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## Neuro-vascular Consideration of *Urvi Marma* of Upper Limb and its Applied Aspects

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### ABSTRACT

*Ayurveda* is the oldest medical science that covenant with physical and psychological health of the human being. According to classical literature of *Ayurveda* the vital energy termed as *Prana*, is also recognized as subtle life force energy for the existence of humanity. *Prana* is entity of the body, but still it is being embedded in specific location of various structural compositions of body. Such a gathering of five fundamental human structures that are Muscle, Vessel, Ligament, Bone, & Joints form very sensitive and highly vulnerable points where this vital force energy is residing. These specific locations are described as concept of *Marma*. 107 *Marma*-points are described by most of the *Acharyas* and on the basis of *Marma Vastu* (involved structures), are classified into five classes also On the basis of *Parinam* (effect of injury), and on the basis of *Shadang Sharir* (location on the body) divided various types. Any severe injury over these areas becomes cause of death. At the mid of Arm lie *Urvi Marma* on the structural basis is type of *Sira* (vascular structure) *Marma* with one *Angula Pramana* and *Vaikalyakara* in nature. *Marma Chikitsa* through various procedures is helpful to treat many health related problems

Some techniques that are adopted in *Marma Chikitsa* (i.e. Massage with and without herbal products, application of bearable pressure over *Marma* points, and application of *Siravedha* (Venupuncture) near the site of *Marma* points escaping the *Avedhya Siras*) are done to treat various diseases which originated through adaptation of faulty life style and psychological imbalance.

### KEYWORDS

*Ayurveda, Sira, health, Prana and vital energy, Urvi, Arm.*



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## INTRODUCTION

*Urvi Marma* lies at the middle of the arm above the elbow joints and injury causes wasting or atrophy of the arms due to loss or diminished blood supply to that area. It is a *Sira Marma* in nature, *Vaikalyakar* in consequences and acceptance an area in one *AngulPraman*<sup>1-2</sup>.

The Anatomical structures corresponding to this *Marma* may be brachial artery, brachial vein, Median nerve, Ulnar nerve, Radial nerve and Biceps brachii muscle. Considering the location of the *Marma* and the consequences of the trauma, it is obvious that the location of *Marma* should be middle position of the Humerus bone and the brachial artery veins with Musculocutaneous, Ulnar nerve and median nerve should be the structures getting affected at the time of trauma<sup>3-4</sup>. The bursting of atrophy of the arm resulting out of the trauma of his *Marma* must be having involvement of the blood vessels like brachial artery vein and nerves (Musculocutaneous, median and Ulnar) passing through the area. Any fracture of Humerus bone and the crush injury at the middle of arm can damage the blood vessels and nerves that may produces heavy blood loss and interrupt blood supply with precipitating moderate to severe atrophy of the arm<sup>5</sup>.

## Regional anatomy of *Urvi Marma* in Upper limb –

Dr. R. R. *Pathak* has opinion about this *Urvi Marma* of upper limb is that the structures related to this *Marma* are Brachial artery, Brachial vein, Musculocutaneous nerve Median and Ulnar nerve. These organization lies in the vicinity of *Urvi Marma* in Upper limb.

Dr. V.S. *Patil* and Dr. B.G. *Ghanekar* have also the same view as of Dr. *Pathak*<sup>6-7</sup>.

## Anatomical structures related to *Urvi Marma*

According to Dr. *Ghanekar* (Commentator of *SushutaSamhita*) structurally *Marma* point is formed by association of five anatomical structures i.e., *Mansa* (Muscle), *Sira* (nerve and vessels), *Snayu* (tendons and ligaments), *Asthi* (bones), *Sandhi* (joints)<sup>8-9</sup>. On the basis of position and its importance one structure becomes dominant over others<sup>10-12</sup>. The anatomical structures involve in the formation of *Urvi Marma* are described below-

- 1-Biceps brachi Muscle, Coracobrachial is and brachial is muscles
- 2-Brachial artery and vein
- 3-Ulnar and median nerve
- 4-Humerus bone
- 5-Elbow joint

### 1-Bone

Humerus is the longest bone of the upper extremities. It lies between shoulder and



elbow joints. Gleno-humeral joint is formed by the association between proximal end of humerus and the glenoid fossa of the scapula. On the other end distally at the elbow joint, the head of the radius with trochlear notch of the ulna articulates with the lower end of humerus<sup>13</sup>.

### **Applied anatomy**

At level of just above the elbow joint distal to it fracture of humerus is known as supracondylar fracture. The fracture is in transverse or oblique in appearance, mostly it appears when fall down in out stretched hands. This condition is most common in children than adults. This may also causes the damage of brachial vessels. Result may be appearing in the form of Volkmann's ischemic contracture. This is expressed as not proper flexion of hand because flexor muscles become small and fibrotic. This may also cause the damage of Ulnar nerve, Anterior interosseous nerve (branch of the median nerve), radial nerves. With the help of 'okay' sign, for testing of weakness of flexor pollicis longus, could also check the palsy of the anterior interosseous nerve<sup>14</sup>.

### **Elbow Joint-**

The variety of elbow joints comes under the synovial types. It lies at the lower end of humerus. This joint is formed by lower end of humerus bone with the head of

radius and trochlear notch of ulna bone. The capitulum and trochlear part of the Humerus one participates in the articulation with the head of the radius and trochlear notch of the ulna respectively.

### **Ligaments**

1. Capsular ligament
2. The Ulnar collateral ligament is triangular in shape.
3. The radial collateral or lateral ligament. This extended from the lateral epicondyle to the annular ligament in the form of triangular fan. Two muscles take origin from this Carpi radialis brevis and Supinator.

### **Relation of anatomical structures at Elbow Joint**

Anteriorly: Brachialis, median nerve, brachial artery and tendon of biceps.

Posteriorly: Triceps and anconeus.

Medially: Ulnar nerve, flexor carpi Ulnar is and common flexors.

Laterally: Supinator, extensor carpi radialis brevis and other common extensors.

**Blood Supply-**From anastomosis around the elbow joint, mainly by branches of brachial artery, Profunda brachii artery, and radial and Ulnar artery<sup>15</sup>.

### **Nerve Supply**

The joint receives branches from the following nerves: (i)Ulnar nerve, (ii)Median nerve, (iii)radial nerve, and



(iv) musculocutaneous nerve through its branch to the brachialis.

### **Carrying angle**

Carrying angle is defined as angle formed between the vertical axis of humerus and the transverse axis of the elbow joint which is directed medially and downwards. Due to this during full extension arm and forearm not comes under a straight line and form an angle of  $13^{\circ}$ . This condition is called as carrying angle.

### **Clinical Anatomy<sup>16</sup>**

1. The Dislocation of elbow joint mostly occurs posteriorly in this fracture of coronoid process of Ulna bone occurs frequently.
2. Subluxation of the radius head (pulled elbow) may occur commonly in children when the forearm is suddenly pulled in pronation. The radius head may slip down from the grip of annular ligament.
2. The condition of Tennis elbow caused by abrupt pronation of forearm that may lead to pain and tenderness at the region of lateral epicondyle.
3. Miner's (or student's elbow) is characterized by effusion into the bursa over the subcutaneous posterior surface of the olecranon process.

**Muscles of anterior compartment of Arm-**The anterior compartment of the upper arm has three chief muscles i.e.,

biceps brachii, coracobrachialis and brachialis. Musculocutaneous nerve supplies all three muscles. Muscles of anterior compartment of arm are supplied by brachial artery and its branches.

**Applied anatomy-** Entire rupture of any tendon in the body is exceptional. The more common rupture is the tendon of long head of the biceps brachii. 'Pop eye Sign' is typical swelling of muscle belly of biceps brachii.

### **The Brachial Artery**

Axillary artery is continuing as brachial artery after the lower border of the teres major. Brachial artery is the main artery of arm. Brachial artery gives largest branch of arm called profunda brachii and at the region of elbow joint brachial artery is terminated by producing anastomosis around it. At the level of cubital fossa, beneath the bicipital aponeurosis, brachial artery gives origin of two terminal branches i.e. radial and ulnar artery.

**Applied anatomy-** Good anastomotic supply persists in the arm. Due to this brachial artery is well sheltered from ischemia of partial occlusion. The necrosis of arm can develop due to complete occlusion of brachial artery. Scar in the tissue can develop in muscle fibres and shorten considerably to tissue. This can cause a characteristic feature of flexion



deformity, called “Volkman’s ischemic contracture”<sup>17</sup>.

### **Brachial vein**

The drainage of deoxygenated blood from the forearm and the arm is subdivided into superficial and deep system. The major superficial veins of upper extremities are known as cephalic vein and basilica veins found within the subcutaneous tissue. Both the veins are connected by the median cubital vein at the elbow region. The cephalic and basilic veins are drain finally in to axillary vein.

**Applied Anatomy** -Venepuncture is the practice of obtaining intravenous access. This is usually for the purpose of providing intravenous therapy. The commonest site of the venupuncture is median cubital vein. These superficial veins lie over at the anterior aspect to the cubital fossa region and commonly utilized for obtaining a blood sample<sup>18</sup>.

### **Median nerve**

It is the chief peripheral nerve of the upper extremities. C6 – T1 (some fibers from C5) is the root value of this.

Motor response- Nerves innervates the pronator and flexor muscles in the anterior compartment of the forearm. The narmuscles and lateral two lumbricals in the hand are also supplied by median nerve. Anterior interosseous nerve and Palmar cutaneous nerve are the main

cutaneous branches of this nerve. Anterior interosseous nerve innervates the deep group of muscles of anterior compartment of forearm. The Palmar cutaneous nerve innervates the cutaneous part of lateral palm.

### **Applied Anatomy**

Median nerve controls coarse movement of the hand, as it supplies most of the long muscles of the front of the forearm. It is therefore called, the “laborer’s nerve”. It is also called “eye of the hand” because it is sensory to most of the hand.

Supracondylar fracture of Humerus bone causes injury of median nerve. Within the carpal tunnel compression of the median nerve may cause carpal tunnel syndrome (CTS)<sup>19</sup>.

### **Tests for carpal tunnel syndrome can be performed during physical examination**

**Tinel’s sign**–Forceful physical initiation of tapping of the nerve in the carpal tunnel is done to elicit pain along the distribution of median nerve.

**Phalen’s manoeuvre** –This is shown by eliciting numbness/pain along median nerve distribution when keep the wrist in flexion position for 1 minute..

**The Ulnar nerve**-Ulnar nerve is also a mainmarginal nerve of the upper extremities. Origin of Ulnar nerve occurs from the brachial plexus. Medial cord is



continuing as ulnar nerve, fibers originate from spinal roots C8 and T1.

Motor functions: Ulnar nerve mainly supply most of the muscles of the hand except apart from the the nar muscles and two lateral lumbricals

Sensory action:

For the sensation point of view the ulnar nerve supply posterior and anterior surface of medial part of hand and it's related palmar region.

The Ulnar nerve passes superficially to the flexor retinaculum in the wrist, and is medial to the ulnar artery. Ulnar nerve pass from the hand through the Ulnar canal also called as "Guyon's canal". Deep and superficial branches are the terminal branches of Ulnar nerve<sup>20</sup>.

**Applied Anatomy**-The Ulnar nerve is also known as the "Musician's nerve" because it controls fine movements of the fingers. Ulnar nerve palsy can be checked by Froment's sign test meant for specifically paralysis of the adductor pollicis.

### **Musculocutaneous nerve**

Chief nerve of front of arm is Musculocutaneous nerve. Lateral cutaneous nerve is the continuation of this nerve in the forearm.

Root Value-The root value of musculocutaneous nerve is ventral rami of C5-C7 segments of spinal cord. From the lower border of the pectoralis minor

musculocutaneous nerve is originated as the lateral cord of the brachial plexus.

### **Branches and Distribution**

Musculocutaneous nerve leaves the axilla, and enters the front of the arm by piercing the coracobrachialis, and gives the branches-

**Muscular:** It supplies the following muscles of the front of the arm:

- (i) Coracobrachialis
- (ii) Biceps, long and short heads
- (iii) Brachialis

**Cutaneous:** it supplied the skin of the lateral aspect of the forearm by lateral cutaneous nerve of forearm. Others are articular branches and communicating branches.

### **Applied anatomy**

Injury may include piercing trauma at the axilla region (e.g. stabbing), and iatrogenic grievance during the delto-pectoral come near to the shoulder as a result of heavy retraction.

Motor action—any trauma may results damaging of biceps brachii, coracobrachialis, and brachialis muscles. Flexion at the shoulder and elbow are both weakened. Muscle Brachioradialis also could not perform action of supination alongside the supinator muscle.

Sensory action—the lateral side of the forearm of upper extremities may lose the sensation.



Excessive uses of muscles of brachialis, biceps brachii and coracobrachialis can cause the compression over the musculocutaneous nerve.

Musculocutaneous palsy: is also known as C6 radiculopathy. In this tendinopathy is found in the long head of biceps brachii muscle, pain in the bicipital groove get suppressed by an injection over the shoulder joint<sup>21</sup>.

Electromyography is the test which represent as slight neural damage at the biceps and the brachialis muscles with slower motor and sensory conduction over the Erb's point.

## DISCUSSION

It appears from anatomical and surgical point of view that the position of *Urvi Marma* lies at the level insertion of coracobrachialis muscle in the arm. Any trauma at this site result *Shosha* of *Sakthi* (*Bahu*, Upper limb). Any hematoma causes arterial insufficiency spasm of the vessels or aneurysm<sup>22-23</sup>.

The Structural predominance at the level of *Urvi Marma* is *Sir as* (vessels and nerves). It is *Vaikalyakar* in nature. Other authors as Dr. Hariprapanna Sharma also stated the same structures in *Urvi Marma* of Lower limb.

Dr. *Ghanekar* (Dr. Bhaskar Govind Ghanekar a renounced commentator of *Sushruta Samhita*) has considered the probabilities of post traumatic hypotrophy of the muscles on the middle of arm in view of brachial vessels and symptoms of trauma are more or less the same<sup>24</sup>.

According *Sushrut* and *Vagbhatta* this *Marma* is one *Angula* in *Praman*. An other author Dr. Ram Raksha *Pathak* has converted *Angula Pramana* in Inch as one *Angula* is equal one inch. Dr. R.R. *Pathak* has agreed with the view of *Ghanekar*. Dr. *Patil* (Dr. V. S. Patil a research scholar Of IMS BHU performed research on *Marma*) appeared to be influenced by *Ghanekar* and has suggested considering subsartorial canal at the position of *Urvi Marma* in lower limb<sup>25</sup>. ***Siravedhana* and its applied aspects**

### *Avedhya Siraye*

*Shakhagata Avedhya Siraye* – 16

*Jaladhara*-1, *Urvi*-2, *Lohitaksha*-1 x 4 = 16

*Jaladhara*= Cephalic vein

*Urvi*= Brachial artery and Brachial vein

*Lohitaksha*= axillary artery and vein

***Siravedhana***- *Siravedhana* (venupuncture) should be done four *Angula* above the (elbow joint) by avoiding the *Avedhya* (restricted) *Siras*. In case of *Plihodar* (Splenomegaly) and *Yakritodar* (Hepatomegaly) *Siravedhan* could be done



four *Angula* above the *Kurpar* in medial cubital vein at the region of mid of Arm. This procedure should also done in case of *Jvara* (fever), *Visham Jvara* (typhoid) and *Antarvidhridhi* (internal abscess)<sup>26</sup>.

## CONCLUSION

On the basis of above discussion it can be concluded that- The chief structures related to *Urvi Marma* are the vessels and nerve. Because the chief characteristic of this *Marma* is, during injury are haemorrhage and muscle atrophy caused by nutritional deficiency and damaging of nerves.

So on the structural point of view, the chief structures related to *Urvi Marma* in Upper limbs are- Brachial artery, Brachial vein, Musculocutaneous nerve, Median and Ulnar nerves. Various treatment aspects can be plan i.e. *Marma Chikitsa* by applying the bearable pressure, Massage therapy, sites may activates through any vibrating devices, via pouring of medicated oils, venupuncture can also done by escaping *Avedhya Siras*.



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