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Anatomical Understanding of *Urdwashakhagata* (Upper Limb) *Ani Marma* (A Vital Area) - A Conceptual Study

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ABSTRACT

The knowledge of *Marma* (Vital Area) dates back to Vedic period. The description of 107 *Marma* are available in the literature of Ayurveda. They are classified on the basis of structure, region, prognosis and dimensions. *Ani Marma* is described as a *Vaikalyakara* based on effect of injury and categorised structurally as *Snayu Marma (Neuroconnective tissue)* located in upper and lower limbs respectively. But there is a need to identify particular structure that can be identified as *Snayu* and injury to that causing *vaikalatwa*(deformity).. The *Snayu* is considered as connective tissue that binds *Mamsa, Asthi*, and *Meda* of the body and gives support and strength. *Snayu Marma* injury causes acute tetanus like symptoms such as stiffness of body, severe pain, deformity and ends in death. It is *Vaikalyakara Marma*, because of injury results in permanent deformity. There is a need to understand the basis of *Viddha Lakshana* and applied aspects of the same. This review will give a complete summary of *Urdwashakhagata Ani marma* about location, underlying structures and importance in *Marma* injury. This knowledge is useful to *Marma* therapist and Ayurveda surgeons. To extend the knowledge of *Marma* in clinical and surgical fields, it is necessary to know the actual structures present at those sites.

Key Words *Marma, Ani, Snayu, Vaikalyakara, Upper Limb, Functional Disability*

INTRODUCTION

Ayurveda is considered as the most reliable and novel Medical Science which has its signature over time immemorial. *Marma Shareera* is one of the important topic discussed in Ayurvedic texts. Different schools of thoughts have analysed this subject from various angles and developed their own thoughts. Sir Monier William and Macdonell coded the term *Marma* as a mortal spot, vulnerable point or any open or exposed or weak or sensitive part of the body[1]. The science of *Marma* was well known in olden days to the warriors and kings. The knowledge of *marma* was applied in the warfare to inflict maximum fatal response against enemy[2]. There are 107 *Marma* located in different parts of the body, on injury to these vital points patients may die or suffers from a kind of deformity. Hence these vulnerable points should

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be protected from the injuries. These marma points are conglomeration of structures like *Mamsa* (Muscular component), *Sira* (Vascular component), *Snayu* (Neuroconnective tissue component), *Asthi (*Sclerous component) and *Sandhi* (Articular component) together along with Prana (Life force) that resides making the place vulnerable. Each Marma possess one predominant structure of its composition and on this basis, they are classified as *Mamsa Marma, Sira Marma, Snayu Marma, Asthi Marma And Sandhi Marma*. Injury to *Marma* points produces symptoms like severe pain or deformity of limbs or death. Based on prognosis, *Marma* are classified as *Sadyopranahara Marma, Kalantarapranahara Marma, Vishalygna Marma, Vaikalyakara Marma And Rujakara Marma***.** The traumatized *Marma* that produce symptoms like permanent deformity or disability are grouped under *Vaikalyakara Marma* and are 44 in number. *Snayu* component is predominantly seen in *Vaikalyakara Marma* and are 16 in number, injury of which leads to symptoms of *vaikalyata*(deformity). *Ani Marma* is one of the *Vaikalyakara Snayu Marma* and are 4 in number. These *Marma* are situated 3 *angula (unit of measurement)* above the elbow and knee in each upper and lower limb respectively. Based on predominant structural entity it is a *Snayu Marma*, with the dimension of *half angula*. Trauma to this marma causes swelling, stiffness of the limbs and deformity of extremity[3]. Thus, the topic is selected to study the relevant structures present at the site of *Ani marma* of upper limb and the clinical implications in detail.

Table 1 Descriptions about Urdwasakhagata Ani Marma

S.no	Classification	Details
1	*Shadanganusara*(Gross division of body in to six regions)	*Bahugata marma* (Vital point of upper limb)
2	*Sankhyataha*(Based on Number)	Four in number
3	*Pramanataha* (Based on measure)	½ *Angula* (1/2 dimension)
4	*Rachanataha* (Based on structure)	*Snayu marma*
	Parinamataha (Based on prognosis)	*Vaikalyakara marma*
5	*Viddha Lakshana* (Based on traumatic effect)	*Shophabhivruddi, stabdasakthi/bahu*

DISCUSSION

Ayurveda classics have given importance on concept of regional anatomy. This is reflected through the gross division of body as *Shareerasysa Shadangatwam*. The human body is divided mainly into six regions for description purpose as two upper limbs, two lower limbs, head and neck as one component and trunk regions. Further it divided into *Anga –Pratyanga* (parts and subparts)[4]. Out of which *baahu* (Arm) and *sakthi* (leg) are stated as two symmetrical sub parts of the body. Contemporary science also opines the same. But in Ayurvedic literature only essential anatomy is considered. However, there are no direct references regarding description or brief explanation of *Urdwasakhagata Marma*. At the end of description of *Adhosakagahta* (lower limb) *Marma*, the author of *Sushruta Samhita* mention, that the *Marma* present in one limb, is the same that is present in the other limbs and with same number[3]. These *Marma* are said to be extending

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from the toes to the groins(hip joint). They are explained in caudocranial sequence. *Kshipra Marma* at lower most vital area and Vitapa Marma as most superior vital area in lower limb. Some *Shakaagata*(limb) *Marma* are located in only one aspect, whether anterior or posterior aspect of limb. The other *Marma* like *Kucha, Kurcha Sira* or *Ani Marma* are situated in both aspects respectively. From the above explanation, the Ani marma which is present in the thigh 3 *angula* above the knee in lower limb, will be present in the arm 3 *Angula* above the elbow region respectively. According to description, the Ani *Marma* is a *Snayu Marma* and Vaikalyakara in nature based on the structural and prognostic classifications. Each marma is conglomeration of five elements as-*Mamsa, Sira, Snayu, Asthi* and *Sandhi*. Any injury to these structures leads to death or disability of a person[5]. The probable structures related to *Urdwasakhagata Ani Marma* based on five structural entities are as below-

- *Mamsa* (Muscular component) – Biceps brachii muscle, Triceps brachii muscle
- *Sira* (Vascular component) - Brachial artery and its branches
- *Snayu* (neuroconnective tissue component) - Biceps tendon, Median nerve, Triceps tendon, Radial nerve
- *Asthi* (Sclerous component) - Distal one third of humerus bone.
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andhi (Articular component) - *Asthi Sandhi* cannot be appreciated anteriorly and posteriorly in this area. But musculotendinous junction of biceps brachii anteriorly and musculotendinous junction of triceps brachii in posterior aspect of Arm may be considered as sandhi component based on sandhi definition[4].

Ani Marma is included under *snayu marma* classification based on predominant structural entity. *Snayu* has been explained as fibrous structure which bind the joints and enables the body to bear weight[6]. *Acharya sushruta* described the word *Snayu* as binding the muscle with the bone[4]. Acharya Bhavaprakasha explained *Snayu* as binding the *Mamsa, Asthi* and *Meda* potently, and as these are stronger than *Sira*, can bind the joints also very strongly[7]. Recent authors like Gananath sen has described *Snayu* word as bunch of fine, stronger threads packed together and binds the joints[8]. Depending upon context, *Snayu* has different correlative meaning in contemporary science, such as tendon, ligament, and nerve or neurofibrous structure. In the dimension of half *Angula* circumference and depth at the specified location of *Urdwasakhagata Ani marma*, the most probable fibrous structure is anteriorly biceps tendon. The Biceps brachii muscle arises by two tendinous heads and forms bulk in mid arm. Both heads expand into fusiform bellies, lies side by side and do not join until about 7cm proximal to elbow, then form a flat tendon by joining the bellies. The distal biceps tendon passes through cubital fossa and inserted on radial tuberosity. It is a powerful supinator of forearm and flexes the elbow in supinated position[9]. The fibrous structures binding muscle to bone in the half

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angula dimension at the posterior surface of arm 3angula above the elbow is the Triceps tendon. Triceps brachii is the principle muscle responsible for extension of the elbow joint and adduction of the Arm at shoulder. It is arising from three heads and inserted on olecranon process of ulna. This tendon is formed 5cm proximal to ulna bone and binds it[10]. From above description, Anterior and posterior aspect of distal one third of arm justifies the *Snayu* structure within half *Angula* and this region can be correlated with Ani marma location. It is important to measure depth of marma injury based on *Marma Viddalakshana* (post trauma effect). Injury to Ani marma causes swelling and stiffness of the Arm, may leads to functional disability in the extremities. The cause of injury could be stab injury, window glass injury, industrial accidents, gunshot injury and Road Traffic Accidents. The distal biceps tendon is involved in 3-12% of biceps brachii muscle injuries. People complain a "pop" at the time of injury associated with swelling, pain and ecchymosis[11]. Toczylowski et al reported complete rupture of the distal biceps in female patients, presented with symptoms of tenderness, swelling, extensive ecchymosis, and a soft-tissue defect just proximal to the antecubital fossa of the right upper extremity. Both patients had a significant deficit in supination strength and elbow flexion power in comparison to the contralateral side. Both surgical and non-operative treatment were used in their care and considered their results satisfactory with predictable outcomes by 16 weeks[12]. The *Vaikalyata* (deformity) is possible in delayed or non-treated tendon rupture cases. At the posterior aspect of Arm, the probable Snayu structure of *Ani marma* is Triceps tendon. Injuries to this tendon can range from a minor strain to a major rupture. Ruptures of the distal triceps tendon (DTTR) are rare, but injured Triceps brachii tendon produces symptoms like bruising, swelling along the posterior aspect of Arm with limited extension. Marappa Ganeshan R, et al. reported a case of DTTR, presented with bruising over the posteromedial aspect of his left arm associated with swelling and painful limited extension. Four months later, he was unable to extend his elbow against gravity and had wasting of the triceps muscle with loss of contour of the muscle mass. The patient was able to return to manual work 3 months after surgical repair[13]. Neumann et al reported Traumatic Rupture of the Distal Triceps Tendon (A Series of 7 Cases) with the symptoms of with a swollen elbow and the disability to extend the flexed elbow against force. The mode of injury is posterior hit of their elbows, were treated surgically[14]. The deformity is possible in above cases if untreated or delayed surgical intervention due to complete tendon atrophy. These sign and symptoms are very similar to the Ani marma injury as described in Ayurveda classics. Form the above description on clinical features of distal arm injuries gives an idea behind pointing *Marma* at distal Arm. The snayu word correlation is difficult from the literatures but from the clinical and structural basis it can be concluded with tendon of biceps and triceps respectively along with Golgi tendon organ, the

sensory receptor present as a neurological entity within it controlling the flexion and extension function along with stretch receptors present in related *peshi*.

CONCLUSION

Marma is the conglomeration of five elements as- *Mamsa, Sira, Snayu, Asthi* and *Sandhi*. Any injury to these structures leads to death or disability of a person. Based on predominant structural entity and prognosis, *Ani marma* is a *Vaikalyakara Snayu Marma*. The word *Snayu* refers to be hard fibrous structure, binding the muscle with the bone potently. As these are stronger than *Sira*, it can bind the joints also strongly. At the distal one third of arm such *Snayu* structures which can be seen are tendon of biceps brachii and triceps brachii. The sign and symptoms of injured tendons are very similar to the *Ani Marma Vidda Lakshana* as described in Ayurveda classics. From the above case reports on distal arm injuries, it gives an idea in pointing vulnerable area (*Marma*) that can be related with *Ani Marma* and impact of injury causing deformity. Hence as per classical description and case studies and literature review, we can conclude that the musculotendinous junctions of Biceps and triceps along with its neurological component in the form of Golgi tendon organ can be considered as *Ani Marma* anatomically. Injury to this causes loss of normal movement of arm related to upper limb or complete loss of movement (*Stabdatha*) along with pain and inflammation (*Shophabivruddi*), that cause deformity (*Vaikalatwa*).

CONFLICT OF INTEREST: None

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