

## A CONCEPTUAL STUDY OF SNAYU W.S.R. TO ANKLE SPRAIN (GULPHA)

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## ABSTRACT

In Ayurveda, the role of Acharya Sushruta is very important. Acharya Sushruta was not only one of the earliest pioneers of surgery in the world but also one among the earliest to study the human body. Acharya Sushruta was the first in the field of Ayurveda who has defined the clinical importance of structural components of the body like *Asthi* (Bones), *Jala* (plexus), *Kurcha* (brush like structure), *Sira* (vein), *Dhamni* (artery), *Snayu*, etc. *Snayu* is one of the important anatomical structures in the human body which is strong and holds all the joints for the purposeful function. Similar to *Snayu*, in modern anatomy, ligaments and tendons are described as human structures which are attached bone to bone and muscle to bone respectively. All the joints are bound together by *Snayu*. According to shape and location the *Snayu* are of four types: *Pratanvati*, *Vritta*, *Sushira* & *Prithula*. *Snayu* are very much similar to ligaments, so excessive stretching, tearing or injury to ligaments causes severe pain. Ligament injuries are the most common amongst the athletes or sports person. Common ligament injuries are to the knee, ankle, wrist, thumb, neck or back ligament with ankle injury being the most common occurring injury.

**Keywords:** *Snayu*, Ligaments, Injuries.

## INTRODUCTION

Sharir Rachana is one of the basic subjects for the principles of Ayurveda. Acharya Sushruta in *Sharirsthan* has described the anatomical position of various structures, *Snayu* being one among them. The strength of the body depends upon *Snayu*, *Asthi*, *Mamsa*, etc. *Snayu* is an important structure which binds the *Mamsa* (muscle) and *Asthi* (bone) in the body thereby helping in weight bearing. In Ayurveda literature, *Snayu* has been also considered as *Vatavahanaadi*. It may be the reason that injury to this structure leads to severe pain when compared to any other structure in the body. The reason for it can be considered as pain is merely due to vitiation of *Vata* and without *Vata* there is no pain. *Sandhi* (joint) is important for locomotion and other vital functions. The strength of the joint depends upon *Snayu*, *Asthi* (bone) and *Mamsa* (muscles). *Snayu* maintains the stability of joints during movement of the body. Any traumatic injury to the joint causes severe pain, swelling, sprain and improper movement of the joint. Sprain is commonly caused by excessive stretching of ligaments and is classified into first, second and third grade respectively. The most common type of foot and ankle injury is ankle sprain.

**Vyutpatti:** The word *Snayu* is formed from the word root (Dhatu) 'Sna'. 'Sna' Dhatu when combined with 'un' and 'yuk' *Pratayaya* forms the word *Snayu*.

### Historical Review:

Acharya Charak has enumerated *Snayu* as *Jangam Dravya* along with the other *Dravya* like *Madhu*, *Goras*, *Vasa*, *Majja*, *Rakta*, *Mansa*, *Mala*, *Mutra*, *Tvak*, *Asthi*, *Horns*, *Nails*, *Hair*, *Roam* and *GoroChan*. Acharya Sushruta has described *Snayu* as a suturing material for the *Vrana* in 25th chapter of *Sutrasthana* in Sushruta Samhita.

Acharya Dalhana has stated that *Mahasnayu* is *Kandara*. According to Acharya Dalhana, the *Snayu* resembles the shape of *Shanakar* refers to a group of fibers used for making a cord. It also implies for making string of the bow. Acharya Sharangdhar stated that *Snayu* are the binding material used for binding *Mamsa*, *Asthi* and *Meda*. Acharya Chakrapani has given a brief description about *Snayu*, *Sira* etc. as binding structure in the body. In *Parishadya Shabdārtha*

*Shariram*, the term *Snayu* is explained in detail and in a more scientific way. In Pratyaksha Shariram, Acharya Gannath Sen has described *Snayu* as a dense bunch of *Shana* (also referred as cord fibers) meant to bind the *Sandhi*.

According to Kashyap Samhita, *Snayu* is termed as *Mastulunga Moola* whereas in Sushruta Samhita, *Mastulunga* has been explained as a type of *Medas*.

### Utpatti Of Snayu:

Acharya Sushruta in the 4<sup>th</sup> chapter "Garbha Vyakaran Sharir" of Sharir Sthana in Sushruta Samhita has described that the formation of *Snayu* in foetus is the result of the *Khara paka of meda dhatu by pitta (Tejas)*.

### Snayu Sankhya:

According to Acharya Sushruta, in the 5th chapter of Sharir Sthana in Sushruta Samhita, the total no. of *Snayu* are 900 in number out of which 600 in *Shakha*, 230 in *Koshtha* and 70 in upper part of *Jatru*. According to Ashtang Sangraha, there are 900 *Snayu* in human body. Acharya Charak has also described that *Snayu* are 900 in number.

### Snayu Bheda (Types of Snayu):

- i) **Pratanvati:** are branched and tendril like structure. These are present in all the *Shakha* (extremities) and the *Sandhi* (joints) of the body.
- ii) **Vritta:** These are rounded or cylindrical in shape. According to Dr. Bhaskar Govind, Ghanekar *Vritta* is considered as *Kandara* which is also present in extremities and in all the joints of limbs.
- iii) **Sushira Snayu:** is found in *Amashaya* (stomach), *Pakwashaya* (large intestine) and *Vasti* (urinary bladder) and are porous like structure.
- iv) **Prithul Snayu:** are thick or flattened and sheet like structure in shape. It is present in *Parsva* (flanks), *Uras* (chest), *Prishtha* (back) and *Shir* (head) of the body.

### Importance of Snayu

- Acharya Sushruta has also described the importance of *Snayu* that injury to the bones, muscles, veins nor joints does not kill the person whereas injury to *Snayu* can be a lethal one and can kill a person.

- A boat consisting of planks becomes capable of carrying load of passengers in river only when it is tied properly with bundle of ropes. Similarly, when all joints in the body are tied with many ligaments then only the person's body is capable of bearing load.

**Snayu Marma:** Acharya Charak has concised Marma only from the medical point of view while Acharya Sushruta who belonged to school of surgeons, elaborated information about every Marma in the body as available in Sushruta Samhita. There is a total of 107 Marma in the body. These Marma are Panchatmaka (five types) e.g. - Mamsa Marma, Sira Marma, Snayu Marma, Asthi Marma, Sandhi Marma in which Snayu Marma are 27 in number. These are 4 Aani, 2 Vitapa, 2 Kakshadhara, 4 Kurcha, 4 Kurcha Sira, 1 Vasti, 4 Kshipra, 2 Amsa, 2 Vidhura, and 2 Utkshepa. Snayu Marma are the specific vital points where Snayu predominance occurs.

**Ayurveda view of Gulpha:** In Ayurveda the ankle is called Gulpha which is derived from "gal" dhatu (root) "Fuk" prateya (affix). Gulpha is that part of the body where the foot is connected to the leg. According to Dr. Ghanekar Gulpha is ankle joint.

Gulpha Marma is situated at the junction of Pada (foot) and Jangha (leg). Gulpha Marma is Shakhagata Marma. It is 2 in number one in each lower limb. Acharya's have explained its dimension as 2 Angula. Trauma to this Gulpha Marma causes pain, restricted movement and limping.

**Ankle Sprain:** Snayu may be ligament, tendon, aponeurosis or sphincter muscles but ligaments are appropriate structure for the term Snayu depending on the shape and function. Snayu, which are present in Shaka (limbs) and all Sandhi (joints) of the body are termed as ligament. Ligaments are fibrous band connecting the adjacent bones and forms on integral part of the joints. Ligament injury in ankle joint is termed as ankle sprain and is also known as twist ankle or rolled ankle. It is one among the most common occurring injury to sportsperson, athletes, laborers, etc.

**Relevant anatomy of Ankle Joint:** The ankle complex includes three joints.

- I) Talocrural (ankle joint):** It is synovial hinge joint between Tibia, Fibula and Talus inferior tibiofibular joint and unites tibia and fibula into mortise.
- ii) Subtalar Joint:** Synovial joint between talus and calcaneus is divided into anterior and posterior articulations which are separated by the sinus tarsi.
- iii) Inferior Tibiofibular Joint:** Distal parts of the fibula and tibia articulate to form fibrous inferior tibiofibular joint (tibiofibular syndesmosis).

#### **Anatomy Review of Ligaments:**

There are three sets of ligaments to stabilize ankle complex:

- Lateral collateral ligament.
  - Medial collateral ligament.
  - Distal tibiofibular syndesmotomic complex.
- 1. Lateral Collateral ligament:** It stabilizes ankle against inversion:
    - a) Anterior Talofibular ligament (ATFL).
    - b) Calcaneofibular ligament (CFL).
    - c) Posterior Talofibular ligament (PTFL).
    - d) Lateral Talocalcaneal ligament (LTCL).
  - 2. Medial Collateral ligament:** it is also called deltoid ligament and is the strongest ankle ligament.
  - 3. Tibiofibular syndesmotomic ligaments:** it maintains the width of ankle mortise and stabilizes against eversion.

#### **Classification of Ankle Sprain**

- 1. Low ankle sprain:** It is called lateral ankle sprain (classic sprain) 80 to 85% in which most common mechanism of ankle injury is inversion of the planter flexed foot. The anterior talofibular ligament is the first or only ligament to be injured in most ankle sprains.
- 2. High ankle sprain:** It is also called syndesmotomic sprain. There generally tends to be less swelling with a high ankle sprain, however, there tends to be pain that's more severe and long lasting. It is more likely to result in recurrent sprain.

**Grading for Ankle Sprain:** Ankle sprain has been classified into 3 grades:

- 1. Grade one:** It results from mild stretching of a ligament with microscopic tears. Patients have mild swelling and tenderness. The patient can bear weight.

**2. Grade two:** Is more severely injury involving an incomplete tear of an ankle ligament. Patients have moderate pain, swelling, tenderness and ecchymosis.

**3. Grade three:** Involves complete tear of ankle ligament. Patients have severe pain and tenderness in ankle. Patients are unable to bear weight.

It is estimated that 80% to 85% of ankle sprains/tear occur to the lateral ligament.

## DISCUSSION

Acharya Sushruta has classified the *Snayu* into four types: *Pratanvati*, *Vritta*, *Sushira* and *Prithul*. According to Acharya Ghanekar, *Pratanvati Snayu* are ligaments and *Vritta* are tendons. *Sushira Snayu* are found in hollow organs while *Prithul Snayu* are flattened in shape and called aponeurosis are found inside, chest, head and back. Acharya Sushruta has said that *Pratanvati Snayu* is found in *Shakhas* and all the joints of the body. Dr. Ghanekar and Damodar Sharma Gaur have stated that *Pratanvati Snayu* which is considered as ligament, provides the articulating sites. They firmly hold the articulating ends of the bones together and facilitate the joints to be more movable in various directions.

During the etymological review, we came across a few instances that *Snayu* is a structure which binds the *Anga Pratyanga Sandhi* (joints). Etymologically *Snayu* is considered as a structure which performs the function of holding and binding the various structures of the human body like bones, muscles and adipose tissue. According to Ayurveda *Snayu* is a “*Shan*” (fibrous) like structure. Ligaments, tendons, Aponeurosis, fascia and other fibrous structures in the body fits into above description. A review of contemporary science reveals that *Mamsa* (muscle) are bound to the bones by ligaments and tendons. Bones are bind together at each joint by ligaments. In general, the function of fibrous structure in a human body is to bind the body structures intact to have the ability to move bearing its own weight as well as bearing the extra weight. It should be a very strong structure so that it holds the bones and muscles together. It must be present around the joints as bones are held together, so the term *Snayu* literally means to bind. It is also explained as ligaments attach the bones

at either ends. Ligaments and tendons are quite similar but differ in the way they are attached. Ligaments attach bone to bone and tendons attach bone to muscle.

In Ayurveda literature *Snayu* is defined as *Vatavaha Nadi* also and *Vata* is responsible for any type of pain in the body. It may be the reason why injury to *Snayu* leads to severe pain compared to any other structure in the body. *Pranavayu* which is in *Murdha* (head) may be travelling through *Snayu* throughout the body.

Anatomically *Pratanvati Snayu* is like the ligaments which are fibrous thread like structure are present in joints and connects the adjacent bones. Ligament is the strong fibrous band which connects bones especially at joints. Ligament injury called sprain occurs when ligament is stretched beyond its normal limit. Symptoms of sprain are same as the symptoms of vitiated *Snayugata Vata* specially *Pratanvati Snayugat Vata* like stiffness, severe pain, restricted movement and sprain. Ankle sprain is the most common sprain. Sprain is classified according to its severity. It is classified into three grades e.g. first grade, second grade and third grade.

## CONCLUSION

*Snayu* is considered as a binding structure which performs the function of holding and binding of various structures like bones, muscles, and adipose tissue. *Snayu* may be ligaments, tendons and aponeurosis or sphincter muscles. Ligament connects bone to bone and tendons connect bone to muscle. *Sushir Snayu* is ring like structure and is present in hollow organs called sphincters. *Prithul Snayu* is flattened in structure and is correlated with aponeurosis connecting muscles to bones. But as per the ancient literature, *Snayu* on the basis of function and structure, are more appropriate and closer to the ligament which is defined as *Sineu* or thread (fibrous) like structure.

*Snayu* is also defined as *Vatavaha Nadi* in ancient literature, so any injury in *Snayu* is very painful and unbearable because any type of pain is the nature of *Vata*. Ankle injury which is most common ligament injury also called ankle sprain can be prevented by maintaining regular physical fitness or conditioning programs like stretching and strengthening exercise or activity. So, it is very important for the physicians, doctors and

surgeons to have a complete understanding about the knowledge of *Snayu*.

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