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Anatomical consideration of *Amsa Marma* - A Cadaveric Study

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ABSTRACT

The concept of *Marma* is one of the most unique principles mentioned in ancient Ayurvedic texts. *Marma* are the vital points in the body where there is confluence of *Mamsa*, *Sira*, *Snayu*, *Asthi* and *Sandhi* where *Prana* resides. They generate the symptoms from excruciating pain to fatal effect when exposed to trauma. Ancient Ayurvedic texts have mentioned 107 vital areas in the body. *Amsa Marma* is one among them, located in the back region. It is a *Vaikalyakar Marma* and result in *Bahustabdhatta*. In this study, scholar was trying to find out exact location of *Amsa Marma* and its relationship with *Amsa Sandhi* and other anatomical entities (in circumference of this *Marma*) with the help of cadaveric study. As a result, the study concludes that *Amsa Marma* is considered as ligaments of the shoulder joints.

Key words: Ayurveda, Marma, Vaikalyakara, Amsa Pradesha, Bahustabdhatta.

INTRODUCTION

The numerous scientific concepts of *Ayurveda* need detailed explanations to assess their utility in the field of science. The concept of *Marma* is one such factor, which is one of the unique principles that stands equally important in the clinical field in modern era. The knowledge of *Marma* was evolved by practical use in both healing and warfare. The healing effect of *Marma* can be understood by yogic sciences and different postures of Yoga which stimulates the *Marma* points.^[1] The second aspect can be understood by use

of weapons like arrow or by hitting the enemy in ancient warfare and in hunting after wild animals aiming at the sites of the body where great damage is achieved even by less effort. Such vulnerable spots in the body identified during ancient times were called *Marma*.^[2]

Marma has been given utmost importance by most of the *Acharya* of *Samhita* period. *Acharya Sushruta* has elaborately mentioned 107 *Marma*, along with their location, dimension, predominant structures, effect of injury in the body. *Marma* are confluence area of *Mamsa*, *Sira*, *Snayu*, *Asthi* and *Sandhi* in the body where specially *Prana* resides by nature.^[3] *Marma* is in variably made of *Panchamahabhutas*, these are said to be constituted by three important vital elements *Vayu*, *Teja*, and *Soma* they also contain *Trigunas* namely *Satva*, *Raja*, *Tama* and *Bhutatmas* in the body, mind and soul.^[4] Therefore, *Marmas* produce particular complications or desired healing based on how they are manipulated.

Considering the origin and the practical utility of 107 *Marma*. These vital points in the body when exposed to trauma generate the symptoms from excruciating pain to fatal effect.^[5]

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The knowledge of *Marma* is very important in prevention of complications during the procedures of *Agni Karma*, *Kshara Karma* and *Shashtra Karma*. In case of trauma, it is useful in understanding the possible anatomical structure affected and possible deformities which may be produced. *Sushruta* is of the view that the knowledge of *Marma* covers half of the knowledge of *Shalya Tantra*. Persons injured in such vital spots die immediately; if anyone survives by the treatment of skilful physician, he is sure to suffer from deformities.^[6]

Acharya *Sushruta* has classified these *Marmas* according to the *Shadang* distribution for the purpose of easy understanding their locations, like *Sakthi Gata* (limbs), *Vaksha* (thoracic), *Udar* (abdominal), *Prishtha Gata* (back) and *Urdhava Jatru Gata* (above the clavicular level). *Prishthagata Marmas* are 14 in number; these are further divided into upper division and lower division by Acharya *Ghanekar* *Marmas* of upper division are *Brihati*, *Amsaphalaka* and *Amsa* while lower division contains *Katiktaran*, *Kukundar*, *Nitamb* and *Parshvasandhi Marmas*.

MATERIALS AND METHODS

The study has been conducted in two parts:

Conceptual Study - Classical literature, modern literature, books, thesis, journal articles, internet materials were reviewed and related information and references were collected and analysed scientifically to determine the anatomical aspect of *Amsa marma*.

Cadaveric Study - A thorough dissection of shoulder region was carried out on human embalmed cadavers.

OBSERVATIONS

Conceptual Study

Etymology

अच्

अं स् + अच् = अंस

The word *Amsa* is formed from when the *Dhatu Amsa* gets mix with *Pratyaya 'Ach'*. Word *Amsa* means shoulder (*Skandha*).

Location

बाहुमूर्धग्रीवामध्येऽसपीठस्कन्धनिबन्धनावंसौनाम, तत्र स्तब्धबाहुता ।
(सु.शा.६/२७)

अंसौ-स्कन्धौ स्यायुमर्मणी अर्द्धाङ्गुले वैकल्यकरे तत्र बाहुस्तम्भः ।
(भा.प्र.पू.खं.३/२३२)

Description of *Amsa Marma* in Ancient Literatures

Maharshi Sushrut and *Acharya Dalhana* stated that *Amsa Marma* is situated between the *Bahumurdha* (tip of arm) and *Greeva* (neck), which binding *Ansapitha* and *Skandha*. It is two in numbers. According to *Acharya Vagbhatt* it is situated on either side in between the *Greeva* (neck), *Baahu* (arm) and *Shira* (head) which bind the *Ansapitha* and *Skandha*. *Bhavprakash* considered *Skandha* as *Amsa Marma*.

Acharya Dalhana gave his specific opinion on the structure basis that *Amsa Marma* is "*Mansa Sira Sandhi Hina*."

Injury to this *Marma*, results in stiffness of the limb with loss of function. It includes all the soft tissues like muscles, ligaments, tendons etc., which take part in the formation of shoulder joint with scapula. An injury to these structures may cause rupture of the muscles, ligaments resulting in dislocation of joint, which leads to loss of function of the shoulder joint. According to *Acharya Vagbhatt* the injury to *Amsa Marma* leads to *Bahukriyahara* i.e., loss of function of upper limb.

Basis of Classification	Types
Structural (<i>Rachananusara</i>)	<i>Snayu Marma</i> (<i>Sushruta</i>) <i>Snayu Marma</i> (<i>Vagbhata</i>)
Prognostic (<i>Aghata Parinamanusara</i>)	<i>Vaikalyakara Marma</i>
Regional (<i>Shadanganusara</i>)	<i>Prishthagatagata Marma</i>
Dimensional (<i>Parimananusara</i>)	1/2 <i>Angula</i>
Numerical (<i>Sankhyanusara</i>)	2
Based on qualitative attributes (<i>Gunanusara</i>)	<i>Soumya</i>

Amsa Marma according to Authors

Dr. Ghanekar	Ligaments of the shoulder joint and trapezious muscles
J. N. Mishra	Ligaments of the shoulder joint
Dr. D. G Thatte	Shoulder joint and its ligament
Dr. A. K. Pathak	Ligaments of shoulder joint
Dr. S. K. Joshi	Coracohumeral Ligament Glenohumeral Ligament Trapezious muscle

Cadaveric Study

The cadaver is placed in supine position. Skin incision from the jugular notch along the clavicle to the acromion is made and continue downwards to the lateral side of the arm to a point that is approximately halfway down the arm.

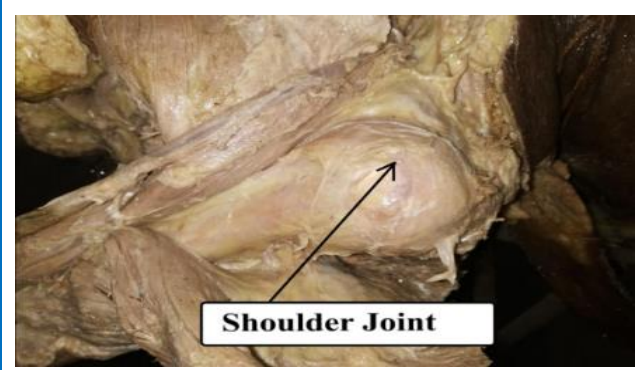
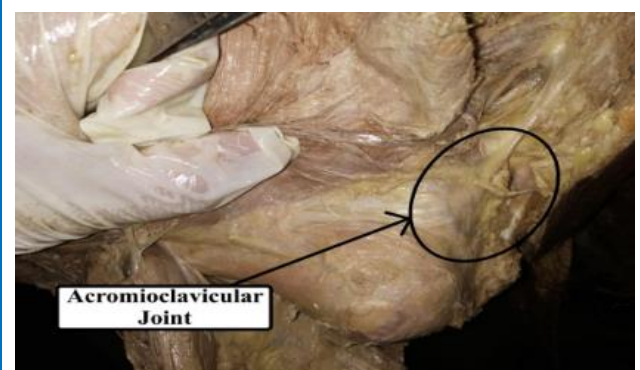
The trapezius muscle from the lateral end of the clavicle is being detached. Coracobrachialis and pectoralis minor muscles from the coracoid process are also detached. The acromioclavicular joint is now exposed. After removing the joint capsule coracoclavicular ligament is seen with its two parts i.e., Conoid ligament and Trapezoid ligament. The conoid and trapezoid ligaments prevent the acromion from moving inferiorly relative to the clavicle, thus strengthening the joint. After this coracobrachialis muscle, long head of the triceps brachii muscle and the short head of the biceps brachii muscle are removed leaving the subscapularis muscle intact

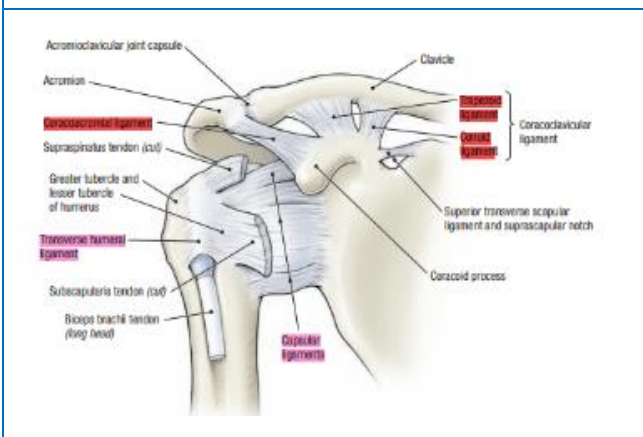
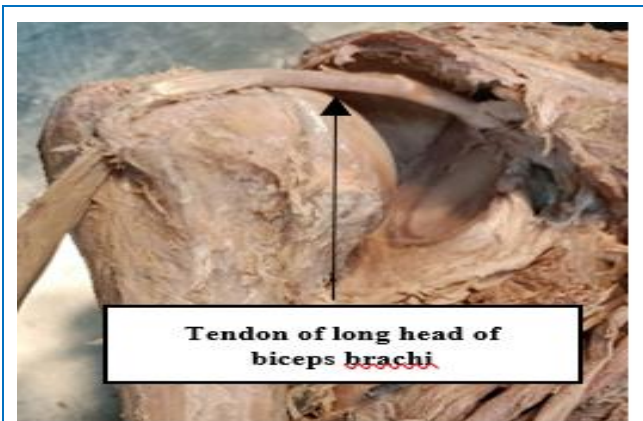
The cadaver in placed in prone position. Tendons of the supraspinatus, infraspinatus, and teres minor muscles blend with the joint capsule. The tendons are removed. The posterior surface of the joint capsule is now exposed. The joint capsule is attached to the anatomical neck of the humerus. The posterior surface of the joint capsule is opened. With the help of saw or a chisel the head of the humerus at the anatomical neck is removed. A probe is used to explore the glenoid cavity. The glenoid labrum and three glenohumeral ligaments, which strengthen the anterior wall of the

fibrous capsule were seen. Observe that the tendon of the long head of the biceps brachii muscle passes through the glenoid cavity and is attachment to the supraglenoid tubercle.

Place the cadaver in the supine position. The coracoacromial ligament, which spans from the coracoid process to the acromion is cleaned. The coracoacromial ligament, the acromion, and the coracoid process prevent superior displacement of the head of the humerus.

Muscles	Trapezious muscle, levator scapuli muscle, coracobrachialis pectoralis minor muscles, head of the biceps brachii muscle, supraspinatus, infraspinatus, subscapularis muscle and teres minor muscle
Ligaments	Coracoclavicular ligament (conoid ligament, trapezoid ligament) acromioclavicular ligament, coracoacromial ligament, glenohumeral ligaments, coracohumeral ligament and transverse humeral ligament
Blood vessels	Subscapular artery and vein
Bone	Scapula, head of humerus and clavicle
Joint	Glenohumeral joint and acromioclavicular joint





DISCUSSION

Marma are the part of the body which exhibits a peculiar sensation or unusual throbbing and causing pain on pressure. The place of *Amsa Marma* should be considered in between the shoulder, neck and arm region and the length of *Amsa Marma* is *Ardha Angula*. It is *Snayu Marma* on the basis of *Rachna* and *Vaikalyakar Marma* on the basis of *Parinama*. *Parimana* of *Amsa Marma* is *Ardhangul* and it is two in numbers. An injury to the *Amsa Marma* cause *Stabdhabahuta* (stiffness in arm), In the *Ashtang Hridaya Samhita*, *Bahukriyahar* (loss of function of the arm) is considered as *Aghataja Lakshana* of *Amsa Marma*.

Dr. Ghanekar considered that *Amsa Marma* to be the ligament of shoulder joint and trapezius muscle. Prof. D.G. Thatte in his book surgical anatomy of *Ayurveda*, mentioned that the shoulder joint and its ligament can be taken for the *Amsa Marma*. The trapezius and latissimus dorsi muscles are also included in this *Marma*, because these muscles help in the movements of *Bahu*. Vd. R.R. Pathak, Dr. Ashutosh K. Pathak and

Dr. Patil counted this *Marma* as to be the coraco-clavicular ligaments, conoid ligament, trapezoid ligament, superior acromioclavicular ligament and coraco-acromial ligaments. In modern science, on the back, the following structure found at the site of *Amsa Marma* - the shoulder joint, acromioclavicular joint, acromioclavicular ligament, coracoacromial ligament, Coracoclavicular ligament, coracohumeral ligament, rotator cuff muscles, subacromial bursa, and suprascapular nerve.

“*Bahumurdha*” is correlated with deltoid prominence, *Greeva* with root of the neck, “*Ansapitha*” with exterior border of the scapula and shoulder region and “*Skandhanibandhavanso*” from ligaments of the shoulder in modern science. Hence the location of *Amsa Marma* lies in between the deltoid prominence and root of the neck. That is where ligaments, subacromial bursa and rotator cuff tendons are present.

According to structure, acromioclavicular ligaments, coracoacromial ligament, Coracoclavicular ligament, and coracohumeral ligament, subacromial bursa and tendons of the rotator cuff muscles are important here, trauma on these site produces stiffness in the arm would be common in upper limb because these structures conduct movements of the shoulder joint

Injury on the *Amsa Marma* leads to symptoms such as *Stabdhabahuta* (stiffness in arm), causing deformity in the arm and the arm does not function properly. An injury to that part of ligaments may leads to rupture of the ligaments resulting in dislocation of the joint, stiffness of the arm and loss of function of shoulder joint. Injury to the *Vaikalyakar Marma* also leads to deformity of that part. It is concluded that the occurrence of *Stabdhabahuta* symptoms on injury to *Amsa Marma* indicates *Vaikalyakar Marma*.

CONCLUSION

Based on the literature study, cadaveric dissection, and discussion, it has been concluded that the location of *Amsa Marma* lies in between the deltoid prominence and root of the neck. That is where ligaments, subacromial bursa and rotator cuff tendons are

present. It has been concluded that the presence of ligaments at the site of *Amsa Marma* is indicative of *Snayu Marma*. The occurrence of *Stabdhabahuta* symptoms on injury to *Amsa Marma* indicates *Vaikalyakar Marma*. *Stabdhabahuta* can be claimed as *Vikalta* which affirms the *Amsa Marma* as *Vaikalyakar Marma*, can attributed to the injury of acromioclavicular ligaments, coracoacromial ligament, Coracoclavicular ligament, subacromial bursa and rotator cuff muscles.

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