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CRITICAL ANALYSIS OF ANATOMICAL TERMINOLOGIES IN ASSOCIATION WITH SNAYU SHARIR

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ABSTRACT

In Ayurveda, *sarira* has given prime importance, and complete knowledge about *sharir* at all times very much essential for the physician to provide a healthy life for mankind. But lots of terms are still remained to get an exact correlation due to lack of informations. Various anatomical terms are beautifully mentioned in ayurveda classical textbooks, but their anatomical identification needs more clarification for a better understanding of the concept of each term. Information's too limited regarding their surgical, physiological, and pathological aspect, *snayu* is one of the most complicated controversial structures among them, Aims and objective of this study are to compare many of the anatomical structures which help for binding *mamsa asthi* and *meda* with types of *snayu* based on important sloka which were given by *Maharshi* Sarangadhara. *snayu* is the structure that helps to bind the *mamsa asthi* and *medha* so *snayu* can be correlated with tendon, ligaments, aponeurosis peritoneal ligaments, different

fascia, meniscus, retinaculum, the serous membrane of various organs, capsular ligaments, and interosseous membrane.

Keywords: *Pratanavati*, *vrutta*, *Pruthula*, *Sushira*, Tendon, Ligaments, Aponeurosis, Retinaculum, Capsularligaments, Interosseous membrane Peritoneum, Serous membrane, Fascia, Fibrocartilaginous structure.

INTRODUCTION

The human body is housed within a building made up of bony Skelton articulated with ligaments and covered with the tendon, muscle, and skin. This structure is similar to a house built of wood and leaf, tied with rope, and covered with mud. In ayurveda literature *snayu* term has been used in many senses as binding two structures together, so there has been a difference of opinion among the authorities of ayurveda .function, location, and characteristics of *snayu* in the body as described by susruta and other authorities of ayurveda, there appears to be a great resemblance with most of the anatomical terminologies, one who knows the detailed anatomy of superficial and deep *snayu* is able to extract the deeply penetrated the foreign body successfully it proves most of the structures of the body is made by *snayu*, with the help of *pramana* like *pratyaksha*, *anumana* and *Upama* can correlate lots of terminologies with *snayu*, identification of a structure or exact correlation of any of the structure is necessary for knowing the treatment of any diseases.

AIMS AND OBJECTIVE

Aim-critical study on anatomical terminology in association with *snayu sharir.*

Objectives-To collect the literature regarding the *snayu sharir* and anatomical terminologies similar to the morphology of *snayu sharir.*

To compare each type of *snayu* with anatomical terminologies which are similar to the morphology of *snayu sharir.*

LITERARY REVIEW OF SNAYU

***Vyutpatti* of *snayu*-**The word *snayu* is derived from the root *'sna'* means to bind the *anga pratyanga*[1]

Uthpathi* of *snayu*-Acharya susruta* said that both *sira* and *snayu* are derived from *the Sneha* part of *meda*, but its *paaka* is different as *sira* is soft, while the same is hard for *snayu*[2] its waste is *sweda*[3]

The appearance of *snayu*-Dalhana said that *snayu* shana[4] *aakaar*, is used to tie a bow and it belongs to the *upadhatu* category[5], the term *snayu* is used in snayu *arma*[6]

Acharya susruta said that some of the *snayu* are hairy[7] thin network appearance and minute so its difficulty to locate with naked eyes, mahatya *snayu* is known as *kandara*[8], while explaining the function of *asthi acharya* susruta said that *mamsa sira* and *snayu* are depended and tied on to *asthi* hence they don't fall and degenerate[9]

Paribhasha* of *snayu*-Acharya* Sarangadhara said that snayu as a structure that supports the body by binding *mamsa asthi* and *medha*[10].chakrapani said that *snayu* is a binding structure and it is derived from the essence of food[11], snayu is *moola sthana* of *mastulunga*[12], *mastulunga* is considered as a type of *medas* in susruta samhita[13]

Importance of *snayu*-the surgeon who has thorough knowledge about the *snayu* is able to remove any deep-seated foreign body without any difficulty[14]

Injury of the *snayu* is more harmful and causes more disability than the injury to any of the *mamsa*, *asthi*, *sira* and *sandhi*[15]

***Snayu karya*-**as the flanks of a boat are tightly bound by a rope, so that can float and carry the weights on the water without any danger. Like that joints of the body are well articulated by the *snayu* and able to move and bear the weight of the body[16]

Snayu bheda* and *Sankya*-Acharya* susruta said that *snayu* are 4 [17], that are *prathanavati, vrutta, pruthula*, and *sushira*,900 *snayu*[18] in all over the body distributed as 600 in *shakha madya sarir* 230 and *greevopari* it is 70

Acharya susruta said that kala is *snayu pratichhanna*[19], *basthi* is supported by *snayu* and *sira*[2]

Classification of connective tissue[21]-connective and supporting tissue differ considerably in appearance, consistency, and composition in different regions. these differences reflect local functional requirements and are related to the predominance of cell type; the concentration, arrangement, and type of fibres. it is classified into an irregular, regular type according to the degree of orientation of its fibrous components.

Irregular connective tissue is further divided into losing, dense, and adipose connective tissue

The function of losing connective tissue is to bind the structure together, it connects the muscles, vessels, and nerves with surrounding structures, it presents in the interior of the organ eg, the choroid and sclera of the eyes.

Adipose tissue-A few adipocytes occur in lose connective tissue in most parts of the body, they are embedded in a vascular loose connective tissue, it is particularly found in subcutaneous tissue, in the mesenteries, and omenta, retro-orbital fat.

Regular connective tissue-it is highly fibrous tissue in which fibres are regularly orientated, either to form sheets such as fascia and aponeuroses or thicker bundles such as tendons and ligaments. The direction of the fibres within this structure is related to the stresses that they undergo.

Dense irregular connective tissue is found in the region that is under considerable mechanical stress and where protection is given to the unsheathed organs eg, the superficial connective tissue of muscle and nerves, capsule of various organs.

Aponeurosis-it is a type of deep fascia, sheet-like elastic tendon, it is made up of white fibrous tissue mainly attached with broad muscle, their primary function is to join muscle and body parts whether the bone or muscle, histologically features are similar with tendon as it is shiny whitish silver in colour sparingly supplied with blood vessels and nerves, aponeurosis look quite different than a tendon. an aponeurosis is made up of layers of delicate thin sheath tendons, in contrast, are tough and rope-like, aponeurosis is made up of a primary bundle of collagen fibres distributed in a regular parallel pattern.

Superficial and deep fascia-superficial fascia is a fibrous mesh containing fat and connects the dermis to the underlying sheet of the deep fascia. it is particularly dense in the scalp, back of the neck palm of the hand, and sole of the feet and binds the skin firmly to the deep fascia.in other part of the body, it is loose and elastic and allows the skin to move freely, thickness of superficial fascia is varying with the amount of fat in it. deep fascia is closely connected with underlying muscles.

Retinaculum-it is the thickened band of connective tissue that passes over or under tendon to keep them in place, it is not a part of the muscle, its name is depending upon the tendon of which types of muscle are it binding as flexor and extensor retinaculum

Tendon -histologically tendon consists of dense regular connective tissue with densely packed collagen fibres, the collagen fibres are parallel to each other and organized into fascicles. A Group of fascicles is bounded by dense irregular connective tissue; it helps to connect the bone to muscle or other structure tendon serve to move the structure

Ligaments-microstructure and biology of the ligaments are similar to the tendon, however, two major differences between tendon and ligaments are one related to gross structure and the other to composition .ligaments tense to have fibre orientated in a rage of directions because they resist the separation of bones in more than one direction, whereas collagen fibres in a tendon must align with the tension in the adjacent muscle, capsular ligaments, interosseous ligaments are also the types of ligaments

Serosa-it lines the external surface of an organ like the lungs heart and peritoneal cavities, the abdomen, and mesenteries that envelop them

DISCUSSION

Acharyas already mentioned that *snayu* is a structure that binds the *anga Pratyanga* or another definition as *snayu* helps for binding *mamsa asthi* and *meda, Vyutpatti* itself shows that *snayu* is a binding structure, its origin function, and appearance saying that it is a strong structure, can able to move, cover, hold and transfer the weight. one of the references from the

susruta samhita *sharir sthana* says that one who has thorough knowledge about snayu can remove deeply seated foreign body without any difficulty .this line shows that it is the binding structure present in almost parts of the body, connective tissue is the most abundant tissue found in the body .most type of connective tissue consisting of three main components like elastic collagen fibres reticular fibres, it is widely distributed throughout the body and function to bind, support and protect the body structures as *snayu*, the morphology of *snayu* is similar with types of connective tissue

Pratanavati snayu is said to be present in *shakha* and all *sandhis*, it is branching pattern so it can correlate with all the ligaments on the joints of the upper and lower extremities like intra articular and extra-articular ligaments including interosseous, capsular ligaments, meniscus because these are the structures helps to bind or connect the structures for stabilizing the joints on the extremities

Vrutta snayu-meaning of *vrutta* is round, location of *vrutta snayu* is not described by *acharyas*, so we can consider that *vrutta snayu* is present all over the body. As per the sloka *vrutta* type of *snayu* is related to *kandara* so flexor and extensor retinaculum and fascia which connected the tendon of any muscle like the iliotibial band can consider as *vrutta snayu* because these are the structures binding or connected on the respected tendon of the body, Tendon of flexor muscles are covered by the flexor retinaculum and extensor muscles tendon are covered by extensor retinaculum. The iliotibial band is connected with the tendon of the muscle of the gluteus maximus, Medius, and tensor fascia lata.

Kandara itself we can't correlate as *vrutta snayu* because *kandara* is separately mentioned in *Sankya vyakarana adhyaya*. The retinaculum is a thickened part of deep fascia on a particular part of the body.

Sushira snayu- the word *sushira* is a hole, it is said to be present on *aamasaya pakvashaya* and *basthi*.

Aamasaya is the seat of *aama anna*, where the food is stored for a certain period for digestion it may be correlated with the stomach and small intestine.

Pakwasaya is the seat of *pakwa anna*, where *mala bhibhajana* is occurring, it can be correlated with the large intestine.

Basthi is seated in the middle of *nabhi,prushta,kati*, and *Mushka* it means *vasthi* is seated on the pelvic cavity,*aamasaya* and *pakwasaya* belonging above and below the *nabhi,sushira* is a cavity so we can consider that *sushira snayu* is related with ligaments which are seated on the abdominal and pelvic cavity, the peritoneum is lining membrane of the abdominal and pelvic cavity so these ligaments are the part of the peritoneum as omentum, mesetry, mesocolon false ligaments of bladder and true ligaments as a pelvic fascia because these ligaments help to bind and support the structure tightly. sphincors of the organs are not correlated with *sushira snayu* because sphincters are made by muscle fibres only, it is separately mentioned in *pesi sharir*.

Pruthu snayu – meaning of *pruthu* is flat or broad, it is said to be present in *parswa*(flanks),*ura*(chest) *prushta*(back), and *siras*(head region) so it can correlate with the aponeurosis of anterior abdominal wall muscle because its upper part get starts from 5^{th} rib on either side upto ilial bone on lower either side with inguinal ligament on *sira* epicraneal aponeurosis and *prusta*, it is erector spine aponeurosis.

Rectus sheath aponeurosis-it is formed by the muscles of the abdomen it has an anterior and posterior wall for most of its length. the anterior wall is formed by aponeurosis of external oblique muscles and half of the internal oblique muscle. The posterior wall is formed by aponeurosis of half of the internal oblique and transverse abdominal, there is only the anterior wall of the rectus sheath no posterior sheath.

Epicraneal aponeurosis -It is a tough fibrous sheet of connective tissue that extends over the cranium for forming 3^{rd} layer of the scalp. it is a broad sheath that connects the frontal belly with the occipital belly of the occipitofrontalis muscle anteroposterior.

Erector spinae aponeurosis-it is located on the lower back, it bends with thoracolumbar fascia, thoracolumbar fascia is made up of dense connective tissue that surrounds the back muscle together with the proximal attachment on the sacrum and the spinous

process of lumbar vertebrae for the three erectors spinal muscle that are iliocostalis, longissimus, and spinalis.

CONCLUSION

This study of anatomical terminologies in association with *snayu sharir* is entirely based on literally review and observation, Here all the classical references show that *snayu* is a band-like structure that helps to bind the *mamsa asthi* and *medha* of any part of the body, so in modern anatomy, the types of connective tissue can be correlated as snayu because types of connective tissue that helps to bind the structure like tendon articular ligaments, aponeurosis, fascia, retinaculum peritoneal ligaments. Articular ligaments intra and extra including meniscus and interosseous membrane on extremities are considered as *Pratanavati snayu, vrutta snayu* is correlated with retinaculum and fascia which connected the tendon, *pruthu snayu* is correlated with the aponeurosis of various parts of the body, various ligaments on the abdominal and pelvic cavity are considered as *sushira snayu*. Anatomical understanding of each and every part of the body is very essential for proper diagnosis and treatment of *vikaras.*

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