



# Title- Conceptual study of Shleshmadhara kala w.r.t ligament of joints

Dr. Pooja G. Kohar, Dr. Vidya B. Dole

Assistant Professor, Rachana Sharir

Dr. Rajendra Gode Ayurved College, Hospital and Research Center, Amravati,  
Maharashtra

, Gov. Ayurved College, Hospital, Nanded, Maharashtra

## Abstract

Background - Ayurved is an ancient medical science explained by different acharya in their Samhita. Out of them acharya sushruta had explained concept of kala sharir. Kala is anatomical structure mention in their *sharirsthan* which are seven in number<sup>1</sup>. Anatomically *kalas* are very difficult to understand performing the function of protection, secretion and absorption but acharya define them in significant manner. *Shleshmdhara kala* is one of them located in all joint (in between two *asthi*) of the body, secrete *shleshmak kapha* and separate the two bone (*asthi*) from each other. Whereas synovial membrane present in synovial joint is one of the ligaments which lubricates the articulating surfaces by secreting synovial fluid for free motion and decrease the resistance in them. Human body consist of 3 types of joint, fibrous joint, fibro cartilaginous joint and synovial joint which has fibrous, fibro cartilaginous and capsular ligament (synovial membrane) respectively<sup>2</sup>. Both structures (*shleshmadhara kala* and ligaments) have similar anatomical position and functional activity. So by studying ligaments one can easily understand *shleshmadhra kala* explained by acharya sushruta. Also one can easily understand anatomical changes in *shleshmadhara kala* which turns into pathological conditions.

**Keywords** – *kala, kala sharir, Shleshmdhara kala, Synovial membrane, ligaments.*

**Aim** – To study *shleshmadhara kala* w.r.t. ligaments of joint.

**Objective**- 1) To study *shleshmadhara kala*

2) To study types of joint and their ligaments

3) Corelation between *shleshmadhara kala* and ligaments.

## Introduction

*Kala sharir* is an important part of Rachana sharir. *Kala* means layer or membrane. There are many layers in our body which envelops over the organs or tissue to support and protect them. *Kala* is defined as separator between *dhatu* and its *ashaya*. They are principally of 7 types<sup>3</sup>.

By definition it is clear that the *kalas* are the layers or membrane present at the junction of the *dhatu* and their *ashayas*.

## Definition of *kala* –

*Kala* is a limiting membrane which is present inside the *dhatu* and *ashaya*. That means *kala* makes limitations between *dhatu* and *ashaya* and separates them<sup>3</sup>. They also produce and retain *dhatu* they can be understood by their functions in the body.

The body is covered by skin externally, in the same way the structures present inside the body like *ashaya*, *koshthanga*, *sira*, *dhamani*, *pesh* are also covered by thin membrane called *kala*.

## Formation

At the time of fetal development, *kleda* present between the *dhatu* and its *ashaya* becomes *pakva* due to *ushma*(heat) of that particular *dhatu* and gets covered with *snayu*, *shleshma* and *jarayu*. The *dhatu sara* (essence of *dhatu*) thus formed is of very small quantity and is the remaining part after the formation of *dhatu*. Because of its small quantity it is called *kala* and it is very thin<sup>4,5</sup>.

## Features-

Just like pith (core part of wood) is seen when the wood is cut, similarly when the *dhatu* such as *mamsa* is cut *kala* becomes visible<sup>6</sup>. *Kala* is considered as mucous membrane or epithelium of various organs of different system in the body. The mucous membrane and epithelium line the organ internally hence it lies between the *dhatu*(tissue) from which that particular organ is formed and the *ashaya* inside the organ. It proved *Dhatvashayantara maryada*<sup>7</sup>.

## Number

According to acharya sushruta there are seven *kala* in the body<sup>3</sup>.

1. *Mamsadhara kala*
2. *Raktadhara kala*
3. *Medodhara kala*
4. *Shleshmadhara kala*
5. *Purishdhara kala*
6. *Pittadhara kala*
7. *Shrkradhara kala*

## *Shleshmadhara kala*

The fourth is *shleshmadhara kala*. It is present in all joints and supporting life functions. This *kala* retains the *shleshaka kapha*. Just like the wheel moves freely when its axle hole is lubricated with oil, similarly the joints in the body moves freely, lubricated with *shleshma*<sup>8</sup>.

It can be compared with the synovial membrane lining the synovial joint capsule internally. It secretes synovial fluid which forms a thin layer on the articular surface of the articulating bones. It reduces friction, supplies nutrition and removes waste from cartilaginous cells.

## Joints

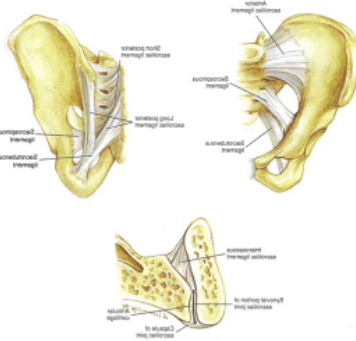
A joint also called as articulation, is any place where adjacent bone or bones and cartilage comes together to form a connection. Joints are classified both structurally and functionally. Structural classification of joints takes into whether the adjacent bones are strongly anchored to each other by fibrous connective tissue or cartilage, or whether the adjacent bones articulate with each other within a fluid-filled space called joint cavity. Functional classification described the degree of movement available between the bones, ranging from immobile, to slightly mobile, to freely moveable joints. Thus immobile or slightly movable joints serve to protect internal organs, gives stability to the body, and allow for limited body movement. In contrast, freely movable joints allow for much more extensive movements of the body and limbs.

### Structural classification of joints<sup>2</sup>

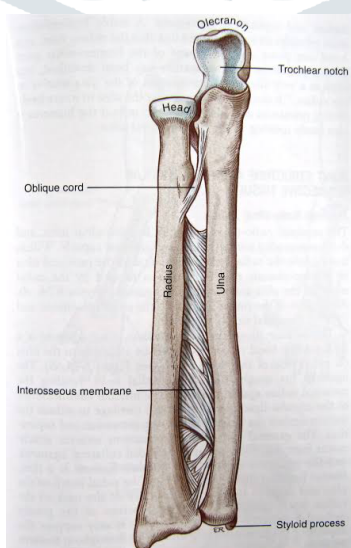
1. **Fibrous joint/ Immobile joint/ syndesmosis** - Where the adjacent bones are united by fibrous connective tissue. The immobile nature of these joints provided for a strong union between the articulating bones, which protect internal organs. The collagenous (or fibroelastic) junction between bones.

Classification-

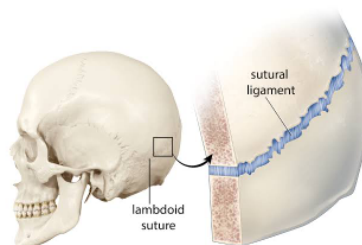
1. Interosseous ligament
2. Interosseous membrane
3. Suture
4. Gomphosis



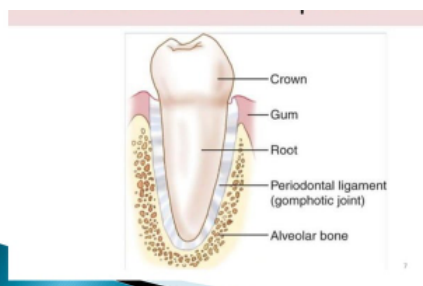
Interosseous ligament



Interosseous membrane



Sutures are limited to the skull. The margins of the bone are separated by connective tissue.

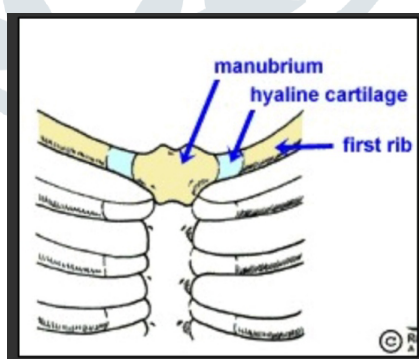


Restricted to the fixation of teeth in their alveolar sockets in the mandible and maxilla. The collagen of the periodontium connects dental cement with alveolar bone.

## 2. Cartilaginous joint/ Slightly moveable joints/ amphiarthrosis- Cartilaginous junction between bones.

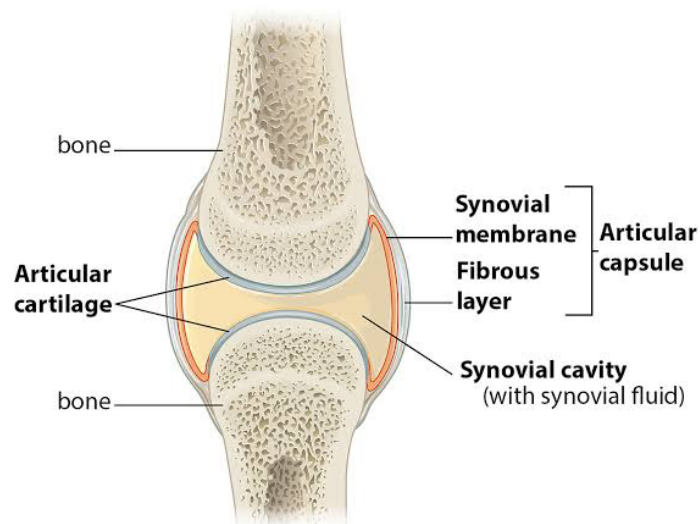
### Classification

a) Synchondrosis/ primary cartilaginous joint- where the connecting medium is hyaline cartilage. Eg- first sternocostal joint



b) Symphysis/ Secondary cartilaginous joint- where connecting medium is fibrocartilaginous. A symphysis is an amphiarthrosis, a slightly movable joint. Eg -pubic symphysis, vertebrae

3. **Synovial joints/ Freely moveable joint/ diarthrosis** – A synovial joint is characterised by presence of fluid-filled joint cavity contained within a fibrous capsule. Bones are attached with each other with the help of synovial membrane which secrete synovial fluid, provide majority of movements, mostly found in appendicular skeleton. eg- hip joint, shoulder joint, knee joint etc.



## Observation

- 1) From above literary study we saw that *shleshmadhara kala* which present in between all joints and create differentiation in two structures. Just like the wheel moves freely when its axle hole is lubricated with oil.
- 2) According to modern anatomy body consist of fibrous, fibrocartilaginous and synovial joints which are bound to each other by ligaments.
- 3) Bones connected with fibrous cartilage don't perform any movement but it separates surfaces the two bones.
- 4) Bones are connected by fibrocartilaginous structure perform slight movement.
- 5) Synovial membrane is very thin membrane lined inside the capsular ligament of joint, secretes synovial fluid by the epithelial cells present on them, which lubricate the joint for free motion.

## Result

Hence from above study we can say that out of seven *kala*, *shleshmadhara kala* is present in all joints in body and all joints also consist of similar structure anatomically and performing similar physiological function. So we definitely study *shleshmadhara kala* with the help of studying ligaments and one can co-relate these two structures with each other.

## Conclusion

We conclude that *shleshmadhara kala* explained by ayurvedic classical text can be compared not only with synovial membrane<sup>12</sup> but also with ligaments of joint anatomically, that is '*Sarvsandhushu*'.

## References

- 1) Sushrut samhita vol 2, sharirsthan , chapter 5/6, page no 70,  
Acharya Priyavat Sharma, Chaukhambha Surbharati Prakashan, Varanasi 2015.
- 2) BD Chaurasia's, Handbook of general anatomy 7th edition edited by Krishna Garg , chapter 3, page no - 85 ,CBS Publishers and distributors pvt Lit.
- 3) Sushrut samhita vol 2, sharirsthan , chapter 4/5, page no 48,  
Acharya Priyavat Sharma, Chaukhambha Surbharati Prakashan, Varanasi 2015.
- 4) Asthang Sangraha by Dr. Jyotirmitra Acharya, Sharirsthana chapter 5/32, Chaukhamba Sanskrit series, Varanasi.
- 5) Asthang Hriday / Sartha Vagbhat by Dr. Ganesh krishan Garde, Sharirsthan chapter 3/9, Rajesh Prakashan.
- 6) Sushrut samhita vol 2, sharirsthan , chapter 4/6, page no 48,  
Acharya Priyavat Sharma, Chaukhambha Surbharati Prakashan, Varanasi 2015.
- 7) Sushrut samhita vol 2, sharirsthan , chapter 4/7, page no 48,  
Acharya Priyavat Sharma, Chaukhambha Surbharati Prakashan, Varanasi 2015.
- 8) Sushrut samhita vol 2, sharirsthan , chapter 4/14,15, page no 49,  
Acharya Priyavat Sharma, Chaukhambha Surbharati Prakashan, Varanasi 2015.
- 9) Textbook of Comprehensive Rachana Sharir by Dr. Rajiv Saxena Vol 1, Chapter 14, kala sharir page no 255, Chaukhamba orientelia, Varanasi.
- 10) Article ANATOMICAL ASPECT OF KALA from JETIR may 2023, vol 10, issue 5.
- 11) Article Understanding the Concept of Kala in Ayurveda : A Review Of Anatomy And Physiology from 2023 IJRTI volume 8, issue 6.
- 12) Article CONCEPTUAL STUDY OF SHLESHMADHARA KALA WITH CO- RELATION TO SYNOVIAL MEMBRANE from wjpmr, 2023, 9(7), 64-66.