraha* and *Acharya Sharangdhara* in *Sharangdhara Samhita*.

यस्तु धात्वाषयान्तरेषु क्लेदोऽवतिष्ठते यथास्वमूष्मभिर्विपक्वः स्नायुः प्लेष्मजरायुच्छन्नः काष्ठ इव सारो धातुसारः रसपेषेऽल्पत्वक् कलासंज्ञः ।।

(अ.सं.पा. 5/34)

The moisture (*Kleda*) which is present between *Ashaya* (organs) and *Dhatu* (tissue), by its own *Dhatwagni* helps to convert into the *Snayu*, *Jarayu* or *Shleshma*, which are the membranous structures illustrated as *Kala*. Just as essence gets formed in the tree and found after removing the bark. Due to less in the quantity of *Rasa* even these *Kalas* are in the form of thin membranes which are called as *Kalas*.

धात्वाषयान्तरै स्थस्तुयत्क्लेदस्तवधितिष्ठति ।
देहोष्मणा विपक्वो सा कलेत्यभिधीयते ॥

(षा.सं.पू. 5/6)

The *Kleda* present in the *Dhatu* (tissues) undergoes transformation by the heat of the body and forms into structure known as *Kala*.

These *Kalas* are in the form of three structures in our body as

1. *Snayu*
2. *Jarayu*
3. *Shleshma*

According to Dr. Bhaskar Govind Ghanekar, *Kalas* are formed by these three structures but it is not necessary that all three structures should be present in *Kala*. Some *Kalas* are only made with *Snayu*, some of it made with *Jarayu* and some of it formed with *Shleshma* and some *Kalas* are formed with all of these structures.

According to Dr. Bhaskar Govind Ghanekar, these structures (*Snayu*, *Jarayu*, and *Shleshma*) can be correlated with fibrous membrane, serous membrane and mucous membrane. Now, we will discuss the *Purishadhara Kala* in depth and correlation with modern aspect.

PURISHADHARA KALA

The *Acharyas* had dominion nature due to which they could coherently express the views of *Ayurveda* in a very compact nature where they played main role in enrichment of this *Shastra*. Gross definition of *Koshtha* has been given in *Charaka Samhita* where it is also called *Mahasrotas* i.e. the largest channel of the body. It is located in the deep recess in the middle portion of the body and is comprises of *Amashaya* and *Pakwashaya*.

The *Shastra* was illustrated and inscribed in such a tidy way which made the *Shastra* to be a paramount. Here, first I would like to mull over on *Pakwashaya* in detail with the following points. They are –

1. Word meaning of *Pakwashaya*
2. Site & relations of *Pakwashaya*
3. Functions of *Pakwashaya*
4. *Pakwashaya* as a *Moola Sthana*

Ergo with the above points, the concept of *Pakwashaya* can be made crystal clear.

1. Word meaning of *Pakwa*

The fountain head of *Pakwashaya* can be considered as follows:

The word ***Pakwa*** means ***Pakwam Parinate***

स्याद्विनाषोन्मुखं पक्वम् ।।

(अमरकोष 3/1/91)

It means that which is ready for destruction is known as *Pakwa*.

The word ***Ashaya*** means

अवस्थान विषेषः अधिष्ठानं, संचयस्थानम्, आधार ।।

(सु.षा. 5)

अवस्थान प्रदेशः ।।

(डल्हण)

Ashaya is the receptacle or reservoir which gives shelter to others. Most of the *Ashayas* are hollow muscular organs that facilitate for the collection, storage and gradual expulsion of *Dosha*, *Dhatu* and *Mala*.

With the meaning of above two words, we can apprehend that it is the place where some substances will reside which are ready to undergo destructive phase.

2. Site & relations of *Pakwashaya*

Pakwashaya is considered as one among the *Koshthanga* as per *Charaka* and *Sushruta* like:

पंचदश कोष्ठांगानि; तद्यथा — नाभिष्व, हृदयं च, क्लोम च, यकृच्च च, प्लीहा च, वृक्कौ च, बस्तिष्व, पुरीषाधारष्व, आमाषयष्व, पक्वाषयश्च उत्तरगुदं च, अधरगुदं च, क्षुद्रान्त्रं च, स्थूलान्त्रं च, वपावहनं चेति ।।

(च.षा. 7/10)

स्थानान्यामग्निपक्वानां मूत्रस्य रुधिरस्य च । हृदुण्डुकः फुफुसष्व कोष्ठ इत्यभिधीयते ।।

(सु.चि. 2/12)

With these quotations it is pellucid that the *Pakwashaya* is situated within the *Koshtha*. When we head over the quotation of *Charaka*, he has used the terms like ***Pakwashaya***, ***Kshudra-Antra*** (small intestine), ***Sthula-Antra*** (large intestine), ***Uttar-Guda*** and ***Adhar-Guda***. So, the *Pakwashaya* must be a different structure than these structures.

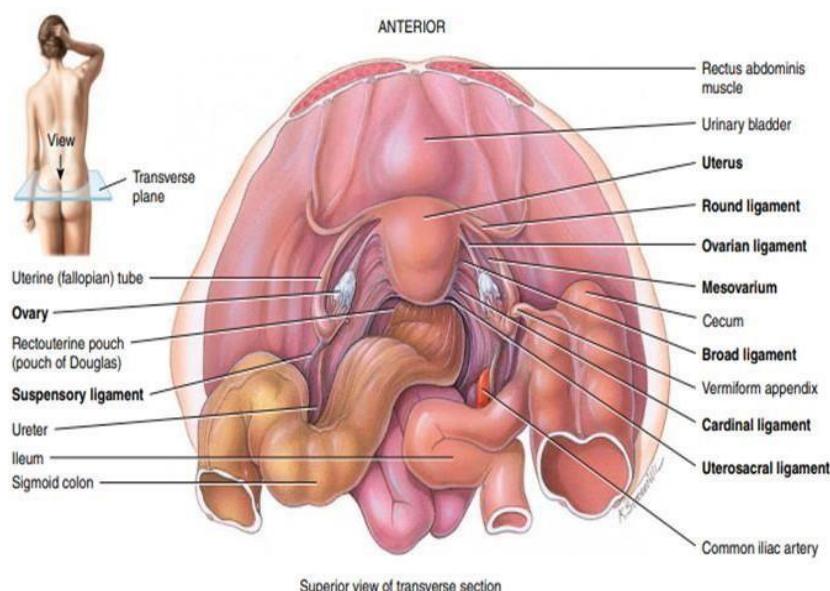
There is another quotation by *Sushruta* which tells about the site of *Pakwashaya* while

explaining the places of *Vata Dosha* i.e.

वातः श्रोणिगुदसंश्रयः, तदुपर्यधो नाभेः पक्वाषयः ।।

(सु.सू. 21/6)

Vata Dosha is situated in *Shroni* (Pelvic region) & *Guda* where *Pakwashaya* is situated above these structures and below the *Nabhi*. This can be compared with the reference from the Gray's Anatomy which has been written as - In the supine position, the ileum lies mainly in the hypogastric region and right iliac fossa. The terminal ileum frequently lies in the pelvis, from where it ascends over the right psoas major and right iliac vessels, to end by opening at the ileo-caecal junction in the right iliac fossa. (page no.1128)



There is another quotation which can be related to the site and relation of *Pakwashaya* said by *Ashtang Sangraha* as-

योनिस्तु षखंनाभ्याकृतिस्त्र्यावर्ता तस्यास्तृतीय आवर्ते पित्तपक्वाषयन्तरे रोहितमत्स्यमुखाकारा गर्भषय्यज्ञं

(अ.सं.पा. 5/91)

Garbhashaya is situated between *Pittashaya* and *Pakwashaya* where *Garbha* resides. It can be understood by the following reference from Gray's Anatomy-

The posterior surface of the uterus is convex transversely. Its peritoneal covering continues down to the cervix and upper vagina and is then reflected back to the rectum along the surface of the recto-uterine pouch, which lies posterior to the uterus. The sigmoid colon and

occasionally the terminal ileum lie posterior to the uterus. (page no. 1295)

3. Functions of *Pakwashaya*

Pakwashaya has a main role in the process of digestion. As *Acharyas* mentioned

पक्वाषयं तु प्राप्तस्य षोष्यमाणस्य वह्निना ।

परिपिण्डितपक्वस्य वायुः स्यात्कटुभावतः ।।

(च.चि. 15/10)

प्राप्य च पक्वाषयं कटुकीभूतमनिलम् ।।

(अ.सं.षा. 6/58)

In the third stage of digestion i.e. *Avasthapaka* the food enters the *Pakwashaya* where it is dried up by the digestive fire and is converted into a bolus and nourishes the *Vata Dosha* due to predominance of *Katu Rasa* in this stage, and when we look into the process of digestion it is completed in the small intestine itself.

4. *Pakwashaya* as a *Moola Sthana*

पुरीषवहे द्वे, तयोर्मूलं पक्वाषयो गुदं च ।।

(सु.षा. 9/20)

पुरीषवहानां स्रोतसां पक्वाषयो मूलं स्थूलगुदं च ।।

(च.वि. 5/8)

षकृद्वाहिनां पक्वाषय स्थूलान्त्रं च ।।

(अ.सं.षा. 6/42)

With the above quotations from the various *Samhitas*, it shows that *Pakwashaya* and *Guda* have been considered as *Moola Sthana* for *Purishavaha Srotas* according to *Sushruta* and *Charaka*. But as per *Vagbhata* he used the word *Sthula- Antra* which indicates the large intestine. Therefore, with this statement it is clear that the *Pakwashaya* and *Sthula- Antra* are different entities. Also, if *Purishavaha Srotas* has to be affected, these two should be affected first then only the *Purishavaha Srotas* will be disturbed.

The lower end of ileum opens on the postero-medial aspect of caecum. The ileo-caecal junction is guarded by the ileo-caecal valve, which prevents the reflex from caecum to ileum. It also regulates the passage of ileal contents into the caecum and prevents them from pouring too quickly. Ileum is often loaded. Ileal discharge occurs only when digestion and absorption in small intestine is completed.

As per Acharya Charaka

बस्तिः पुरीषाधानं कटिः सक्थिनी पादावस्थीनि पक्वाषयच्च वातस्थानानि, तत्रापि पक्वाषयो विषेषेण वातस्थानम् ।।

(च.सू. 20/8)

In this quotation *Charaka* has used two words i.e. *Purishadhana* and *Pakwashaya* which indicate that both are different entities and it is clear that *Purisha* does not reside in *Pakwashaya*.

It is difficult to understand the concept of *Ayurveda* in a lucid way because of its compactness. As per *Ayurveda* the *Sharira Sthana* explains about the formation of *Purusha*, its development and the structures related to *Purusha*. But the functional unit of the *Sharira* has also been scattered in other *Sthanas* like *Sutra Sthana* etc. In those *Sthanas* they have explained about these structures with their functions. The doyens of ancient period had almost same opinion regarding the site, position and functions of the *Pakwashaya*.

With the above explanations the *Pakwashaya* is an *Ashaya* which means that it acts as a reservoir for something, and when we look into the functions of ileum which is always loaded with semi-solid chyme expelled in a very slow process. Emphasizing on these points, the concept of *Pakwashaya* will be crystal clear in the minds of the scholars. For better understanding, I thought to dwell on these points by narrating the *Pakwashaya* with ileum. In thumbnail, the functions of *Pakwashaya* are much closer to the functions of ileum where both these can be considered analogically.

The next structure is *Unduka*.

It is derived from *Kitta* of *Rakta* which has been explained as.

षोणितकिट्टप्रभव उण्डुकः ।।

(सु.षा. 4/25)

रक्तकिट्टादुन्दुकः ।।

(अ.सं.षा. 5/48)

It has been related to caecum unanimously by all the authors. Caecum is the structure which is divided from ileum by a valve known as ileo-caecal valve where the division of *Mala* takes place as per this *Kala*.

उत्तरगुदः यत्र पुरीषमवतिष्ठते, येन तु पुरीषं निष्क्रामति तदधरगुदम् ।।

(चक्रपाणि: च.षा. 7/10)

Chakrapani, the commentator of *Charaka Samhita* has explained the term as follows: *Uttar Guda* is that part where *Purisha* or faeces are collected and *Adhara Guda* is that part through which the faeces are expelled out.

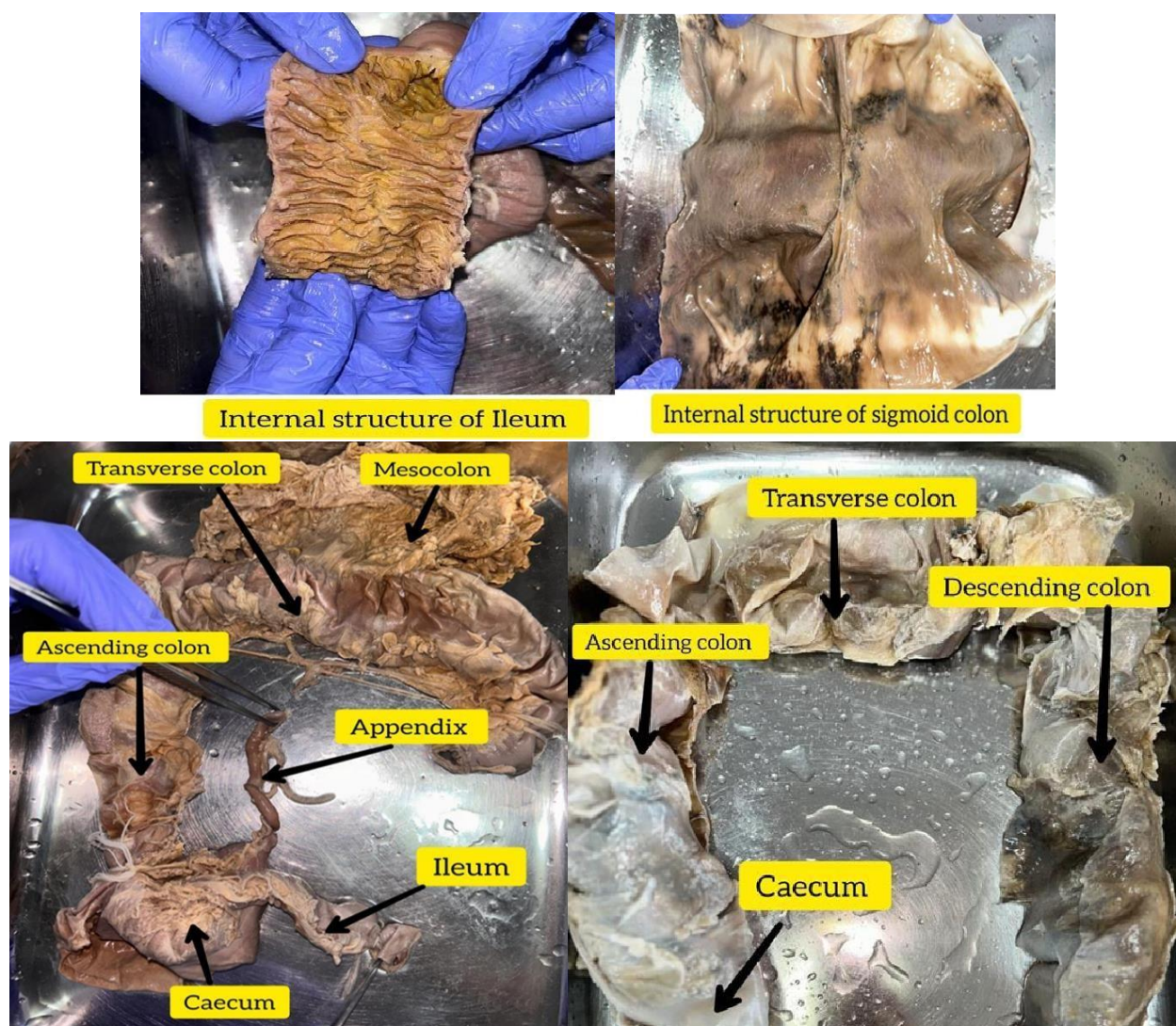
While explaining about this *Kala*, *Acharya* said that

याऽन्तः कोष्ठे मलमभिविभजते पक्वाषयस्था ।
यकृत्समन्तात् कोष्ठं च तथाऽन्त्राणि समाश्रिता ।
उण्डुकस्थं विभजते मलं मलधरा कला ॥

(सु.षा. 4/16-17)

It is present deep to the *Koshtha* that means it is definitely related to only *Koshtha* not any other part of the body, and at the *Pakwashaya* level *Mala Vibhajana* takes place. Further explaining he said that, this *Kala* is close to *Yakrit* and also lies within the *Antra*. But he has not mentioned about *Sthula Antra* or *Kshudra Antra*. In the first line he has said that at the level of *Pakwashaya*, *Mala Vibhajana* takes place. And the same function is also seen in the *Unduka* which he has explained in the last line of the *Shloka*. So, these structures may reside together in vicinity with those which separate the *Mala* in the *Koshtha*.

The wall of the large intestine contains the typical four layers found in the rest of the gastrointestinal tract- mucosa, sub-mucosa, muscularis and serosa. The mucosa consists of simple columnar epithelium, lamina propria and muscularis mucosae. The epithelium contains mostly absorptive and goblet cells. The absorptive cells function primarily in water absorption; the goblet cells secrete mucous that lubricate the passage of the colonic contents. Both of the cells are located in the crypts of Lieberkuhn embedded in the mucosa.



As per the discussion, the structures mentioned in *Samhitas* can be correlated in the following ways-

Sr. No.	Structures according to <i>Ayurveda</i>	Modern Correlation
1.	<i>Pakwashaya</i>	Ileum
2.	<i>Unduka</i>	Caecum
3.	<i>Sthula Antra</i>	Large intestine
4.	<i>Kshudra Antra</i>	Small intestine
5.	<i>Uttar Guda</i>	Rectum
6.	<i>Adhar Guda</i>	Anal Canal
7.	<i>Purisha-Adhara</i>	Sigmoid Colon

CONCLUSION

The concept of *Kala* has to be considered by *Acharyas* both anatomically and physiologically. Some of the *Kalas* have been related to physiology rather than anatomy, e.g. *Pittadhara Kala*, *Purishadhara Kala*.

Kala can be considered at two levels, one is *Avyakta*, invisible to the naked eye and second is *Vyakta*, seen with naked eye. *Acharya Vriddha Vagbhata* stated that *Kalas* are *Alpatvata* i.e. subtle in nature.

However, *Acharya Sushruta* compared *Kala* with *Snayu*, *Jarayu* and *Shleshma Veshthit*. Dr. *Ghanekar* related these structures with fibrous membrane, serous membrane and mucous membrane. So, we can say that *Kala* can be considered as *Vyakta* and *Avyakta*.

As we have seen that entire body is formed by four main tissues namely epithelial tissue, connective tissue, muscle tissue and nervous tissue which are developed from the three germ layers i.e. ectoderm, endoderm and mesoderm. Every system within the body is intricately connected to the four primary types of tissues, which encompass all known biological materials in existence.

Even the *Kalas* of our body have to be interconnected with modern perspective within four tissues itself. But it is very difficult to say exactly this one can be related to this only. So, it is not practically feasible to assert that any single layer can encompasses all aspects of the *Kala*. There are primarily two types of membranes: epithelial and connective tissue. Some principles might relate to epithelial membranes while others might relate to connective tissue membranes and occasionally, they may overlap.

Based on literary review, factual analysis and our discussion, the following conclusions have been formulated.

1. *Pakwashaya* is an *Ashaya* which means that it acts as a reservoir for something, and can be correlated with ileum because ileum is always loaded with semi-solid chime expelled in a very slow process. The functions of *Pakwashaya* are much closer to the functions of ileum where both of these can be considered analogically.
2. ***Undukashtham Vibhajate Malam*** – The digestion of food consumed through the mouth as well as absorption of *Satmya Bhaga* take place in the *Kshudra Antra*. As long as the *Satmya Bhaga* and *Mala Bhaga* remain together then we cannot call this content as *Mala*. In the end part of small intestine i.e. ileum almost all *Satmya Bhaga* is absorbed and only *Mala* and *Jala* part come in the large intestine through caecum. In such condition large intestine absorbs the water present in the *Mala Bhaga*. If the faeces reach the anus in a reasonable time from the beginning of large intestine, then eighty percent of water gets

absorbed forming a semi-solid consistency. In short, the residue i.e. *Kitta Bhaga* after the absorption of *Satmya Bhaga* reaches *Unduka* is separated from water and this process is done by the mucous membrane of colon.

3. Most of the absorption in the large intestine occurs in the proximal one half of the colon, giving this portion the name **absorbing colon** whereas the distal colon functions principally for faeces storage until a propitious time for faeces excretion and is therefore called the **storage colon**.
4. **Absorbing colon** includes caecum, ascending colon and maximum part of transverse colon.
5. **Storage Colon** includes some part of transverse colon, descending colon and sigmoid or pelvic colon.
6. **According to Hurst-** Sigmoid colon is the faecal reservoir. Distension of rectum causes desire to defaecate.
7. **According to Paterson-** Upper part (related to peritoneum)- acts as a faecal reservoir.

Lower part (devoid of peritoneum)- It is empty in normal conditions. Its distension causes desire to defaecate.

So, from above points we can conclude that *Purishadhara Kala* is mucous membrane of **Ileum, Colon and Upper part of rectum (i.e. part related to peritoneum)**. We cannot include lower part of rectum and anal canal because according to various authors rectum is usually empty. When a mass of faeces causes distension of rectum, it creates a desire to defaecate.

The wall of large intestine contains the typical four layers found in the rest of the GIT; mucosa, submucosa, muscularis and serosa. The mucosa consists of simple columnar epithelium, lamina propria and muscularis mucosae. The epithelium contains mainly absorptive and goblet cells. The absorptive cells function mainly in water absorption; the goblet cells secrete mucous that lubricate the passage of the colonic contents.

In conclusion, the findings of this article not only deepen our understanding of *Purishadhara Kala* in both *Ayurvedic* and modern point of view, but also pave the way for further

exploration and application in relevant field.

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