



## Review Article

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### MUSCULOSKELETAL AILMENT WITH SPECIAL FOCUS ON SNAYU MARMA: A REVIEW

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#### ABSTRACT

A musculoskeletal disorder is an injury that affects the human body's movement or musculoskeletal system, including muscles, tendons, ligaments, nerves etc. Ayurveda understands the ailment in detail like etiological factors, marma-chikitsa, a traditional therapy for managing vital points and specific panchakarma to manage ailments effectively without any side effects. Acharyas said 107 marmas are classified into five varieties based on their structure, location, and effect of an injury. Anatomically marma is the junction point of mamsa, sira, snayu, asthi & sandhi; they are named as their dominancy. Marma is a special concept described in Sushruta Samhitas, knowing this, one can be a good physician and surgeon. Snayu is a vital structure that helps maintain joints' stability during movement, and all joints are bind together by snayu. Snayu is like the tendon, ligament, nerve, and muscle tissue. There is 27 snayu marma covered under ten names and scattered all over the body. They are Aani (4), vitap (2), kakshadhar (2), kurcha (4), kurchashir (4), vasti (1), and kshipra (4), amsa (2), vidhur (2), utkshepa (2). Injury to snayu marmas will cause shortening, debility of the body part, inability to perform their action, severe pain, causes more harm to the body than harm to these marma like asthi, sandhi, peshi, sira. It is necessary to have detailed knowledge of snayu marma and its structure to rule out causative pathophysiology behind the formation of such deformities and minimize their occurrence in future.

**Keywords:** Marma, snayu marma, ligaments, tendon, musculoskeletal disorders (MSD).

#### INTRODUCTION

The musculoskeletal system comprises the bones of the skeleton, muscles, cartilage, tendons, ligaments, joints, and other connective tissue that supports and binds tissues and organs together. The musculoskeletal system's primary functions include supporting the body, allowing motion, and protecting vital organs. However, diseases and disorders that may adversely affect the function and overall effectiveness of the system.<sup>1</sup>

"Musculoskeletal disorders" include various inflammatory and degenerative conditions affecting the muscles, tendons, ligaments, joints, peripheral nerves and supporting blood vessels. These include clinical syndromes such as tendon inflammations and related conditions (tenosynovitis, epicondylitis, bursitis), nerve compression disorders (carpal tunnel syndrome, sciatica), and osteoarthritis.<sup>2</sup>

#### REVIEW OF LITERATURE

**MARMA** - In Ayurveda, "Ayu" means life is defined as the conjunction of body, soul, mind, and senses. Each has been given importance in maintaining health and curing and preventing diseases. Health is a precious possession; wisdom and art, strength, and wealth, are useless if health is lacking (Charaka Sutra sthana - 30/26).

Acharya Charaka has opined that marma is the site of Chetana, so the sense of pain will be more in this region compared to the other part of the body; Acharya Sushruta in Sharir sthana has described the anatomical sition of various structures- Snayu being one among them. The strength of the body depends upon Snayu, Asthi, Mansa etc. The redactor of Ashtanga Hridaya Arundatta explains that it is called "Marma" because an injury to the part brings out miseries which is equal to death. Bhavaprakasa has defined marma as the meeting place of mansa, sira, snayu, asthi and sandhi, where prana resides.<sup>3</sup>

Marma is one of the unique and important topics discussed in Ayurveda. Knowledge of marma is described as half the knowledge of shalya tantra as a person injured in a vital spot die immediately or suffers from an unforeseen ailment which is life-threatening.<sup>4</sup>

Marma (fatal spots) is 107 in number; these are of five kinds such as mansa marma (muscular spot), sira marma (venous spot), snayu marma (ligamental spots), asthi marma (bony spot) and sandhi marma (spot on joint) there are no other kinds of marma apart from those of muscles, veins, ligaments, bone, and joints. The term 'Marma' is defined in Sushruta Sharir sthana pratyaka marma nirvesa 6<sup>th</sup> chapter, "Marayanti iti marmani" (Dalhan)-that spot which, when injured, kills the person, some cause deformities and severe pain. These are classified based on the

tissue predominant in that area, such as muscles, veins, ligaments, bone, or joints.<sup>5</sup>

If we observe these five elements in modern science, they form a significant part of the body in the form of muscles, veins, ligaments, bones and joints. Thus, damage to such a vital part leads to structural or functional impairment.<sup>6</sup>

**Samprapti of Marmabhighata**

Samprapti of marmabhighata is there at the end of an article shown in Figure 1. <sup>7</sup> All the above descriptions show the importance and vitality of the marma point. Any injury, trauma or disease affecting marma will cause death or miseries equal to end.

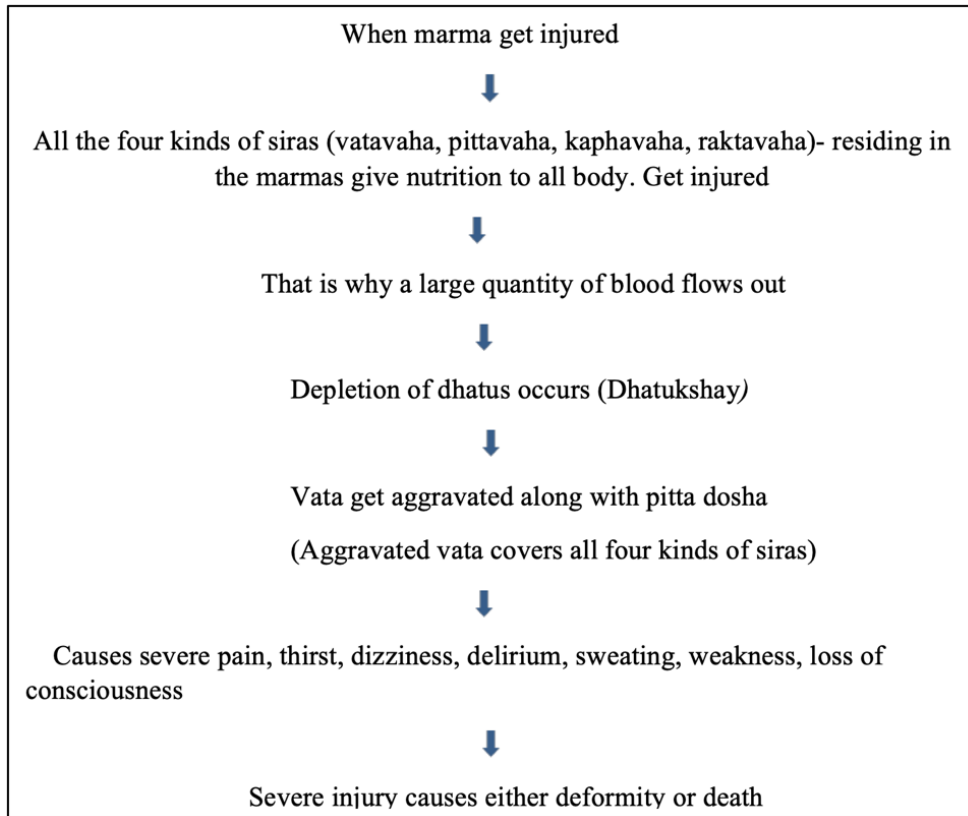


Figure 1: Samprapti of Marmabhighat

Table 1: Marma in upper and lower limbs<sup>13</sup>

Marma	No.	Pramana	According to Parinama	Location of marma
Aani	4	½ angul	Vaikalyakar	Three angula (6cm) above the kurpar (elbow joint) and janu (knee)
Vitap	2	1 angul	Vaikalyakar	Between the rushan (testis) and vankshan (inguinal/groin region).
Kakshadhar	2	1 angul	Vaikalyakar	in between the vaksha (thorax) and kaksha (axilla)
Kurcha	4	4 angul	Vaikalyakar	Upper limb-proximal to the junction b/w thumb & forefinger. Lower limb-proximal to junction b/w big toe & 1 <sup>st</sup> toe
Kurchashir	4	1 angul	Rujakar	Upper limb – distal to the wrist joint. Lower limb- distal to the ankle joint
Basti	1	4 angul	Sadya pranhar	Mutrashaya (urinary bladder)
Kshipra	4	½ angul	Kalantar pranhar	In hand- in between the index finger and thumb In foot- in between big and 2 <sup>nd</sup> toe
Amsa	2	½ angul	Vaikalyakar	in between the arms, head and neck
Vidhur	2	½ angul	Vaikalyakar	at the back (or behind) the ear and below it.
Utkshap	2	½ angul	Vishalyaghana	It is located at the level of the scalp's hairline, above the temple.

Table 2: Structure involve in Aani marma

The structure involved in aani marma	Upper extremities <sup>15</sup>	The brachial artery, median nerve, radial nerve, and ulnar nerve. Musculocutaneous nerve, coracobrachialis muscle, biceps brachii and triceps brachii muscles, blood vessels and other tissues are present in the area, but mainly it is rich in ligaments, tendons and nerves.
	Lower extremities <sup>16</sup>	Five relative structures are seen- 1. mamsa- the lower end of rectus femoris, vastus intermedius, vastus medialis. 2. sira- femoral vessels, 3. snayu- tendon of quadriceps femoris 4. asthi- the lower end of the femur and patella 5. sandhi- the joint between patella and femur.

**Table 3: Anatomical structures of vitap marma**<sup>20</sup>

Anatomical structures of Vitapa Marma in males	Anatomical structures of Vitap Marma in females
<ul style="list-style-type: none"> <li>•External oblique aponeurosis</li> <li>•Internal spermatic fasciae</li> <li>•Cremasteric fascia</li> <li>•External spermatic fascia</li> <li>•Ilio-inguinal nerve, Spermatic cord</li> <li>•Inguinal ligaments</li> </ul>	<ul style="list-style-type: none"> <li>•External oblique aponeurosis</li> <li>•Internal oblique muscle of abdomen</li> <li>•ilio-inguinal nerve</li> </ul>

**Table 4: Structure involves in Kurcha marma**<sup>24</sup>

Upper extremities	Lower extremities
<ul style="list-style-type: none"> <li>•Carpo-metacarpal and intermetacarpal ligaments</li> <li>•Tendons of Extensor pollicis longus, <ul style="list-style-type: none"> <li>•Extensor digitorum,</li> <li>•Extensor indicis</li> <li>•Flexor carpi</li> </ul> </li> <li>•radialis brevis muscles</li> <li>•Radial artery and its Dorsal metacarpal branches,</li> <li>•Interosseous muscles</li> <li>•Carpo-metacarpal and inter metacarpal articulations</li> </ul>	<ul style="list-style-type: none"> <li>•Tarsometatarsal and inter-tarsal ligaments</li> <li>•Extensor digitorum brevis</li> <li>•Dorsalis pedis and Dorsal intertarsal arteries</li> <li>•Tendons of Extensor digitorum longus</li> <li>•Extensor hallucis longus</li> <li>•Peroneus tertius muscles</li> <li>• Branches of deep Peroneal nerve</li> </ul>

**Table 5: Structure involves in Kurchashir marma**<sup>25</sup>

Upper extremities	Lower extremities
<ul style="list-style-type: none"> <li>•Ulnar Collateral ligaments</li> <li>•Radial collateral ligaments</li> <li>•Inter-carpal ligaments</li> <li>•Transverse carpal ligaments</li> <li>•Ulnar artery</li> <li>•Median nerve</li> <li>•Superficial branches of ulnar nerve</li> <li>•Inter-carpal articulations</li> </ul>	<ul style="list-style-type: none"> <li>•Deltoid ligaments</li> <li>•Talocalcaneal ligaments</li> <li>•Calcaneofibular ligaments</li> <li>•Annular ligaments</li> <li>•Tendon of Tibialis anterior muscle</li> </ul>

**Table 6: Structure involves in Kshipra marma**<sup>29</sup>

In Upper Limb	In lower limb
<ul style="list-style-type: none"> <li>•Dorsal metacarpal Artery</li> <li>•Flexor Pollicis Brevis</li> <li>•Oblique and transverse head of adductor pollicis</li> <li>•Branches of the median nerve</li> <li>•Superficial and deep palmar arch supplying blood to the finger.</li> </ul>	<ul style="list-style-type: none"> <li>•Dorsal Pedis Artery</li> <li>• Branch of deep peroneal nerve going to big toe</li> <li>•Adductor hallucis Brevis</li> <li>• Lumbricalis muscles</li> <li>•Plantar arch</li> <li>•Medial plantar artery</li> <li>•Posterior tibial nerve</li> <li>•Meta tarso- phalangeal joint.</li> </ul>

### Concept of Snayu

The term snayu means "To bind". It is explained as a structure that helps bind the joints and helps the body in weight-bearing. Shayu is said to be originated from medas along with sira. Snayu by khara paka and sira by mrudupaka.<sup>8</sup>

In Ayurveda literature, Snayu has also been considered as "Vatavahanaadi". It may be why injury to this structure leads to 'severe pain' 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.<sup>9</sup>

In the human body, the joints are held together by ligaments and joint capsules. The tendon crossing the joint also helps in its stability. The muscles which cover the joint also provide it with strength and protection. Ligaments, tendons, and fascia are all made up of connective tissues. They are historically similar in structure and differ in how they connect structures. The number of snayu mentioned by Sushruta Sharir sthana 5<sup>th</sup> chapter (Sharir sankhya vyakarana) is 900, These are further divided region-wise, but it is still unclear about the anatomical structures which make up these Snayu in our body. There are many structures like tendons, ligaments, nerves, muscle tissue etc., which can be related to Snayu.<sup>10</sup>

### Type of Snayu (Ligaments)

Snayu are of four types<sup>11</sup>

1. Pratanavati (spread out/broad)- are present in extremities and all bony joints.
2. Vrtta (round/ cylindrical)- are known as kandara (tendon)
3. Prthula (thick bag)- are present in parshva (flanks), urah (chest), prustha (back) and sira (head)
4. Sushira (hollow/ring-like)- are present at the end of amashaya (stomach), pakvashya (large intestine) and basti (urinary bladder).

### Importance of Snayu

Snayu holds the Sharir together by joining the bones at joints like the ropes hold the wooden planks of a boat together. Like a strong boat can carry a heavy load. While emphasizing its importance, Sushruta has mentioned that an injury to Shayu will cause more harm to the human body than caused by Asthi, Peshi, Sira and Sandhi.

**Snayu Marma** (ligamental spots)- 10

Snayu has also been mentioned as a type of Marma. These are 27 in number.<sup>12</sup> (Table 1)

### Snayu Marma Vidha Lakshana

Shortening, debility of body parts, inability to perform their actions, severe pain, and wound (of the knife) healing after a long time should be understood as caused due to cut/injury to the ligaments.<sup>14</sup>

#### 1) Aani Marma

Structures involve (Table 2)

#### Viddha Lakshana (Traumatic Effect)

**According to Ayurveda** - Injury to the Aani Marma causes Shopha abhivruddhi (massive swelling) and Stabdghata (stiffness) of upper and lower limbs.<sup>17</sup>

**According to modern** - Any injury such as tearing the bicep tendon and triceps tendon may lead to inflammation and stiffness of the arm with following deformities such as extension and flexion of the elbow and supination of the forearm.<sup>10</sup> The rupture of the quadriceps tendon causes compartment syndrome, an injury to the hamstring muscles that can range from a minor strain to a major rupture.<sup>18</sup> The signs and symptoms of thigh swelling and stiffness due to injury on the quadriceps femoris muscle.<sup>19</sup>

#### 2) Vitap Marma

Structures involve (Table 3)

#### Vidha Lakshan (Traumatic Effect)

**According to Ayurveda** - Injury to the Vitapa Marma leads to Shaandhya (Impotence) and Alpa Shukrata (oligospermia, infertility).<sup>17</sup>

**According to modern** - An injury over this canal area is bound to damage the spermatic cord, which may increase the chances of sterility. If the injury is limited to one side of the inguinal canal, then the chances of ejaculation of a lesser quantity of semen or oligospermia may be there. If the spermatic cord, along with the blood vessels and the ilioinguinal and genitofemoral nerve, is damaged, the chances of impotence due to crush of cord blood vessels and nerves or blockage of vas deferens.<sup>21</sup> In females' incompetence of the round ligament of the uterus can result in abnormalities of the uterus, thus resulting in infertility.<sup>19</sup>

#### 3) Kakshadhar Marma

**The structure involves** the brachial plexus, lateral Cord, median cord, posterior cord, axillary artery, axillary vein, and tendon of pectoralis minor.<sup>22</sup>

#### Viddha lakshan (Traumatic Effect)

**According to Ayurveda** - Injury to the Kakshadhara Marma leads to Pakshaghata, or Paralysis of the upper limb due to blood loss.<sup>17</sup>

**According to modern** - If brachial plexus injury- Pain, Loss of sensation, Muscle weakness, Paralysis of some or all the shoulder and upper limb muscles.<sup>23</sup>

#### 4) Kurcha Marma

Structures involve (Table 4)

### Viddha lakshan (Traumatic Effect)

**According to Ayurveda** - Injury to the Kurcha Marma causes Bhramana (irregular shape, twisting, twitching) and Vepana (tremors, convulsions) of hands or foot.<sup>17</sup>

**According to Modern** - Injury to the Kurcha, marma may cause tremors and abnormalities in foot signs, and symptoms may be seen due to injury to the tarsometatarsal, inter-tarsal ligament and extensor tendons of lower extremities.<sup>19</sup>

#### 5) Kurchashir Marma

Structures involve (Table 5)

#### Viddha lakshan (Traumatic Effect)

**According to Ayurveda** - Injury to the Kurchashira Marma causes Ruja (severe pain) and Shopha (swelling or odema).<sup>17</sup>

**According to modern** - Impairment of the flexion and abduction of the wrist, bleeding from the radial artery and pain due to injury to the radial nerve. Damage to the ligaments and bone may cause severe pain and impair the foot's function.<sup>26</sup>

#### 6) Basti Marma

**The structure involves** the tissues involved in Basti Marma are the urinary bladder, terminal part of the ureter, prostate & prostatic urethra, puboprostatic/pubo-vesical ligaments and other ligaments, vesical branches of the internal iliac artery, the internal iliac veins and its tributaries from bladder, sympathetic and parasympathetic nerves from inferior hypogastric plexus etc.<sup>27</sup>

#### Viddha lakshana (Traumatic Effect)

**According to Ayurveda** - The injury of Vasti Marma causes immediate death. Any injury to the marma except those caused by Ashmari (stones), Ashmari Vrana (wound caused by stones) and vrana (wounds of small proportion) would cause immediate death.<sup>28</sup>

**According to modern** - Injuries due to sharp weapons used in the battle or the blunt trauma due to road traffic accidents and sports injuries are the leading causes of bladder injury. These injuries can damage the bladder extraperitoneal, intraperitoneally or both.<sup>27</sup>

#### 7) Kshipra Marma

Structures involve (Table 6)

#### Viddha lakshana (Traumatic Effect)

**According to Ayurveda** - Injury to the Kshipra Marma leads to Aakshhepana (convulsions), gradually leading to death.<sup>17</sup>

#### According to modern

1. The presence of the dorsal pedis artery and the middle terminal branch of the peroneal nerve favors the condition of tetanus since the deep wound after hemorrhage favors the multiplication devoid of oxygen. The exotoxins travel through this vascular, nervous tissue and get fixed in the anterior horn cells. The convulsions can be seen if an injury occurs in this portion of the body. Predominantly in the lower part of the body.

2. Injury to the muscle involved here may lead to impairment of the function of the thumb or toe. The dorsal metacarpal artery or palmar arch injury may lead to blood loss.

3. The convulsions are produced in the conditions like bleeding or infections like tetanus bacilli. If heavy blood loss occurs, then the result will be death.<sup>29</sup>

### 8) Amsa Marma

**Structure involve** - Coraco-clavicular ligaments, Conoid ligaments, Trapezoid ligaments, Acromio-clavicular ligaments, Coraco-clavicular ligaments.<sup>30</sup>

#### Viddha lakshan (Traumatic Effect)

**According to Ayurveda** - Injury of Amsa, Marma causes deformity. Injury of Amsa Marma leads to Stabdha Baahutaa, i.e., stiffness or rigidity of the shoulder or arm.<sup>31</sup>

**According to modern** - Injury to this marma results in limb stiffness and loss of function. It includes soft tissues like muscles, tendons, ligaments, etc., which form the shoulder joint with the scapula. An injury to these structures may cause rupture of the muscles, ligaments resulting in dislocation of the joint, which leads to loss of function of the shoulder joint (frozen shoulder).<sup>32</sup>

### 9) Vidhura Marma

**The structure involves** - Stylo mastoid artery, and the facial nerve is especially found at the site of Marma passing through the stylo mastoid foramen.<sup>33</sup>

#### Viddha lakshan (Traumatic Effect)

**According to Ayurveda** - The injury of Vidhura Marma leads to Baadhira, i.e., deafness.<sup>31</sup>

**According to the modern** - At remote level, under the consideration of anatomical structures, the vestibulocochlear nerve and the mastoid air cells can also be included as they have the values in the development of complications. Injury at Vidhura Marma may lead to deafness.<sup>33</sup>

### 10) Utkshapa Marma

**The structure involves** superficial and deep fascia of the temporal region, i.e. up to the meninges, super facial temporal artery, deep temporal artery and vein zygomatic temporal nerve. The pterion is a small circular area within the temporal fossa which contains the junction of the frontal, sphenoid, parietal and temporal sutures.<sup>34</sup>

#### Viddha lakshan (Traumatic Effect)

**According to Ayurveda**- The person lives if the shalya (foreign body) has not been removed. The impacted shalya falls off by itself (without being manually removed), and the person survives.<sup>31</sup>

**According to modern, a blow to the head's side** may fracture the thin bones forming the pterion, rupturing the middle meningeal artery, and producing extradural clot formation. Blood and CSF come out from this point which causes an increase in intracranial pressure, cerebral oedema and ultimately death.<sup>34</sup>

### CONCLUSION

All the above descriptions show the importance and vitality of the marma point. Marma is the confluence of muscles, veins, ligaments, bones, and joints. In these places, prana (life) resides specifically by nature; hence when fatal spots are injured,

producing their respective effects. Snayu plays an important role in the posture of the human body, Snayu present in the human body are closely allied to vata. Snayu marma, better known as the vital point in ayurvedic anatomy, is a specific location in the human body characterized by the predominance of the ligament. Injury to snayu will cause more harm to the human body than caused by other elements. The injury to the nerve, muscles or ligaments may lead to a decrease in length, strength movement and emaciation of limb. Therefore, knowledge of marma, especially snayu marma, is essential for physicians and surgeons for preventive and curative aspects. Therefore, we need to protect this structure by knowing its structure.

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