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ANATOMICAL REVIEW OF *KAKSHADHARA MARMA* W.S.R TO ERB –DUCHENNE PALSY

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ABSTRACT

Ayurveda is one of the most trustworthy and concluded ancient remedial science which give rise to proved for extra than 5000 years. Even though the modern science is changing from time to time, *ayurveda* has maintained its special place till death. *Marma Sharir* is the distinctive concept of *ayurveda*.The detailed description of *Marma Sharir* is present in *Samhitas*. *Acharya Sushruta* acknowledged every aspect of *Marma* like definition, location, sign and symptoms of *Marma* injury. According to the fundamental definition of *Marma* as per *Sushruta, Marma* are vital areas regarded as conglomeration of *Mamsa, Sira, Snayu, Asthi and Sandhi*. Total figure of *Marma* are 107 described in *Samhitas* which are located in different parts of body. These vital points when exposed to trauma generate the symptoms pain to lethal effect. *Kakshadhara Marma* is one of the *Bahu Marma* situated in both axilla region and they are two in number. Trauma to the *Kakshadhara Marma* leads to *Pakshaghata* which we can co-relate with Erb's palsy in modern aspect. Erb's palsy is the paralysis of the arm caused by injury to the upper trunk (C5-C6) of the Brachial plexus. So the major ambition of this study is to understand the *Kakshadhara Marma*, it's location in human body, its applied aspect and to achieve out any similarity with the most important points enlighten in *ayurveda* classics.

KEYWORDS: *Marma, Kakshadhara Marma, Pakshaghata,* Erb's Palsy, Brachial Plexus.

INTRODUCTION

Marma Sharir is one of the prominent subjects in *Ayurveda. Marma Vigyana* was residential as science of war. There are a lot of references from *Vedas* as regarding attack on *Marmasthana* of enemies and defending one's *Marma*s by taxing protectants. Similar in today's short-lived life, it is very important to protect our *Marmasthanas* because of heavy road traffic which results in accidents causing injury to *Marmas*. References of *Marmas* are found in *Rigveda*.[1]

In dictionaries the word "*Marman*" measures mortal sport, vulnerable point, weak or hypersensitive crave up of body, joint or articulation, core of anything, vital structure.[2] *Marma* in *Ayurvedic* classics is illustrated as the vital point in human body, the injury of which leads to termination of life. In historic era a *vaidya* had to reveal out with more exigencies during the time of war and it might have been the reason why *Marma* was given utmost importance in our *Samhitas*. Descriptions of 107 *Marma* given by all *Acharyas* being classified into five varieties on the basis of structure involved, five on the basis of effect of injury, five on the basis of location on the body[2] *Kakshadhara Marma* is one such vital region in human anatomy which falls under the above classification on the basis of structure involved. It is explained as one among the *Snayu Marma*[3] Totally there are 27 of *Snayu Marma. Kakshadhara* and *Vitap Marma* both are considered under *Sira Marma* by *Acharya Vagbhatta* so he stated that *Snayu Marma* are 23 in number[4] *Kakshadhara Marma* is located between *Vaksha* (chest) and *Kaksha (*Axilla)[5] According to *Amarkosha* the meaning of *Kaksha* word is *bahumoola* (origin of *Bahu*). So *Kakshadhara Marma* is situated at the axilla region. An injury to *Kakshadhara Marma* result in deformity in *bahu* (arm), *Pani* (hand) and *anguli* (fingers)[6] Erb's palsy is a paralysis of arm caused by injury to the upper trunk (C5 – C6) of the brachial plexus continued during delivery Injury to armpit during birth causes Erb's palsy[7] Hence this study is aimed to analyses the anatomical structure of *Kakshadhara Marma* and its *Viddha lakshana*. Present work is been taken up with an idea of updating early concept of a better understanding of *Kakshadhara Marma* in accordance with the advance anatomical description in view of modern and applied anatomy and also to explore *Viddha lakshana* of *Kakshadhara Marma* in relation to *Pakshaghata*.

MATERIALS AND METHODS

1. The *Ayurvedic* literature related to *Kakshadhara Marma* was studied from various sources like *Brihat – trayee, Laghu Trayee* etc.

2. The modern literature related to shoulder joint will be studied.
3. The modern literature related to brachial plexus is studied.
4. The modern literature related to Erb's palsy is studied.

REVIEW OF *KAKSHADHARA MARMA*

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As per the description, the exact location of *Kakshadhara Marma* is mentioned as between *Kaksha* (Axilla) and *Vaksha* (Chest) that will be more related to *Kaksha*[5] The *Kaksha* region refers to root of the arm i.e., the joint which connects the arm to the shoulder known as *Kaksha Sandhi*. *Vaksha* is the region above the *Hridya* (Heart) and below the *Kantha* (Neck). It may be considered as the sub-clavicular region and the region above the breast. The word *Dhara* means bearing or holding, hence it is named as *Kakshadhara*, it is assumed that it holds the *Kaksha* region with the help of muscles and ligaments. So the location of the *Marma* is in between the chest and *Kaksha* S*andhi* but nearer to the *Kaksha Sandhi* as the name indicates. It is situated in the region of the body where the upper arm is connected with the trunk. Specifically, the *Kakshadhara Marmasthana* is to be considered just below the clavicle nearer to the *Kaksha Sandh*i. The muscles, ligament, blood vessels and nerves in the sub-clavicular and brachial plexus region are related to the *Kakshadhara Marmasthana*. Any injury to this particular *Marmasthana* leads to *Pakshaghatha* or paralysis of the upper limb.[5]

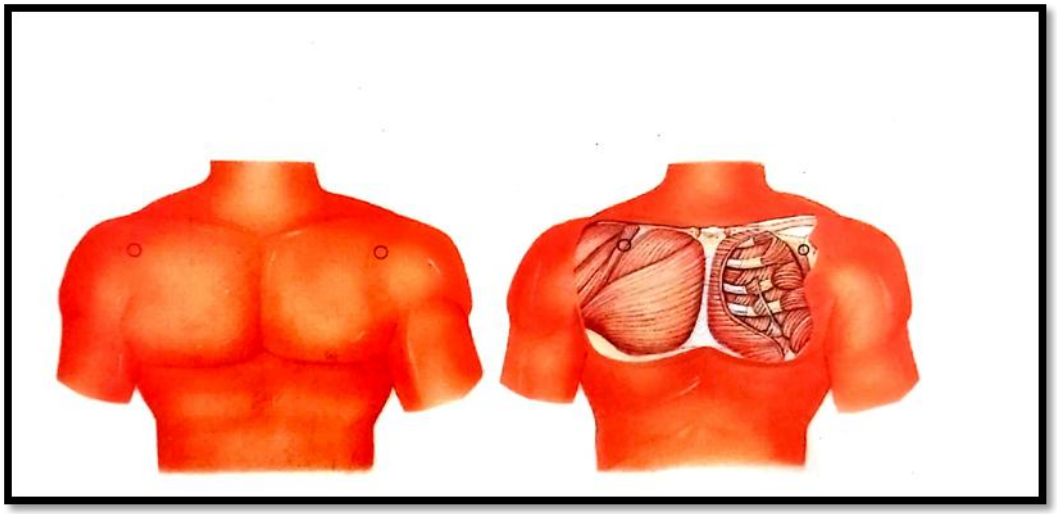

Figure 1.0: (Anatomical site of *Kakshadhara Marma*).

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As per the description, *Marmas* are the conglomeration of the five elements of body namely *Mamsa*, *Sira*, *Snayu*, *Asth*i and *Sandhi*. In natural phenomenon, the *Pranas* are seated at these places of conglomeration.[3]

Mamsa: Pectoralis major, pectoralis minor, deltoid, coraco-brachialis, long head and short head of biceps brachii, subscapularis, tapezius, supraspinatus, infra spinatus, teres major, teres minor, and triceps brachii all these muscles were observed in the sub-clavicular and shoulder region explained in *Kakshadhara Marmasthana.*[8]

Sira: *Acharya Sushruta* explained that *Sira* (Vessels) are introduce in *Marma*s. They nurture muscles, bones, joints and ligaments. These next blood vessels are observed in the *Marmasthana*, Superior thoracic artery, lateral thoracic artery, thoraco-acromial artery, circumflex scapular artery, thoraco-dorsal artery, anterior and posterior circumflex humeral artery, axillary vein, brachial vein, cephalic vein, subclavian vein, supra scapular artery, superficial cervical artery.[8]

Snayu: According to modern explanation the these ligaments are found during dissection. Superior, middle and inferior gleno-humoral ligament, coraco-acromian ligament, capsular ligament, acromio-clavicular ligament, transverse humoral ligament. The fascia that has been observed are the deep fascia covering the deltoid, subscapular fascia, clavipectoral fascia.[8] Since *Snayu* does the *Anga Bandhans*, these ligaments may be compared with *Snayu* in *Marmasthana.*

Nerves:- Posterior subclavicular nerve, cutaneous branches from axillary nerve, cords of brachial plexus, axillary nerve, medial and lateral pectoral nerve and median nerve these are observed in the subclavicular and shoulder region related with *Marmasthana*.

Asthi and Sandhi :- *Acharya Sushruta* said that one *Asthi* is present in the *Bahu* and two in the *Amsaphalaka* (Scapula). These results in *Kaksha Sandhi* (Shoulder joint). It is a form of *Ulukhal Sandhi*. As per the modern science the articular parts of the humerus, scapula, and clavicle are observed as the bony parts and joint formed is the gleno-humeral joint which is the ball and socket variety of synovial joint.[8] These bony parts are compared as *Asthi* the *Marmasthana* and gleno-humeral joint may be compared as *Sandhi* in the *Marmasthana*.

Table 01: Anatomical description of *Kakshadhara Marma.*

Name of *Marma*	***Kakshadhara***
Number	02
Type(acc. to *Rachana*)	*Snayu*
Type(acc. to *Aghataj parinaam*)	*Vaikalyakara*
Type(acc. to *Pramaan*)	01 *angula*
Anatomical Site	Axilla (Brachial plexus)
Structures involved	Subscapularis, Pectoralis minor, Brachial plexus Axillary artery, Axillary vein, Axillary lymph node
Sign if injured	Paralysis of arm

Review of Brachial Plexus

The Brachial plexus is a somatic nerve plexus formed by inter-communications among the ventral rami (roots) of the lower four cervical nerve (C5-C8) and the first thoracic nerve (T1).It consists of roots, trunks, divisions, cords and branches[7]. It undergoes a complex pattern of branching and convergence before terminating as peripheral nerves that provide motor and sensory innervention to the upper extremity.

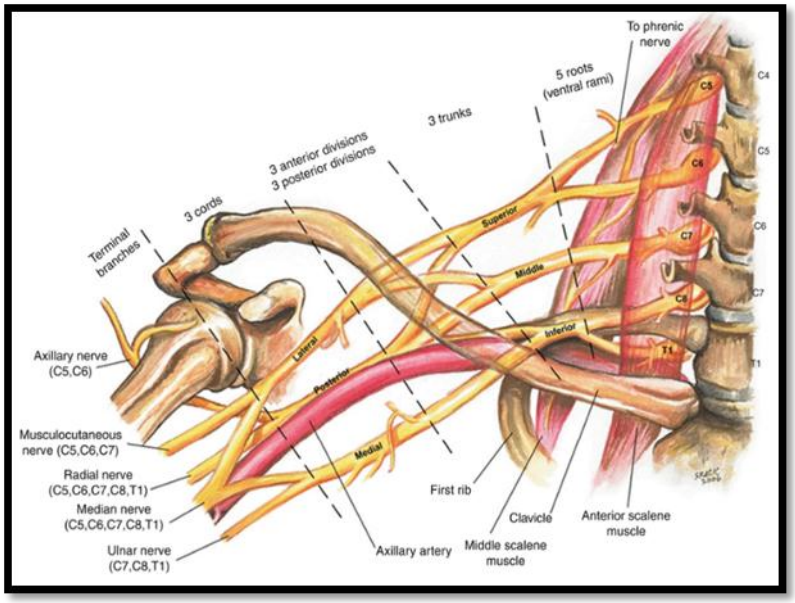

Figure 2.0 (Brachial plexus).

Roots and Trunks: Roots C5 and C6 join to form the upper trunk, Root C7 forms the middle trunk and roots C8 and T1 join to form the lower trunk of brachial plexus.

Divisions: Each trunk divides into ventral and dorsal divisions. These divisions join to form cords.

Cords: Lateral cord is formed by the union of the ventral divisions of the upper and middle trunks, Medial cord is formed by the ventral division of the lower trunk and the posterior cord is formed by the union of the dorsal divisions of all the three trunks of brachial plexus.

Branches: Long thoracic *nerve* (C5, C6, C7) and dorsal scapular nerve (C5) are the branches of roots. Supra-scapular nerve (C5, C6) and nerve to sub-clavius (C5, C6) branches are arises only from the upper trunk. Three branches (lateral pectoral nerve, musculo-cutaneous nerve and lateral root of median nerve) are arises from lateral cord. Five branches (medial pectoral nerve, medial cutaneous nerve of arm and forearm, ulnar nerve, medial root of median nerve) are the branches of medial cord. Five branches (upper sub-scapular, thoraco-dorsal nerve, lower sub-scapular, axillary and radial nerve) arise from posterior cord.

Erb's Palsy (Erb-Duchenne Palsy)

Erb's palsy is the paralysis of arm caused by injury to the brachial plexus specifically the upper trunk of brachial plexus.A brachial plexus injury at the 'Erb's point' will lead to, what is known as 'Erb-Duchenne Paralysis'. The Deformity Is Known As "Policeman's Tip Hand" Or Waiter's Tip Hand.[9]

Causes

1. Birth injury
2. Trauma to the head and shoulder
3. Clavicle fracture
4. While giving Anesthesia

Disability The following movements are lost

1. Abduction and lateral rotation of arm.
2. Flexion and supination of the fore arm.
3. Bicep and supinator jerk are lost.
4. Sensations are lost over a small area.

The brachial plexus is a network of nerves that originate in the neck region and branch off to form most of the other nerves that control movement and sensation in the upper limbs, including the shoulder, arm, fore arm and hand. The radial, median and ulnar nerves originate in the brachial plexus. Palsy means weakness and brachial plexus birth palsy causes arm weakness and loss of motion. One region of the upper trunk of the brachial plexus is called

Erb's point. Six nerves meet here**.**C5-C6, supra-scapular nerve, nerve to subclavius and anterior and posterior division of C5-C6.[9]

Table 02: Structures involved in *Kakshadhara Marma* and Erb's palsy.

Structures	***Kakshadhara Marma***	**Erb's palsy**
Muscles	Pectoralis major, Pectoralis minor, deltoid, coracobrachialis, biceps brachi, subscapularis, tapezius, supraspinatus, infra spinatus, teres major, teres minor, and triceps brachii	Paralysis and atrophy of deltoid, biceps brachii, brachialis, brachioradialis, partly supraspinatus, infraspinatus and supinator.
Vessels	Axillary artery and Axillary vein	Axillary artery and Axillary vein
Nerves	Brachial plexus	Brachial plexus upper trunk (C5-C6) Most commonly involved sub scapular, musculo-cutaneous and axillary nerve
Symptoms	*Ayaama, Akshepaka, Stambha, excessive Ruja* in *Snayus, Yanasthana Ashakthi and Vaikalyata* in *Anga*	Pain Loss of sensation Muscle weakness Paralysis of some or all of the muscles of arm

DISCUSSION

According to *Sushruta* the *Kakshadhara Marma* is a *Snayu Marma*. *Acharya Vagbhatta* mentioned it as *Sira Marma*. According to Prognosis it is *Vaikalyakar Marma.* The *Snayu Marma Viddhalakshana* are *Akshepaka* (Convulsion), *Stambha* (Stiffness), *Ruja* in *Snayus* (Excessive pain in ligaments), *Yanasthana*, *Ashakthi* and *Vaikalyatha* (Deformity) in *Anga.*[4] In the case of *Kakshadhra Marma* viddha symptom explained is *Pakshaghata.* It is a *Snayu Marma* and *Snayu* observed in relation to *Marma* are:

- ✓ Glenohumeral ligaments,
- ✓ coracoclavicular ligament,
- ✓ transverse humeral ligament,
- ✓ coracoacromial ligament,
- ✓ coracoclavicular ligament, and the
- ✓ Clavipectoral fascia.

These are the important vital structures that protect the axillary vessels and nerves are present in this area. The structures piercing the clavipectoral fascia are thoracoacromial artery, cephalic vein, and lateral pectoral nerve. These strctures justifies the statement of Acharya *Vagbhatta*, though he states that Kakshadhara *Marma* is a sira *Marma*. The blood vessels related to *Kakshadhara Marma* are axillary artery, superior thoracic artery, thoraco acromial

artery etc. According to *Vagbhatta* Results of trauma on Kakshadhara *Marma* is disability occurs due to heamorrhage and paralysis. An injury to these vessels will result in severe blood loss and lack of blood supply to the muscles of arm. This will lead to *Pakshaghata.* In Erb's palsy structures concerned are upper trunk of the brachial plexus, specially suprascapular nerve, musculocutaneous nerve and axillary nerve, axillary vessels, Injury to these vital structures will lead to the Erb's palsy. The Erb's palsy is the symptom of *Kakshadhara Marmabhighata.*

CONCLUSION

From the above classical description and its co-relation with modern anatomical science we can conclude that *Pakshaghata* observed at *Kakshadhara Marma* can be co-related with Erb's palsy. The structures affected in Erb's palsy are upper trunk of brachial plexus (C5-C6), suprascapular nerve, nerve to subclavius and anterior and posterior division of C5-C6. The *Viddhalakshana* documented by Acharyas at the *Kakshadhara Marma* shows similarity with the signs and symptoms of Erb's palsy. The affected part is the brachial plexus which situated in between the *Vaksha* and *Kaksha* region. At this site, *Acharya Sushruta* have stated the site of *Kakshadhara Marma.* Finally, we can conclude that in *Viddhalakshana* of *Kakshadhara Marma* is injury to brachial plexus and in Erb's palsy, there is trauma to upper trunk of brachial plexus.

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