

## AN APPROACH TO UNDERSTAND MYOLOGY IN AYURVEDA WITH IT'S CLINICAL ASPECT

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### ABSTRACT

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Myology in Ayurveda has been mentioned by various scholars in different aspect. Every aspect has its own concept and worth understanding in modern words. Among these, concept of mamsa dhatu, peshi are directly related to Myology. Apart from this Mamsadhara kala, Mamsavaha srota, Snayu, Jalak, Mamsa rajju also comes under the preview of Myology. All the structures has their own significance and importance and are stressed from morphological aspect as well as clinical aspect. Different clinical aspect of mamsa dhatu i. e. kshay, vriddhi, pradosaja vicar, Mamsavaha srota dusti and Mamsavaha srota viddha lakshanas has been tried and analysed. Kshay incorporated under different types of Muscular dystrophy. Previous works are used to define all the structures and their function.

**KEYWORDS:** Mamsadhatu, peshi, kshay, vriddhi, Muscular dystrophy.

### INTRODUCTION

Muscles in Ayurveda is understood in terms of Mamsa Dhatu, Peshi, Mamsadhara kala, Mamsavaha srota, Mamsa marma, Snayu, Jalak, Mamsa rajju, Mamsasara purusa, Mamsadhara twacha, Mamsa as derivative of matrija bhav.

Mostly these structures are related to covering of some other structures.

Mamsa dhatu mainly functions as *lepana* and is present all over the body.

Peshi covers the structures like *asthi*, *sandhi*, *sira*, *snayu* and thus functions as bala provider(balavanti).

Apart from the anatomical aspect the paper also tries to explain some clinical condition related to *kshay*, *vriddhi* and *pradosaja vikar* of *Mamsa* in the light of modern science.

Some more clinical condition related to *mamsa* mentioned in classics is also discussed.

Under Muscular dystrophy, a number of disorder simulates *Mamsa kshay*.

*Mamsapradosaja vikar* highlights gradation of vitiation of a particular dhatu. *Adhimamsa Keela*, *Galasaluk* etc. though can not be directly related but from external features point of view can be related to some extent.

Also, therapeutic aspect of disorders of *Mamsa* is mentioned as per different classics and also in specific clinical condition.

*Mamsavarga* includes *mamsa* of different animals and birds mentioned by Acharya Charak and Sushruta in relation to some specific diseases and specific sort of preparation like “*Mamsa rasa*” and “*Beshavaar*”. Prognosis of diseases associated with *Mamsa kshay* and *bala kshay* is also tried shortly which is stressed by Acharya Charak in *Indriyasthan* in a wide manner.

## AIMS AND OBJECTIVES

1. Evaluation of muscles in Ayurveda.
2. Understanding muscle disorder and it's interpretation in both Ayurvedic aspect and Modern aspect.

## MATERIALS AND METHODS

1. The concept of muscles related structures in Ayurveda is evaluated from textual references.
2. *Mamsa* understood under fundamental and clinical aspect.
3. Application of Histology and Dissection point of view is also tried.

## REVIEW AND DISCUSSION

### (A) REVIEW

Review study has been carried out under the following headings:

1. FUNDAMENTAL
2. DISSECTION
3. HISTOLOGY
4. CLINICAL
5. THERAPEUTIC

1. Fundamental: It includes the following structures which are related to *mamsa*-

(a) *Mamsa dhatu*

(b) *peshi*

- (c) Mamsadhara kala
- (d) Mamsavaha srota
- (e) Mamsa marma
- (f) Mamsasara purusha
- (g) Mamsa rajju
- (h) Mamsa as derivative of matrija bhava
- (i) Mamsadhara twacha
- (j) Snayu
- (k) Jalak

## MAMSADHATU

**Derivation:** Word *mamsa* has been derived from the root word “mans” meaning flesh.<sup>[1]</sup>

मांसम् वली, (मन्यते इति। मनज्ञाने + “मने- दीर्घश्च।”.[2]

## Origin or Utpatti

वायवम्बुतेजसा रक्तमूष्मणा चाभिसंयुतम्

स्थिरतां मांसं स्यात् रक्तोष्मणपवमेव तत् | (Ch/chi/15/29)

Rakta accompanied by *vayu*(air), *teja*(fire), *jala* (water) and *usma*(heat) attains compactness/stability(*sthirata*) and gets transformed into “*mamsadhatu*” after being acted upon by it's own dhatwagni(Charak). Acharya Sarangadhar opines that *rakta* being acted upon by its own agni when becomes *ghanibhut* by *vayu* is called *mamsa*.<sup>[3]</sup>

## Importance of Mamsadhatu

दश प्राणायतनानि; तद्यथा- मूर्धा, कण्ठः, हृदयं, नाभिः, गुदं, बस्तिः, ओजः, शुक्रं, शोणितं, मांसमिति।  
तेषु षट् पूर्वाणि मर्मसङ्ख्यातानि || (Ch/sa/7/9).

Acharya Charak mentioned special significance of “*mamsa*” in “*dashapranayatanani*”.  
*Mamsa* is one of the ten vital site of *prana*.

*Mamsa* is included in “*dashapranayatanana*” as maximum decrease of muscle tissue in a individual causes morbidity to that individual.

**Synonyms:** “*pishitatarasam mamsam palalamkravyamamisham*”<sup>[4]</sup>

1. *Pishita* 2. *Tarasa* 3. *Palala* 4. *Kravya* 5. *Amisha* are the synonyms of “*mamsa*”.

### Panchabhoutik composition of Mamsa dhatu

Though *vayu*, *jala* and *agni* mahabhuta play a major role in the formation of *mamsa* but *prithvi* mahabhuta is predominant as because “*sthiratva*” is obtained due to *prithvi*.<sup>[5]</sup>

Besides this Acharya Charak in another context also mentioned “*mamsa*” as *parthiva*.

तत्र यद्विशेषतः स्थूलं स्थिरं मूर्तिमद्गुरुस्वरक्तनिमङ्गं नखास्थिदन्तमांसचर्मवर्तकेशश्मश्रुलोमकण्डरादि तत् पार्थिवं गन्धोग्राणं च; यद्द्रवसरमन्दस्निग्धमृदुपिच्छिलं (Ch/sa/7/16).

Commentator Bhanumati also stressed on *prithvi* mahabhuta as it's main panchabhoutik composition.<sup>[6]</sup>

“*Mamsam parthivam*”.

### Time span of Mamsa formation

Acharya Sushruta mentioned time duration of *rasa dhatu* formation is 3015 *kala* and it transforms to *veerya* in male and *artava* in female in 30 days, further says *Shukradhatu* formation from *rasadhatu* is 18090 *kala*.

He also mentioned it takes five days time for transformation of one *dhatu* to other i. e. 3015 *kala*. Therefore, from this aspect time duration for formation of *Mamsa dhatu* is 6030 *kala*. (ten days).<sup>[7]</sup>

### Function of Mamsa dhatu

Among other function “*lepana*” is the specific function of *Mamsa dhatu* entrusted by Acharya Vagbhata II.

All most all scholars Acharya Sushruta, Vagbhata I,<sup>[8]</sup> Sharangadhar<sup>[9]</sup> mentioned *lepana* as function of *Mamsa*. Again Acharya Sushruta says nourishment of *sharir* and *meda dhatu* is function of *Mamsa*; “*mamsam sarirpustim medasca*”.<sup>[10]</sup> while Acharya Charak opines that person having proper quality of muscles and proper development of muscles can sustain all sorts of physical stress, their *jatharagni* is strong; gives strength to the body and stability to sense organs.<sup>[11]</sup>

### Guna of Mamsa dhatu

As *Mamsa dhatu* is *prithvi bahula* so *guna* of *prithvi* is considered as *guna* of *mamsa*.

Physical properties of *mamsa* as mentioned by Acharya Charak are *sthula*, *stira*, *guru*, *kathina*, *khara*.<sup>[12]</sup>

## Upadhatu

Vasa and twaca are upadhatu of mamsa.

रसात् स्तन्यं ततो रक्तमसृजः कण्डराः सिराः।

मांसादसा त्वचः षट् च मेदसः स्नायुसम्भवः॥(Ch/chi/15/17)

Acharya Sharangdhara mentioned only vasa as upadhatu of mamsa.<sup>[13]</sup>

## Mala of Mamsa dhatu

किदृमन्नस्य विण्मूत्रं, रसस्य तु कफोऽसृजः।

पित्तं, मांसस्य खमला, मलः स्वेदस्तु मेदसः॥(Ch/chi/15/18)

Mala of mamsa dhatu are called “kha mala”

The wastes accumulated in the hollow structures of the body such as external ears and nostrils etc. are the “kitta” of Mamsa or “kha-malas”

(a)Karna mala(ear wax), (b)Netra mala (eye discharge)

(c)Nasa mala(nasal discharge) (d)Asya mala (oral debris)

(e)Roma koopa mala (sebum) (f)Prajanan mala (external genital discharge)

## PESHI

पेशी, स्तौ, (पिश+दङ्। वा डौष्।)

Peshi is the structure originated from mamsadhatu.

The term peshi is originated from Sanskrit word “pishita” which means flesh.<sup>[14]</sup>

**Definition:** मांसावयवसङ्घातः परस्परं विभक्तः पेशी इत्युच्यते. (Dalhan, su/sa/5/38).

When component of mamsa get split into specific entity its called “peshi”.

## Utpatti/Origin

यथार्थमूष्मणा युक्तो वायुः स्रोतांसि दास्येत्॥२८॥

अनुप्रविश्य पिशितं पेशीर्विभजते तथा(Su/sa/4/28)

According to Acharya Sushruta at the time of development (embryological), vayu mahabhuta along with usma guna helps to form the srotas and also enters mamsa and splits it into structures called peshi

Pishitam anupravesya peshir vibhajyate anilau”. (Sharang/pu/5/62)

Vayu enters mamsa and splits it into structures called peshi

## Function

सिरास्नायवस्थिपर्वाणि सन्धयश्च शरीरिणाम्।

पेशीभिः संवृतान्यत्र बलवन्ति भवन्त्यतः ॥ (Su/sa/5/49)

Peshi gives strength and protection to the body by ensheathing *sira*, *snayu*, *asthi*, *parvasandhi*.

मांसपेश्यो बलाय स्युस्वष्टम्भाय देहिनाम् (sharang/pu/5/62)

Mamsapeshi gives strength and support to human body. It plays important role for the built of the body.

### Swaroop of peshi

पेश्यः पुनः स्नाय्वाकृतयो मांसमस्यः॥ ७१ (comment. Indu on A. S.)

Peshi is of different shapes and forming shape as like snayu and made of mamsa dhatu(A. Sang/sa/5/71)

पेशी दीर्घा मांसपेश्याकारा (chakrapanidutta on Ch/sa/4/10)

The peshi are lengthy and have fleshy appearance.

### Number of peshi: Male.

पञ्च पेशीशतानि भवन्ति |

तासां चत्वारि शतानि शाखासु, कोष्ठे षट्षष्टिः, ब्रीवां प्रत्यूर्ध्वं चतुस्त्रिंशत् (Su/sa/5/37)

In males there are 500 peshi in the body

1. Sakha: 400 (upper limb and lower limb)
2. Kosta: 66 (trunk, Madhya sarir)
3. Griva urdha: 34 (supraclavicular, above neck)

Female:- स्त्रीणां तु विंशतिरधिका ... (Su/sa/5/50)

In females additional 20 muscles are enumerated

1. Ten in breast(5 each)
2. Four in vaginal introitus, (apathyapath) (externally-2, internally -2)
3. Three in uterine tract, (garbhachidra)
4. Three help in entry of sperm and ovum.

According to Acharya Charak there are 400 no. of peshis.<sup>[15]</sup>

### Types

तासां बहलपेलवस्थूलाणुपृथुवृत्तह्रस्वदीर्घस्थिरमृदुश्लक्ष्णकर्कशभावाः सन्ध्यस्थिसिरास्नायुप्रच्छादका यथाप्रदेशं स्वभावत एव भवन्ति (Su/sa/5/52)

As per Sushruta, muscle types can be enlisted in the following pattern.

Bahala	Large/largest (e. g. Pectoralis major, Rhomboid major, Vastus lateralis)
Pelava	Small (e. g. Subclavius, Thenar muscle, Palmar brevis, Pyramidalis)
Anu	Thin/minute (e. g. Stapedius, Muscles of Alae nasae)
Sthula	Thick/large/big (e. g. Teres major, masseter)
Pruthu	Thin and large and expansive (e. g. Latissimus dorsi, Trapezius)
Vritta	Circular/domes shaped (e. g. Orbicularis oculi, Orbicularis oris, Diaphragm)
Hrsva	Short (e. g. Abductor pollicis brevis, Flexor digitorum brevis)
Dirgha	Long (e. g. Sartorius, Extensor digitorum longus, Extensor hallucis longus)
Sthira	Firm/compact/strong (e. g. Hamstring group of muscles, Deltoid, Coccygeus)
Mridu	Soft/delicate (e. g. Visceral muscles)
Slakshna	Smooth (e. g. Intrinsic muscles of eye, muscles rich in nerve supply)
Karkasa	Rough/hard (e. g. Lumbricals, Serratus anterior)

### MAMSADHARA KALA

Kala is the separating structure between dhatu (tissues), and its ashay (organ or viscera). They are principally of seven types. Among them the first kala is *mamsadhara kala* (which is present inside the muscles). As from stalk of lotus its root spread in the watery mud in all direction and grow constantly likewise in Mamsadhara kala network of *sira*, *dhamani*, *srota*, *snayu* resides. Acharya Sushruta also mentioned similar verse.<sup>[16, 17]</sup>

तासां प्रथमा मांसधरा नाम यस्यां मांसे सिरास्नायु

धमनीस्रोतसां भूमाविव पङ्कोदकेन बिसमृणालानां प्रतानानि भवन्ति॥ (A. S. /Sa/5/35)

To do the probable modern co-relation of Mamsadhara kala where we consider the kala as *dhatu ashay maryada*, deep fascia and its modifications like septa can be correlated as it is present in between the *dhatu* and *ashaya*.

Image of Mamsadhara kala



Fig: Suprapleural membrane.



Fig: Clavipectoral Fascia



## MAMSAVAHA SROTA

The structures through which *mana*, *prana*, *anna*, *jala*, *dosha*, *dhatu*, *upadhatu*, *dhatumala*, and *mutra* etc flows/is transported are called srotas. *Vayu* combines with proper amount of *usma* and results in Srota formation.<sup>[18]</sup>

स्वधातुसमवर्णानि वृत्तस्थूलान्यणूनि च।

ओतांसि दीर्घाण्याकृत्या प्रतानसदृशानि च (A. S/Sa/6/73)

The srotas/channels have the colour similar to that of the *dhatu* they carry. They may be tubular in shape either large or small in size and either straight or reticulate. Similar verse in Charak Samhita is mentioned.<sup>[19]</sup>

The *moola* of/root of srotas are located within cavity like structure of the body. They spread all over the body carrying nutrients to all parts and excludes *sira* and *dhamani*. (Su/sa/9/13).

**Types:** Normally classified in two types i. e. macroscopic and microscopic in relation to vision and observation. However, it can be distributed in anatomical aspect as.

*Vritta* (cylindrical), *dirgha* (comparatively larger dimension), *pratana* (reticulated). In general Srota comprehends all channels, big and small, perceptible or imperceptible.

**Synonyms:** *srotamsi* (capillary), *sira* (vein), *dhamani* (artery), *rasayani* (lymph ducts), *rasavahini* *dhamani*(capillaries), *nadi* (tubular), *pantha* ( passage), *marga* (pathway), *sarirchidra* (opening of skin), *sthana* (site), *ashaya* (receptacle), *niketa* (resort).<sup>[20]</sup>

Above terms are used for vascular drainage in maximum, also indicating pores of cell.

**Classification:** Acharya Sushruta considered it as 11 pairs while Acharya Charak counted it as 13 in no. Acharya Charak has mentioned about *artavavaha srota* also in context of *Garbha* so it is 14 in total.

*Mamsavaha srota* according to Charak is 1 in no. and *Mamsavaha srota* according to Acharya Sushruta is 2 in no.

**Moolasthana:** *snayu* and *twacha* (Ch/vi/5/7), (A. Sang/sa/6/43), *snayu*, *twacha* and *raktavahi dhamani*.<sup>[21]</sup>



The term moola indicates.

1. Source of origin(according to Chakrapani)
2. Maximum prominent part(according to Dalhan)

### MAMSA MARMA

मर्माणि मांससिरास्नाय्वस्थिसन्धिसन्निपाताः; तेषु स्वभावत एव विशेषेण प्राणास्तिष्ठन्ति; तस्मान्मर्मस्वभिहतास्तांस्तान् भावानापद्यन्ते(Su/sa/6/16)

Basically marma is the junction or meeting point of *mamsa*, *sira*, *snayu*, *asthi* and *sandhi* where *Prana* is situated by nature and hence when these marmasthana are injured they produce their respective effects. This is called the *lakshana of marma*.

Total no. of marma is 107. Structurally they are of five types which are as follows.

- 1.) *mamsa marma*, 2.) *sira marma*, 3.) *asthi marma*, 4.) *snayu marma* and 5.) *sandhi marma*. (Su. /sa/6/3).

Acharya Charak also mentioned 107 no. of marmas distributed in *saakha* and *skandha*.<sup>[22]</sup>

*Mamsa marma* are 11 in no. according to Acharya Sushruta and Vagbhata I. according to Acharya Vagbhata II is 10 in no.<sup>[23]</sup>

They are as follows.

- 1) *Talahrday* -4 2) *Indravasti*-4 3) *Stanarohita*-2 4) *Guda*- 1

Vagbhata II excluded *Guda* while rest are same.

As per Sushruta Samhita, *Talahrday*, *Indravasti*, and *Stanarohita* are considered under *Kalantara pranahara marma* and *guda* under *Sadya pranahara marma*.

### MAMSA SARA PURUSHA

शङ्खतलाटकृकाटिकाक्षिगण्डहनुब्रीवास्कन्धोदरकक्षवक्षःपाणिपादसन्धयःस्थिरगुरुभ्रुभ्रमांसोपचितामांससाराणाम् सासारताक्षमांधृतिमलौल्यं वित्तं विद्यां सुखमार्जवमारोग्यं बलमायुश्च दीर्घमावष्टे (Ch/vi/8/105).

Persons having the excellence of *mamsa* are characterised by stability, heaviness and plumpiness in the regions of *sankha pradesh* (temples), *lalaat* (forehead), *krikatika* (nape of neck), *netra* (eyes), *ganda* (cheeks), *hanu* (jaws), *greeva* (neck), *skandh* (shoulder), *udara* (abdomen), *kaksha* (axilla), *vaksha* (chest), *pani* (hands), *paada* (leg) and *sandhis* (joints) being covered by flesh. Such individuals are endowed with tolerance, patience, forgiveness, non greediness, wealth, knowledge, simplicity, happiness, health, strength and longevity.

अच्छिद्राग्रं गूढारिथसन्धिं मांसोपचितं च मांसेन (Su/su/35/18)

Individual having (well developed body) *achidragatram* and *gudasthisandhimamsaopacitam* (whose bones bony joints are concealed by well developed muscles is to be called as *mamsa sara purusha* i. e. person of excellence of *mamsa* (muscles).

### MAMSA AS DERIVATIVE OF MATRIJA BHAVA

All soft structures like *mamsa* (muscle), *rakta* (blood), *meda* (fat), *majja* (bone marrow), *hrday* (heart), *nabhi* (umbilicus), *Yakrit* (liver), *pleeha* (spleen), *antra* (intestine), *guda* (rectum) etc. are derived from the mother.<sup>[24]</sup>

### MAMSADHARA TWACHA

In relation to formation of twacha mamsadhatu forms the innermost layer called *Mamsadhara twacha* which is one among the seven layers of twacha. It is equal to 2 grains of paddy in thickness and seat of diseases like *bhagandara* (fistula in ano), *vidradhi* (abscess), and *arsha* (piles).<sup>[25, 26]</sup>

### MAMSA RAJJU

महत्यो मांसरज्जवश्चतस्रः- पृष्ठवंशमुभयतः पेशीनिबन्धनार्थं द्वे बाह्ये, आभ्यन्तरे च द्वे. (Su/sa/5/14)

*Mahati mamsa rajju* (big muscular ropes) are four in no. and meant for binding *peshi* to the bones located on both sides of the *pristha vangsha* (vertebral column)-two inside and two outside. Acharya Vagbhatt I holds same opinion.<sup>[27]</sup> Acharya Vagbhatt II and Sharangdhar also mentioned four no. of *mamsa rajju*.<sup>[28, 29]</sup>

### SNAYU

#### Definition/ Swaroop

स्नायुरिति शणाकार उपधातुविशेषः, येन धनूंषि नह्यन्ते (Dalhan. on Su/su/25/21)

Dalhana explains *snayu* as updhātu which is similar to cotton thread that can be used as bowstring.

#### Function and importance

नौर्यथा फलकास्तीर्णा बन्धनैर्बहुभिर्युता |

भारक्षमा [१] भवेदप्सु नृयुक्ता सुसमाहिता (Su/sa/5/41)

एवमेव शरीरेऽस्मिन् यावन्तः सन्धयः स्मृताः |

स्नायुभिर्बहुभिर्बद्धास्तेन भारसहा नराः (Su/sa/5/42)

All joints in human body are binded by *snayu* and thus it makes the joints strong and enable the body to endure a lot of heavy manual work.

Just as a boat built with wooden planks placed side by side, when fastened tightly by ropes become capable of carrying weights and sails swiftly in water so also the joints of our body can carry weight as long as joints are fastened by ligaments tightly in many ways.

Almost similar verse also mentioned by Vagbhata I. He lays stress on movement of joints possible due to presence of *snayu* in joints.<sup>[30]</sup>

**Types:** On the basis of shape, *snayu* is of 4 types as mentioned by Acharya Susruta.

They are: *Pratanvati snayu*, *Vritta snayu*, *Sushira snayu*, *Prithu snayu*.

### Sankhya/number of Snayu

According to Acharya Sushruta, Vagbhata I, total number of *snayu* in human body is 900.

Distribution is as follows --

Shakhas(extremities)-600

Madhya sharir(trunk)-230

Above neck - 70.

Acharya Charaka also mentioned 900 *snayu*.

### JAAL

In our body some particular places are innervated by *mamsa peshi*, *sira*, *snayu* and *asthi* forming a network like structure called *jaal*. In *manibandha* and *gulpha* i. e. wrist joint and ankle joint these are present together combined with one another and forming spaces in between.

By these four kinds of network the entire body is made *gavakshita* (having spaces spongy structure).<sup>[31]</sup>

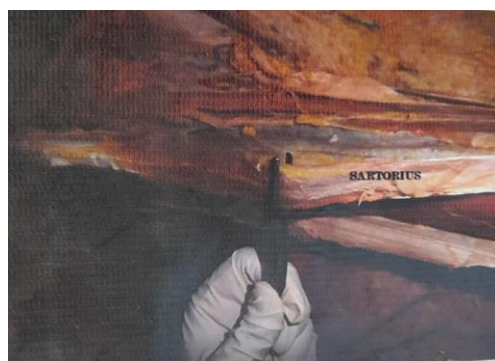
**Types and numbers:** Total 16 no., each *manibandha* (wrist joint)- 4 *jaal*, each *gulpha* (ankle joint)-4 *jaal*.<sup>[32, 33]</sup> Again *sira jaal* -4, *mamsa jaal* -4, *snayu jaal* -4, *asthi jaal* -4.

### DISSECTION

To evaluate the morphological aspect Sushruta's concept of *peshi* in relation to different types i. e. *bahala*, *pelava*, *dirgha*, *hrswa* etc. can be identifiable in cadaveric study.



**Fig. 1 Medial head of Gastrocnemius.**



**Fig. 2 Sartorius muscle.**

## HISTOLOGY

Histological aspect includes structure of muscles at cellular level and its function<sup>[34]</sup>

Myology includes study of muscular structure, function and diseases of muscles.

### Types

1. Skeletal muscle -voluntary and striated.

These are specialised tissue that is attached to bone and allows movement.

2. Smooth muscle –Involuntary and non-striated.

These are found in various internal structures like digestive tract, uterus, blood vessels etc.

3. Cardiac muscle – Striated and involuntary

These are specific to the heart.

### Cellular structure

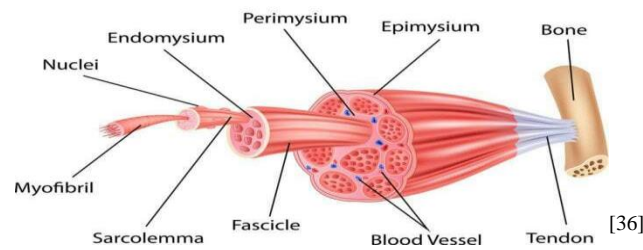
The cellular units of skeletal muscle are the muscle fibres. Many muscle fibres are grouped into bundle called FASCICULI which is again of various size and pattern. An individual muscle may consist of many fasciculi. Connective tissue sheaths encloses different muscle component.

**ENDOMYSIUM:** Spaces between muscle fibres are termed endomysium or the delicate network surrounding and infilling the spaces between muscle fibres are collectively termed endomysium.

**PERIMYSIUM:** Ensheaths individual fasciculi.

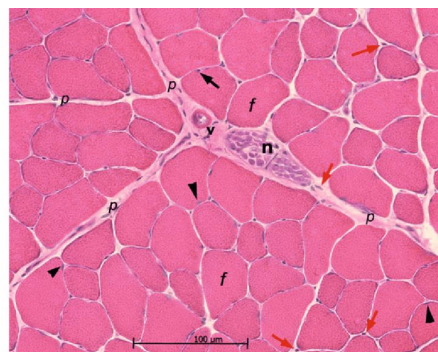
**EPIMYSIUM:** Bounds the whole muscle, continuous with the perimyseal septa within and the connective tissue external to it.<sup>[35]</sup>

### Structure of Skeletal Muscle



The cell membrane of a muscle cell is known as SARCOLEMMA.

MYOFIBRILS are structural unit of muscle cell. MYOFILAMENTS are structural units of myofibril, a thread like filament of actin or myosin (protein). Actin is thin and myosin is thick.<sup>[37]</sup>



**Figure 2:** Mammalian skeletal muscle in cross section showing portions of four fascicles surrounded by: (p)perimysium (v) a vessel (n) nerve bundle (f) individual myofibre (arrowheads) peripherally localised myonuclei (red arrows) Interstitial cells (black arrows) presumptive satellite cell.

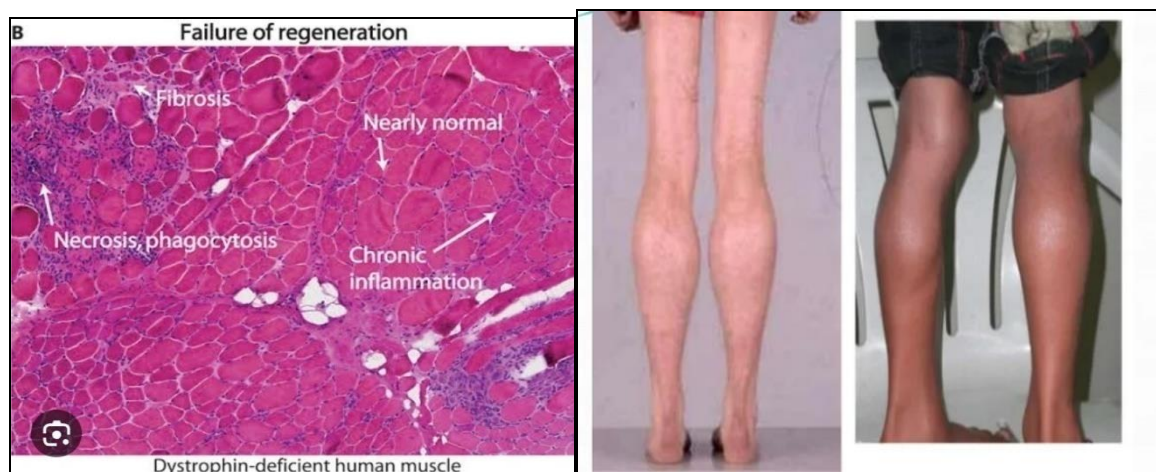


Fig-Histological changes seen in Duchene's Muscular Dystrophy. Fig- Muscular dystrophy.<sup>[38]</sup>



## CLINICAL ASPECT

The morbidity of mamsa dhatu can be understood under the following heading:

1. Kshay.
2. Vriddhi.
3. Pradosaja Vikar.
4. Mamsavaha srotodusti lakshana.
5. Mamsavaha srota moola viddha lakshana.

	Charak Samhita	Sushruta Samhita	A. Sangrah	A. Hriday
Mamsa Kshay lakshanas	Sushkata specifically in sphiga(buttocks), greeva (neck), udara(abdomen). (Ch/su/17/65)	Sushkata in region of sphiga(buttocks), ganda (cheeks), upastha (penis), uru (thigh), vaksha (chest), kaksha (axilla), pindika (calf), udara(abdomen), greeva (neck). Rauksha(dryness), toda (pricking pain), gaatranam sadanam (debility of the body), dhamani saithilyam(loss of artery tonicity)(Su/su/15/13)	Sushkata in region of sphiga (buttocks), ganda (cheeks)etc., toda (pricking pain), rauksha (dryness), akshaglaani (weakness of indriyas), sandhi sfotan(cracking sound of sandhi), dhamani saithilya (loss of tonicity of arteries). (A. S. /su/19/10)	Akshaglaani (debility of indriyas), sushkata of ganda(cheeks), sphiga (buttocks), sandhi vedana (joint pain). (A. Hr/11/
Mamsa Vriddhi lakshanas		Increase of mamsa in sphiga (buttocks), ganda (cheeks), osth (lips), upastha(penis), uru (thigh), bahu (hands), jangha (waist), gurugatrataam(heaviness of body). (Su/su/15/13)	Galaganda (goitre), gandamala (lymphadenitis), arbuda (tumour), granthi (swelling), taluroga (disorders in palate), jihwaroga (tongue diseases), kantha roga (disease of throat), more heaviness of sphiga (buttocks), ganda (cheeks), osth (lips), bahu (hands), udara(abdomen) uru (thighs). kapha rakta janya roga (diseases related to kapha rakta)seen commonly. (A. S. /su/19/7)	Galaganda (goitre), gandamala (lymphadenitis), arbuda(tumour), vriddhi of ganda (cheeks), uru (thighs), udara (abdomen). kanthadiswa adhimamsa. (A. Hr/Su/ 11/10a-10b)
Mamsa pradoshaj a vikar	Adhimamsa (excess growth of muscle), arbuda (tumour), keela (piles), galashaluk (uvulitis), galasundi (tonsillitis), putimamsa	Adhimamsa, (excess growth of muscle), arbuda(tumour), arsha (piles), adhijihwa (tongue swelling), upajihwa (cystic swelling in tongue), upakusha (gingivitis), galasundika (tonsillitis), alaji (eyedisorder), mamsa sanghata(tumour of the plate)ostha prokopa (swelling		

	( <i>sloughing of flesh</i> ), <i>alaji</i> ( <i>eye disease</i> ), <i>galaganda</i> ( <i>goitre</i> ), <i>gandamala</i> ( <i>lymphadenitis</i> ), <i>upajihwika</i> ( <i>tongue disease</i> ) (Ch/su/28/13, 14)	<i>of lips</i> ), <i>galaganda</i> ( <i>goitre</i> ) <i>gandamala</i> . (Su/su/24/12)		
Mamsava ha sroto dusti lakshanas	Acharya Charak mentioned common dusti lakshanas for all srotas. (Ch/vi/5/7. 3)			
Mamsava ha sroto moola viddha lakshanas		<i>Sawathu</i> ( <i>swelling</i> ), <i>mamsa sosha</i> ( <i>atrophy of muscles</i> ), <i>siragranthi</i> ( <i>filariasis</i> ), <i>maranam</i> ( <i>death</i> ) (Su/sa/9/12).	<i>Viddha lakshanas</i> common to all srotas. (A. S. /sa/6/45)	Common viddha lakshanas for all srotas. (A. Hr/Sa/3/47)

Apart from all the above aspects some more clinical conditions are there which are as below.

- Mamsa marma
- Vrana vastu
- Vrana sthan
- Mamsa granthi
- Mamsa as a site for vidradhi
- Pranasta shalya
- Mamsa medagata dusta vayu
- Mamsagata kupita vayu
- Mamsa medagata kupita vayu
- Mamsavritta vayu
- Mamsa arbuda
- Kustha in mamsa dhatu
- Mamsa sira snayu asthi sandhi marma vrana
- Mamsagata khudra roga
- Mamsagata jwar.



Features related with the above presented in tabular form.

Clinical condition	Lakshana
Mamsa marma viddha lakshana	<i>Viddheajasramsrsravo</i> (there is continuous bleeding) <i>mamsadhavanvatatanu</i> (bloodcolour is like washed meat water) <i>pandutvam</i> (paleness of body) <i>indriyagyanam</i> (decreased perception by all indriyas) <i>maranam</i> (resulting in death in later stage) (A. Hr/Sa/4/47)
Mamsa Medagata dusta vayu	<i>Gurvanga</i> (heaviness of body), <i>atyartha toda</i> (excessive pain), <i>dandamusti hata</i> (feels pain like beaten by stick or fist), <i>saruk sramitam atyartha</i> ( pain associated with excessive fatigueness) (Ch/chi/28/32)
Mamsagata kupita vayu	<i>Granthin sashulan</i> (painful tumours) (Su/Ni/1/26)
Mamsa medagata kupita vayu	<i>Granthistodaadayana</i> (painful tumour), <i>karkashan</i> (roughness) <i>bhram</i> (delusion), <i>guruanga</i> (heaviness of body) <i>atiruka stambha</i> (pain and stiffness) <i>mustidandahatapamam</i> (feels pain like beaten by fist or stick) (A. sang/Ni/15/13) (A. Hr/Ni/15/11)
Mamsavritta vayu	In context of avaran: <i>kathinasca vivarnasca pidaka</i> (appearance of hard and discoloured eruption), <i>sawathustatha harsha</i> (swelling and horripulation), <i>pippilikanama ca sancar</i> (feeling as if ant is moving in the body) (Ch/chi/28/64) (A. Sang. /Ni/16/36), (A. Hr/Ni/16/34).
Mamsa marma vana	<i>bhrama</i> (dizziness), <i>pralap</i> (delirium), <i>patana</i> (fallingdown), <i>pramoha</i> (unconscious), <i>vicesta</i> (irregular contraction of limbs), <i>glani sarirusnata</i> (tiredness and rise of body temperature), <i>stastra angata</i> (looseness of body parts), <i>murcha</i> (loss of function of sensory organs), <i>urdhavata</i> (upward movement of vata), <i>vatajanya tivra rujo</i> (severe bodyache caused by vata), <i>mamsaodakabham rudhiram</i> (bleeding as like washed meat water colour) (Madhav/uttr/43/18-19)
Mamsagata jwara lakshana	<i>Trida</i> (thirst), <i>glani</i> (tiredness), <i>atisar</i> (diarrhoea), <i>antardah</i> (burning sensation inside body), <i>bhrama</i> (dizzy), <i>tama</i> (darkness), <i>dourgandhya</i> ( foul smell), <i>gatravikhep</i> (shivering of body) (A. Sang. /Ni/2/82-83, (Madh/pu/2/50) Also Acharya Vagbhatt I mentions about involvement of mamsavaha nadi in Anyedu jwar. (A. Sang. /Ni/2/74). Involvement of mamsavaha srota in Tritiyak jwar mentioned by Acharya Charak in relation to vishamjwar. (Ch/chi/3/66)

Some more conditions

**Vrana vastu:** There are 8 vrana vastu as mentioned by Sushruta and mamsa is one among them. These are the site of all types of vrana. Vrana which is seen to develop in mamsa is dusadhya as mentioned by Acharya Sushruta. (Su/sut/22/3). Characteristics of Mamsagatavrana srava.

- Concentrated like ghrita
- White in colour
- Sticky in nature.

**Vrana sthana**<sup>[39]</sup>: Acharya Charaka has mentioned 8 Vrana sthana and mamsa is one among them.

**Mamsa granthi**<sup>[40]</sup>: According to Acharya Charaka granthi which occurs due to mamsa vikar is bigger in size and devoid of pain.

Classification of granthi by Acharya Charaka, Vagbhatt(A. sang. /uttar/34/3), Sharangadhar(Sharang/purv/7/68) Mamsagranthi is considered one among them.

**Pranasta shalya**<sup>[41]</sup>: Acharya Sushruta has described symptoms of mamsagata shalya as below:

- i. Sopha avivridhi(much swelling)
- ii. Shalyamarga anupasanroha(slow or no healing)
- iii. Pidana asahisnuta(tenderness)
- iv. Chosa(burning sensation)
- v. Paka(suppuration)

Acharya Vagbhatta I mentioned same symptoms as above.<sup>[42]</sup>

**Mamsa as a site for vidradhi**: Acharya Charaka (Ch/su/17/90) and Acharya Sushruta(Su/ni/9/4) mentioned mamsa as a site of vidradhi. These are clinical involvement of mamsa dhatu.

*Maharujah* (excessive pain) mentioned by Acharya Charaka to be associated with *bahya vidradhi*. Acharya Vagbhatt II also mentioned mamsa involvement in vidradhi (A. Hr/ni/11/1-2).

### Mamsarbuda

At the place on the body when hit by the fist etc. the muscle there in getting vitiated gives rise to a swelling which is painless, unctuous, of the same colour of the body, not forming pus, which is stone like hard and immovable is the *Mamsa arbuda* which occurs in persons who have vitiated muscle and consumes meat regularly.<sup>[43]</sup>

### Kustha in mamsa dhatu

..... दूष्याश्च शरीरधातवस्त्वङ्मांसशोणितलसीकाश्चतुर्था.....(Ch/Ni/5/3)

Acharya charak has mentioned mamsa as one of the dushya in development of kustha.

बाहुल्यं वक्रशोषश्च कार्कश्यं पिडकोद्गमः |

तोदः स्फोटः स्थिरत्वं च कुष्ठे मांससमाश्रिते(Su/Ni/5/23)

Lakshan of kustha affecting mamsa dhatu –*bahulyam* (Heaviness) *vaktrasoshasca* (dryness of the mouth), *karkasya*(roughness of skin), *pidikaodgamah*(appearance of eruption), *toda*(pricking pain), *sphota*(bursting pain or cracking pain), *sthirattvam*(stability).<sup>[44]</sup>

Again, Acharya Vagbhatt II mentioned *paanipada asrita sphota*(blister formation in hands and feet), *kledah sandhishucadhikam* (excessive moistened sandhi). (A. Hr. /Ni/14/34), (A. Sang/Ni/14/36).

### Mamsa marma vrana lakshana

A person who has severe pain day and night which does not subside by any means should be understood that the person has mamsa vrana.

Among 60 kshudra roga mentioned by Acharya Sharangadhar **mamsagata khudraroga** is one.<sup>[45]</sup>

**Disorders** where Mamsa is mentioned as one of the **Dushyas**: **1. prameha**(Ch/Su/4/7), (Ch/Chi/6/8) **2. kustha**(Ch/Ni/5/8) **3. visarpa**(Ch/Chi/21/15) **4. vidradhi**(Ch/Su/17/10), (Su/Ni/9/4) **5. shatponak bhagandara** (Su/Ni/4/6) **6. mamsa arbuda**(Su/Ni/11/18).

Mamsa as **Adhithan** in :1. Vranasthan 2. Pranasta Shalya 3. Vranavastu 4. Mamsagata khudraroga 5. Pittajanya Shwitra(A. Hr/Ni/14/38) 6. Arsha(Ch/Chi/14/6).

### Therapeutic Aspect

मांसजानां तु संशुद्धिः शस्त्रक्षाराग्निकर्म च(Ch/su/28/26)

The disorder of mamsa dhatu should be treated with *sodhan* (purification i. e vaman, virechan) *shastrakarma*(surgery) *ksharakarma*(application of alkali) *agnikarma* (cauterization).

### In certain specific Diseases

**(a) Treatment of vrana**-In all types of vrana: Sodhan karma i. e. *vaman*, *virechan*, *vastikriya* and *Shastrakriya* should be done, whichever is suitable to eliminate kupita vayu, has to be carried out. For purification of localised doshas *shastrakriya* is advised.<sup>[78]</sup>

**(b) Treatment of pranasta shalya**: According to Vagbhatt I shalya embedded in mamsa if not suppurated has to be treated by *mardan*, *swedan* of the affected part, by *shodhan*, followed by *karshan* or *brinhan*, by *tikshna upanah*, by *annapan* by giving incision by

*shastra* in the affected part, by pressing, by cutting and finally *eshan* i. e. extraction of *shalya*.<sup>[46]</sup>

(c) **Treatment of mamsavritta vayu:** Use of snehas like taila, dugdha, ghrita, mamsarasa, swedana, abhyanga etc. are beneficial.<sup>[47]</sup>

(d) **Treatment of mamsa medagata vayu**

विरेको मांसमेदःस्थे निरुहाः शमनानि च (Ch/chi/28/92)

Here, *virechan*, *niruha vasti* and *shaman chikitsa* is indicated in classics.

(e) **Treatment of mamsagata jwara**

विरेचनसोपवासमांसमेदःस्थितेहितम् (Ch/chi/3/316) *Virechan* (purgation), and *upavasa* (fasting) is done when doshas causing jwara is located in mamsa and meda.

**Treatment of mamsagata visa**

When visa enters mamsa dhatu *madhu* mixed with *khadirarista* is administered orally Or roots of *kutaja* is crushed and given with water to drink.<sup>[48]</sup>

**Clinical importance of mamsadhatu**

In *yakshma* patient *mamsarasa* consumption is extremely expounded by Acharya Charak.

Besides some other indication are also there which are as below.

Name of Disorder	Preparation of mamsa	Guna
1. <i>Yakshma</i>	Mamsarasa of Prasaha mamsa varga (carnivorous animals and birds) Meat of <i>lava</i> , <i>titar</i> , <i>murga</i> and <i>bater</i> is cooked in ghrita and amla, lavan, katu rasa is added and serve hot to the patient	<i>Bringhaniya</i> (Ch/chi/8/132)
2. <i>krishata</i> (emaciated patient)	Mamsarasa of prasaha mamsa varga	<i>Bringhaniya</i> (Ch/chi/8/149)
3. <i>Peenus</i> (and other 6 complications of <i>Rajayakshma</i> )	Mamsarasa (prepared by goatmeat cooked in ghrita along with <i>pipar</i> , <i>jau</i> , <i>kulthi</i> , <i>sounth</i> , <i>anardana</i> , <i>amla</i> etc. ) (Ch/chi/8/67)	
4. <i>Long standing Arsha roga</i> , <i>grahani roga</i> .	Mamsa of prasaha varga	<i>Balya</i> , <i>virya vardhak</i> , <i>vatashamak</i> , <i>kapha</i> and <i>pitta vardhak</i> . (Ch/su/27/56-57)
5. All types of <i>pratisyay</i>	Dashakshiraghrita prayog (jungal mrga and pakshi mamsa kalka cooked in milk and ghrita added with other herbs)	<i>Vatahara</i> (Su/ut/24/38-41)
6. <i>Sadyavrana</i> ( <i>chinna</i> , <i>bhinna</i> , <i>viddha</i> and <i>khata vrana</i> )	Veshabar (used as a poultice over vrana): "Veshabarernirasthiswinnasnigdhapistamamsei" (Dalhan) (Su/chi/2/24)	Guru, <i>snigdha</i> , <i>balya</i> , <i>vata ruja apaha</i> (Su/su/46/370)
7. <i>Vislista deha</i> (parts of body when displaced and	Mamsarasa adviced to be cosumed orally. (Su/chi/2/78)	

injured due to fall from height)		
8. <i>Bhagna</i>	Mamsarasa adviced in the form of ahar(diet) (Su/chi/3/5)	
9. <i>Swas kaas kshay roga</i>	Mamsarasa is adviced	<i>Vata pitta nashak, hrdya, sramahara</i> (Su/su/46/363)

### Importance of mamsa in prognosis

Acharya Charak has explained about the signs and symptoms of prognosis, *Arista lakshana*, in regards of mamsa dhatu in some disorders which are mentioned under the following headings.

***Sparshagamy arista:*** If the feet, knees, thighs, buttocks, abdomen, sides of the chest, vertebral column, neck, hand, palate, lips and forehead of the patient are touched and found wet, cold, rigid and devoid of *mamsa and rakta* indicates patient is near to death.<sup>[49]</sup>

***Nakhavishayak arista:*** If patient nails are devoid of *mamsa and rakta*(flesh and blood), bluish in colour like pakva jamun(ripe jamun fruit)is indicative of near death.<sup>[50]</sup>

***Jvarkasvishayak arista:*** Patient with morning fever and *ksheena bala mamsa*(deficient of strength and flesh) and much cough is close to death.<sup>[51]</sup>(Ch/In/6/10).

***Pannarupiya:*** If a patient with *ksheena mamsa* (wasting of muscles), reduced to bone and skin, does not take food dies in 1 month.<sup>[52]</sup>

Similarly, in *Astamaharoga visayakarista i. e. Vata vyadhi, Apasmara, Kustha, Sopha, Udara roga, Gulma, Madhumeha and Rajyakshma* do not respond to treatment if there is kshay of *bala and mamsa*.<sup>[53]</sup>

***Teenpaksha arista:*** Patient cannot survive for more than one and half months i. e. 3 fortnight if there is rapid diminution of *bala and mamsa* and aggravation of disease associated with *Arocaka* (Anorexia).<sup>[54]</sup>

### (B) DISCUSSION

Musculoskeletal system in Ayurveda includes a number of structures.

Mamsa, the third dhatu, specifically shows characteristics of muscle tissue from various aspect like composition, function, clinical and therapeutic aspect. Peshi covers various

structures like *asthi*, *sira*, *snayu* etc. and represent the musculoskeletal part. It has 12 different variety depending on shape, size of muscle like *bahala* means large and also in modern nomenclature of muscle relative size, shape etc. are base for classification.

Characteristics of *mamsadhara kala* can be related with intermuscular septum and fascia. Srotamsi form the internal transport system similar to vascular capillary bed and plasma membrane of cell and thus has got property of semipermeability and selectivity. That means *mamsavaha srota* will allow only it's concerned dhatu to penetrate through.

Snayu are the fibro-elastic (white fibrous tissue) tissue like ligaments to bind, support and sustain the joints.

Other components like jala, mamsarajju are representation of reticulum and rope like shape of muscle respectively considering from their morphological and physiological aspect. Sushruta while explaining chikitsa of parsukasthi bhagna have used the word *mamsanibandhani* (which hold/which stabilizes). Dalhana has commented that the word "*Mamsanibandhani*" is used with respect to "*Mamsarajju*" "The whole vertebral column is stabilized by the staying effect of the long muscles which attach to the girdles, head and the appendicular skeleton. This effect is particularly marked for" Erector spinae" which controls global posture and movement. Hence, structurally and functionally Erector spinae muscles can be considered as "*Mamsarajju*".

Clinical aspect of Mamsadhatu understood under *kshay*, *vridhhi*, *pradosaja vikar*, *viddha lakshan*.

*Sushkata* is the common term used by maximum scholars which can be understood as reduction of muscle mass which is mostly found in Muscular Dystrophy.

Acharya Sushruta mentioned *Sushkata* as a character of Mamsakshay in some specific region as like *sphiga*(buttock), *Ganda*(cheek), *uru*(thigh)etc. These kind of characteristics are seen in Miyashi myopathy where muscle wasting is observed in both calves, thighs, gluteal region in early or late adulthood.

Miyashi myopathy is a muscle disorder that begins with weakness in the muscles that are located away from the centre of the body such as those in legs.

During early to mid adulthood affected individual typically begins to experience muscle wasting and weakness in one or both calves. Over a period of years the weakness and atrophy typically spread to the thighs and gluteal muscles.

Basic character of *sushkata* as described in Samhitas can be found in all the three groups:

1. Congenital
2. Environmental
3. Hereditary

Mamsakshay may include - Decrease in (a) muscle bulk (b) tonicity or (c) activity.

Disorder in muscle termed myopathy where all the above characters are found is exhibited in following diseases.

Muscular dystrophy is a hereditary condition marked by progressive weakening and wasting of the muscles. Muscular dystrophy is area group of muscle disease caused by mutations in a person's genes. Over time muscle weakness decreases mobility making every day tasks difficult.

Many types of muscular dystrophy are diagnosed in childhood but there are several types that can appear during adolescence and adulthood.

1. Duchenne Muscular Dystrophy
2. Becker's Muscular Dystrophy

Here, wasting of muscles and muscle weakness are seen in both DMD and BMD whereas in Limb girdle muscular dystrophy muscle weakness(lower limb) is prominent feature.

3. Congenital Muscular Dystrophy :However, in Congenital muscular dystrophy, wasting of muscles, hypotonia and muscle weakness all are exhibited.

Considering *Sushkata* in relation to reduced muscle bulk can be seen in Central core, Nemaline myopathy, Centronuclear Myopathy(all comes under Congenital muscular dystrophy) is exhibited by hypotonia and muscle weakness.

Vayu comes in close relation to *Sushkata* as one of the guna of vayu is *rukshata* which is identical with *Sushkata*.

Regarding *kshay* Acharya Charak has mentioned 18 types and their causes are mentioned in Nidansthan where most of them are seemed to be due to vata prakopa.

*Sandhivedana* can be co related to joint contracture where rigidity of joints and reduction of movements are seen.

Again *Sandhivedana* as mentioned by Vagbhata II may occur when there is excess emaciation of muscle tissue.



Acharya Sushruta's concept of *vriddhi* mostly is related to the enlargement of some structures or regions as like *uruvriddhi*, *sphigavridhi*.

The character in obese person specially in relation to increased BMI seems to be mentioned in "*mamsavridhi lakshana*" described by Sushruta.

Abnormality of muscles may be due to morbidity in the function of artery supplying it or malfunctioning of nerves (may be motor or sensory). Mamsavaha srota can be understood as nerve or artery that intervene muscle as because structures that nourishes our muscle is "*mamsavaha srota*". Such type of abnormality can be seen in Post polio syndrome which is an example of muscle atrophy due to nerve injury.

Post polio syndrome usually occurs 15-40 yrs after the infection and recovery. PPS is believed to be the result of a deterioration of nerve cells(called motor neurons) over many years that leads to loss of muscle strength and dysfunction.

Symptoms mainly include slowly progressive muscle weakness, gradual decrease in the size of muscles(muscle atrophy) which clearly goes parallel with "*Mamsavaha srota viddha lakshana*" mentioned by Acharya Sushruta where he has mentioned "*mamsasosha*" as it's main lakshana. The symptom Mamsasosha can be considered as wasting of muscles(found also in muscular dystrophy).

Pradoshaja vicar may be related to excess vitiation of doshas which in turn leads to certain specific diseases. In order to highlight the gradation of vitiation of one particular dhatu pradoshaja vicar is emphasized.

Adhimamsa is overgrowth of muscle tissue.

Keela is outgrowth of muscle tissue in the shape of nail. Chakrapani commented *keela* as *arsha*.

Galasaluk may be related to granular eruption in throat (uvulitis)

Alaji simply boil in muscle tissue.

Galaganda may be related to goitre(on the basis of external characteristic)

Gandamala is swelling of lymph glands around the neck look like garland

Upajihwa may be cystic swelling of tongue.

Arbuda refers to benign growth.

Galasundika may be related to tonsillitis

All these above disorders like goitre, lymph adenitis, uvulitis, tonsillitis are glandular swelling which may occur due to inflammation caused by infection and hence not specific muscle growth, however observing their outer growth or increase in size they are included in mamsapradosaja vikar.

**Mamsadhatu problems due to vitiated vata dosha**

Ruksha guna causes—Muscular pain, Sprain Fibromyalgia, Ankle sprain

Laghu guna causes—Muscle atrophy, Marasmus, Cachexia

Shita guna causes—Shivering, stiffness of muscle

Khara guna causes—Muscle contractures

Suksma guna causes—Embryological developmental

problem in mamsa dhatu, genetic diseases(muscular dystrophy)

Chala guna causes tremors, fasciculations.

**CONCLUSION**

Myology relate to structures and functional aspect of muscle tissue. In Ayurveda it is included under Mamsadhatu. Apart from it Peshi is the specific structural element. Mamsavaha srota, mamsadhara kala are two entity relate to nourishment and persistence of that dhatu. Applied aspect included kshay, vridhhi, pradosaja vicar. The characteristics has got certain similarity with different type of Myopathy which may be congenital or acquired.

**REFERENCES**

1. Williams Monier Monier; A English Sanskrit Dictionary; Bharatiya Granth Niketan; 2713 Kucha Chelan, Daryaganj, New Delhi 110002; Edition 2006; page no. 276.
2. Devabahadur, syarajaRadhakanta; Sabdakalpadroom, Chaukhambha Surbharati Prakashan, Edition 2015, Tritiya Kanda, vyanjan varna, page no. 682.
3. Pandita Sarangadharacharya; Sarangadhara –Samhita; Annoted with“DIPIKA” Hindi commentary byDrBrahmanandTripathi; ChaukhambaSurbhartiPrakashan; Varanasi; Edition 2020; purvakhanda/5/20; Page no. 40.
4. Amarsimha: Amarkosa(Ditiya Kanda) with Ramasrami commentary ofBhanuji Dikshita (Ramasrama) Edited by Pt. Haragovinda Sastri; Chaukhambha Sanskrit Sansthan ; Varanasi; Reprint Edition 2008; 2/6/62; page no. 287.
5. Agnivesha; Charak Samhita with Ayurveda Dipika Commentary by Chakrapanidatta; edited by Dr. Gangasahaya Pandeya; Foreword By Yadavji Trikamji Acharya; Chaukhambha Sanskrit Sansthan; Varanasi; Reprint 2006; Chikitsa sthan 15/29 Page no. 383.
6. Datta Chakrapani; Sushrut-Samhita with Bhanumati Commentary; Introduction By Mahamahopadhyaya Kaviraj Gananath Sen, Saraswati; edited by Vaidya Jadavji Trikamji

- Aacharya and Pt. Nandkishor Sharma Bhisagacharya; Edition 1939; Sutrasthan/15/8; Page no. 193.
7. Sushruta; Sushruta Samhita; Edited with Ayurveda-Tattva-Sandipika By Kaviraja Ambikadutta Shastri; Foreword by Dr. Pranajivana Manekchanda Mehta; Chaukhambha Sanskrit Sansthan, Varanasi; Reprint Edition: 2005; Sutrasthan/14/14-15; Page no. 50.
  8. Vagbhata; Astanga Samgraha by Kaviraj Atrideva Gupta; Foreword by Rajvaidya Pandit Sri Nandkishor Sharma Bhisagacharya; Chaukhamba Krisnadas Academy; Varanasi; Reprint Edition 2011; Sutrasthan19/4; Page no. 152.
  9. Pandita Sarangadharacharya; Sarangadhara –Samhita; Annotated with “DIPKA” Hindi commentary by Dr Brahmanand Tripathi; ChaukhambaSurbharti Prakashan; Varanasi; Edition 2020; purvakhanda/5/17; Page no. 39.
  10. Sushruta; Sushruta Samhita; Edited with Ayurveda-Tattva-Sandipika By Kaviraja Ambikadutta Shastri; Foreword by Dr. Pranajivana Manekchanda Mehta; Chaukhambha Sanskrit Sansthan, Varanasi; Reprint Edition: 2005; Sutrasthan/15/7. Page no. 57.
  11. Agnivesha; Charak Samhita; Introduction by Vaidya Samrat SriSatya Narayana Sastri; edited by Pt. Rajeswaradatta Sastri *et al*; Chaukhambha Bharati Academy; Varanasi; Reprint 2015; Sutrasthan/21/18-19; Page no. 413-14.
  12. Agnivesha; Charak Samhita; Introduction by Vaidya Samrat SriSatya Narayana Sastri; edited by Pt. Rajeswaradatta Sastri *et al*; Chaukhambha Bharati Academy; Varanasi; Reprint 2015; Sarirsthan/7/16; Page no. 916.
  13. Pandita Sarangadharacharya; Sarangadhara –Samhita; Annotated with “DIPKA” Hindi commentary by DrBrahmanandTripathi; ChaukhambaSurbhartiPrakashan; Varanasi; Edition2020; purvakhanda/5/28; Page no. 40.
  14. [www.spokensanskrit.org](http://www.spokensanskrit.org).
  15. Agnivesha; Charak Samhita; Introduction by Vaidya Samrat SriSatya Narayana Sastri; edited by Pt. Rajeswaradatta Sastri *et al*; Chaukhambha Bharati Academy; Varanasi; Reprint 2015; Sarirsthan/7/14; Page no. 914.
  16. Sushruta; Sushruta Samhita; Edited with Ayurveda-Tattva-Sandipika By Kaviraja Ambikadutta Shastri; Foreword by Dr. Pranajivana Manekchanda Mehta; Chaukhambha Sanskrit Sansthan, Varanasi; Reprint Edition: 2005; Sarirsthan/4/5; Page no. 29.
  17. Vagbhata; Astanga Samgraha by Kaviraj Atrideva Gupta; Foreword byRajvaidya Pandit Sri Nandkishor Sharma Bhisagacharya; ChaukhambaKrisnadas Academy; Varanasi; Reprint Edition 2011; Sarirsthan/5/35; Page no. 300.

18. Pandita Sarangadharacharya; Sarangadhara –Samhita; Annotated with “DIPKA” Hindi commentary by Dr Brahmanand Tripathi; ChaukhambaSurbharti Prakashan; Varanasi; Edition 2020; purvakhanda/5/66-67; Page no. 45.
19. Agnivesha; Charak Samhita; Introduction by Vaidya Samrat SriSatya Narayana Sastri; edited by Pt. Rajeswaradatta Sastri *et al*; Chaukhambha Bharati Academy; Varanasi; Reprint 2015; Vimansthan/5/25; page no. 714.
20. Sarma Tikendrajit; Srota: The Transport System: A review; 35<sup>th</sup> edition Ayurjyoti magazine 2006-07; Govt. Ayurvedic College, Guwahati, Assam. Page no. 95.
21. Sushruta; Sushruta Samhita; Edited with Ayurveda-Tattva-Sandipika By Kaviraja Ambikadutta Shastri; Foreword by Dr. Pranajivana Manekchanda Mehta; Chaukhambha Sanskrit Sansthan, Varanasi; Reprint Edition: 2005; Sarirsthan/9/12; page no. 72.
22. Agnivesha; Charak Samhita with Ayurveda Dipika Commentary by Chakrapanidatta; edited by Dr. Gangasahaya Pandeya; Foreword By Yadavji Trikamji Acharya; Chaukhambha Sanskrit Sansthan; Varanasi; Reprint 2006; Siddhisthan/9/3; page no. 973.
23. Vagbhata; Astangahrdayam; Edited with ” Vidyotini” Hindi Commentary by Kaviraja Atrideva Gupta; edited by Vaidya Yadunandana Upadhyaya; ChaukhambhaPrakashan, Varanasi; Reprint Edition 2008; Sarirsthan/4/40; page no. 269.
24. Sushruta; Sushruta Samhita; Edited with Ayurveda-Tattva-Sandipika By Kaviraja Ambikadutta Shastri; Foreword by Dr. Pranajivana Manekchanda Mehta; Chaukhambha Sanskrit Sansthan, Varanasi; Reprint Edition: 2005; Sarirsthan/3/31. page no. 27.
25. Sushruta; Sushruta Samhita; Edited with Ayurveda-Tattva-Sandipika Part I By Kaviraja Ambikadutta Shastri; Foreword by Dr. Pranajivana Manekchanda Mehta; Chaukhambha Sanskrit Sansthan, Varanasi; Reprint Edition: 2005; Sarirsthan/4/4; Page no. 28.
26. Vagbhata; Astanga Samgraha by Kaviraj Atrideva Gupta; Foreword by Rajvaidya Pandit Sri Nandkishor Sharma Bhisagacharya; ChaukhambaKrisnadas Academy; Varanasi; Reprint Edition 2011; Sarirsthan/5/33; Page no. 300.
27. Vagbhata; Astanga Samgraha by Kaviraj Atrideva Gupta; Foreword by Rajvaidya Pandit Sri Nandkishor Sharma Bhisagacharya; ChaukhambaKrisnadas Academy; Varanasi; Reprint Edition 2011; Sarirsthan/5/64; Page no. 303.
28. Vagbhata; Astangahrdayam; Edited with ” Vidyotini” Hindi Commentary by Kaviraja Atrideva Gupta; edited by Vaidya Yadunandana Upadhyaya; ChaukhambhaPrakashan, Varanasi; Reprint Edition 2008; Sarirsthan/3/15; page no. 251.

29. Pandita Sarangadharacharya; Sarangadhara –Samhita; Annotated with “DIPKA” Hindi commentary by Dr Brahmanand Tripathi; ChaukhambaSurbharti Prakashan; Varanasi; Edition 2020; purvakhanda/5/71; page no. 45.
30. Vagbhata; Astanga Samgraha by Kaviraj Atrideva Gupta; Foreword by Rajvaidya Pandit Sri Nandkishor Sharma Bhisagacharya; ChaukhambaKrisnadas Academy; Varanasi; Reprint Edition 2011; Sarirasthan/5/84; page no. 306.
31. Murthy K. R. Srikantha; Sushruta Samhita; Volume I; ChaukhambhaOrientalia, Varanasi; Reprint Edition 2022; Sarirasthan/5/12; page no. 82.
32. Sushruta; Sushruta Samhita; Edited with Ayurveda-Tattva-Sandipika By Kaviraja Ambikadutta Shastri; Foreword by Dr. Pranajivana Manekchanda Mehta; Chaukhambha Sanskrit Sansthan, Varanasi; Reprint Edition: 2005; Sarirasthan/5/12; page no. 43.
33. Vagbhata; Astanga Samgraha by Kaviraj Atrideva Gupta; Foreword by Rajvaidya Pandit Sri Nandkishor Sharma Bhisagacharya; ChaukhambaKrisnadas Academy; Varanasi; Reprint Edition 2011; Sarirasthan/5/62; Page no. 303.
34. Sontakke Yogesh Ashok; Textbook of Human Histology; CBS Publishers & Distributors Pvt. Ltd.; 4819/XI Prahlad Street, 24 Ansari Road, Dariyaganj, New Delhi 110002, India; First Edition 2020; page no. 92.
35. Gray Henry; Gray’s Anatomy; Edited by Peter L. Williams *et. al* ELBS with Churchill Livingstone Funded by the British Government; Edition 37<sup>th</sup>, 1989; Page no. 546-547.
36. Trifocusfitnessacademy. co. za, Educational Institution, Sandton; South Africa.
37. Sontakke Yogesh Ashok; Textbook of Human Histology; CBS Publishers & Distributors Pvt. Ltd.; 4819/XI Prahlad Street, 24 Ansari Road, Dariyaganj, New Delhi 110002, India; First Edition 2020; Page no. 94-95.
38. Muscular Dystrophy Photos and Premium High Res Pictures; [www. Gettyimages. com](http://www.Gettyimages.com); photos; muscular dystrophy.
39. Agnivesha; Charak Samhita with Ayurveda Dipika Commentary by Chakrapanidatta; edited by Dr. Gangasahaya Pandeya; Foreword By Yadavji Trikamji Acharya; Chaukhambha Sanskrit Sansthan; Varanasi; Reprint 2006; Chikitsa sthan/25/26; page no. 621.
40. Agnivesha; Charak Samhita with Ayurveda Dipika Commentary by Chakrapanidatta; edited by Dr. Gangasahaya Pandeya; Foreword By Yadavji Trikamji Acharya; Chaukhambha Sanskrit Sansthan; Varanasi; Reprint 2006; Chikitsa sthan/12/81; page no. 309.

41. Sushruta; Sushruta Samhita; Edited with Ayurveda-Tattva-Sandipika Part I By Kaviraja Ambikadutta Shastri; Foreword by Dr. Pranajivana Manekchanda Mehta; Chaukhambha Sanskrit Sansthan, Varanasi; Reprint Edition: 2005; Sutrasthan/26/11; Page no. 108.
42. Vagbhata; Astanga Samgraha by Kaviraj Atrideva Gupta; Foreword by Rajvaidya Pandit Sri Nandkishor Sharma Bhisagacharya; ChaukhambaKrisnadas Academy; Varanasi; Reprint Edition 2011; Sutrasthan/37/5; Page no. 244.
43. Sushruta; Sushruta Samhita; Edited with Ayurveda-Tattva-Sandipika Part I By Kaviraja Ambikadutta Shastri; Foreword by Dr. Pranajivana Manekchanda Mehta; Chaukhambha Sanskrit Sansthan, Varanasi; Reprint Edition: 2005; Nidansthan/11/18; Page no. 274.
44. Sushruta; Sushruta Samhita; Edited with Ayurveda-Tattva-Sandipika Part I By Kaviraja Ambikadutta Shastri; Foreword by Dr. Pranajivana Manekchanda Mehta; Chaukhambha Sanskrit Sansthan, Varanasi; Reprint Edition: 2005; Nidansthan/5/23; Page no. 250.
45. Pandita Sarangadharacharya; Sarangadhara –Samhita; Annotated with “DIPKA” Hindi commentary by Dr Brahmanand Tripathi; ChaukhambaSurbharti Prakashan; Varanasi; Edition 2020; purvakhanda/7/99; Page no. 72.
46. Vagbhata; Astanga Samgraha by Kaviraj Atrideva Gupta; Foreword by Rajvaidya Pandit Sri Nandkishor Sharma Bhisagacharya; ChaukhambaKrisnadas Academy; Varanasi; Reprint Edition 2011; Sutrasthan/37/29Page no. 247.
47. Agnivesha; Charak Samhita with Ayurveda Dipika Commentary by Chakrapanidatta; edited by Dr. Gangasahaya Pandeya; Foreword By Yadavji Trikamji Acharya; Chaukhambha Sanskrit Sansthan; Varanasi; Reprint 2006; Chikitsa sthan/28/195; Page no. 720.
48. Agnivesha; Charak Samhita with Ayurveda Dipika Commentary by Chakrapanidatta; edited by Dr. Gangasahaya Pandeya; Foreword By Yadavji Trikamji Acharya; Chaukhambha Sanskrit Sansthan; Varanasi; Reprint 2006; Chikitsa sthan/23/187; Page no. 578.
49. Sharma R. K and Das Vaidya Bhagwan; Caraka Samhita (Text with English Translation & Critical Exposition Based on ChakrapaniDatta’s Ayurveda Dipika); vol-II; Chowkhamba Sanskrit Series office; Varanasi; Edition Reprint 2008; Indriyasthan/3/5; page no. 534.
50. Sharma R. K and Das Vaidya Bhagwan; Caraka Samhita (Text with English Translation & Critical Exposition Based on ChakrapaniDatta’s Ayurveda Dipika); vol-II; Chowkhamba Sanskrit Series office; Varanasi; Edition Reprint 2008; Indriyasthan/3/6; page no. 535.

51. Sharma R. K and Das Vaidya Bhagwan; Caraka Samhita(Text withEnglish Translation & Critical Exposition Based on ChakrapaniDatta's Ayurveda Dipika); vol-II; Chowkhamba Sanskrit Series office; Varanasi; Edition Reprint 2008; Indriyasthan/6/10; page no. 554.
52. Sharma R. K and Das Vaidya Bhagwan; Caraka Samhita(Text withEnglish Translation & Critical Exposition Based on ChakrapaniDatta's Ayurveda Dipika); vol-II; Chowkhamba Sanskrit Series office; Varanasi; Edition Reprint 2008; Indriyasthan/7/31; page no. 562.
53. Sharma R. K and Das Vaidya Bhagwan; Caraka Samhita(Text withEnglish Translation & Critical Exposition Based on ChakrapaniDatta's Ayurveda Dipika); vol-II; Chowkhamba Sanskrit Series office; Varanasi; Edition Reprint 2008; Indriyasthan/9/8-9; page no. 569.
54. Sharma R. K and Das Vaidya Bhagwan; Caraka Samhita(Text withEnglish Translation & Critical Exposition Based on ChakrapaniDatta's Ayurveda Dipika); vol-II; Chowkhamba Sanskrit Series office; Varanasi; Edition Reprint 2008; Indriyasthan/9/22; Page no. 572.