

## A CRITICO ANATOMICAL STUDY OF KOORCHA AND KOORCHASIRA MARMA

Bhageshwari Sharma<sup>1</sup>, A.N Pandey<sup>2</sup>

<sup>1</sup>M.D Scholar, Dept. of Rachana Sharir, Rishikul Campus-Haridwar,

<sup>2</sup>Professor, Dept. of Rachana Sharir, Gurukul Campus-Haridwar,  
Uttarakhand Ayurveda University. Uttarakhand, India

Email: [bhageshwarisharma80@gmail.com](mailto:bhageshwarisharma80@gmail.com)

### ABSTRACT

The chapter 'Marma Sharira' of *Sushruta Samhita* (ancient manuscript of *Ayurveda*) gives detailed information about the *Marma*, for completely understand the importance of *Marma* and keeping in mind the sites of *Marma* to avoid the injuries over the vital points (*Marma*) during surgery. *Marma* is known as vital point on which trauma, can lead to disability, death sooner or later or serious consequences. Almost all the *Samhitas* have mentioned the 107 *Marma*. Out of 107 *Marma*, 27 are mentioned under the heading of *Snayu Marma*. *Koorcha* and *Koorchasira marma* are among the *Snayu marma*, located in *Shakhas*. Aim of our study is to find out the appropriate structures related to *Koorcha* and *Koorchasira Marma*; and we try to compare the effect of trauma on the site of *Marma* with the modern science on the basis of some sign and symptoms mentioned in the *Samhitas*. The anatomical structures at site of *Marma* are observed and analysed through the cadaveric study and conceptual study through different texts and previous researches. For *Koorcha Marma*, it is above *Kshipra Marma* and for *Koorchasira*, it is below the *Manibandha* in both upper and lower extremity (*Gulpha*). The study concludes that, the extensor and flexor tendons may be taken anatomically as the *Koorcha Marma* and trauma over the lumbricals are responsible for the *Vaikalyta* as mentioned by *Acharayas*. *Koorchasira marma* is considered anatomically as the flexor and extensor retinaculum and trauma over the median nerve in hand and tibial nerve in foot under the retinaculum shows the symptoms of *Ruja* as mentioned in *Samhitas*.

**Keywords:** *Marma, Koorcha Marma, Koorchasira Marma*

### INTRODUCTION

*Marma*, a part of *Ayurvedic Shareera Rachna* is of immense value when it comes to protection of body and its parts during surgery and traumatic injuries. *Marma* being the vital structures of body are also known as the seats of *Prana* or life element. *Marma* is defined as the combination of *Mamsa*, *Sira*, *Snayu*, *Asthi* and *Sandhi*. *Marma* are described nearly by all *Ayurvedic* texts especially *Shushruta Samhita* in

*Prateyak Marma Nirdesh Sharir*, *Trimarmiya Chikitsa* chapter of *Charak Samhita*, *Marma Vibhaga* chapter in *Ashtang Sangrah* and *Sharir vichaya Sharir* chapter in *Kashyapa samhita*. In *Shushruta Samhita* 107 *Marmas* are explained under five groups of structural classification as *Mamsa Marma*, *Sira Marma*, *Asthi Marma*, *Snayu Marma* and *Sandhi Marmas*; five on the basis of location in the body as

*Shakhagata Marma, Udaragata Marma, Koshtagata Marma, Prasthagata Marma, Shira Grevagata Marma*; five on the basis of effect of injury as *Sadhya Pranahara Marma, Kalanatra Pranahara Marma, Vishalyagana Marma, Vaikalyakara Marma, Rujakara Marma*. Out of these 27 are *Snayu Marma*. In these *Marmas*, *Koorcha* and *Koorchasira* are mentioned under *Shakhagat Marma* both are present 4 in number. *Koorcha Marma* is one of the *Vaikalyakara* and *Koorchasira* comes under heading of *Rujakara marma*. The knowledge of clinical manifestation shown by injury to these places as described by the *Ayurvedic* texts can be used in better understanding of the regional anatomy of these sites.

### Objectives

1. To critically analyze the anatomical structures related to *Koorcha* and *Koorchashira Marma* in modern parlance.
2. To do review on the clinical importance described in literature related to *Koorcha* & *Koorchashira Marma*.

### Materials & Methods: -

**Conceptual Study:** Asserting the most appropriate position of *Koorch* & *Koorchshira Marma* on the basis of data collection from different classical texts, *Ayurvedic* literature, commentaries of modern period (1800A.D.-onwards), medical journals.

**Cadaveric Study:** To understand the anatomical structures of *Koorcha* and *Koorchshira Marma*, cadaveric study of hand and foot was carried out in the P.G Department of Rachana Sharir, Rishikul Campus, Haridwar, Uttrakhand *Ayurved* University. All the procedure was done by following the Cunningham's dissector.

### Marma Review:

**Koorcha Marma:** In Monier William's dictionary it is meant as a bunch of anything, bundle of grass etc. It is situated two *Angula* above the *Kshipra marma*.<sup>1</sup> It is also present in lower extremity above the *Kshipra Marma*.

Classification: *Sakha Marma*<sup>2</sup> *Vaikalyakara Marma*<sup>3</sup> *Swapanitala Pramana*<sup>4</sup> *Chaturankhya*

Sign when gets injured: *Bhramana* and *Vepana* of the foot. *Vaghat* has used the word *Kampa*

instead of *Vepana*.<sup>1</sup>

The term *Kampa* has been assigned with the meanings trembling, tremor, shaking etc. in Monier William's dictionary and the word *Vepana* has been assigned with the meaning quivering, trembling, fluttering etc.

**Koorchashira:** It has been defined as the *Shira* of *Kurcha* in *Shabdhalpadruma*. It has been meant as the upper part of the palm of the hand and foot in Monier William's dictionary. Though it is mentioned, it is present below the *Gulpha Sandhi*, it has been cleared later that the *Manibandha Marma* in upper limb is homologous to the *Gulpha Marma* in lower limb.<sup>1</sup> It is situated just below the *Manibandha Sandhi* according to *Vaghat*.<sup>5</sup>

Classification: *Sakha Marma*<sup>2</sup> *Rujakara Marma*<sup>6</sup> *Dwayangula Paramamna*<sup>4</sup> *Chaturankhya*

An injury to the *Marma* will lead to *Sopha* and *Ruja* (pain and swelling).<sup>1</sup>

**Cadaveric Study:** The dissection on 4 hands of two cadavers was carried out in the department of *Rachana Sharira* Rishikul Campus, Haridwar as per the Cunningham's manual. Following structures were revealed by keeping in mind the site of *Koorcha* and *Koorchasira Marma* as per mentioned in literatures.

### In Hand:

Skin and Superficial fascia around the region of the palm was removed.

Flexor retinaculum which is a fibrous band and modification of deep fascia was identified. It was attached to the Scaphoid and Trapezium laterally. Medially it is attached to the Pisiform and Hamate bones.

The median nerve and the four muscles of the flexor compartment were observed passing deep to the carpal tunnel.

- Four tendons of the flexor digitorum superficialis
- Four tendons of flexor digitorum profundus
- Tendon of flexor pollicis longus
- Tendon of flexor carpi
- Palmaris Longus was found

Palmar apponeurosis is a thick triangular portion of deep fascia that lies in the central region of the palm. Its apex at flexor retinaculum, base near the head of

metacarpals and its four slips were identified.

Originating from the tendons of flexor digitorum profundus four lumbricals were observed. The first two were unipennate and the remaining two bipennate and were inserted to the dorsal digital expansions of the corresponding digits.

The four palmar interossei muscles were spotted positioned between shaft of metacarpal bones. Extensor retinaculum: It is an oblique fibrous band and modification of deep fascia was observed. Laterally it was found attached to the anterior border of the radius above the styloid process and medially to the pisiform and triquetral bones.

The nine muscles of the extensor compartment were identified.

1. Extensor Carpi Radialis Longus
2. Extensor Carpi Radialis Brevis
3. Extensor Digitorum
4. Extensor Digit Minimi.
5. Extensor Carpi Ulnaris
6. Abductor Pollicis Longus was found
7. Extensor Pollicis Longus.
8. Extensor Pollicis Brevis
9. Extensor Indicis

The four dorsal interossei were also found placed between the metacarpal.

#### **In Foot:**

**Skin and Superficial fascia of the foot was removed, following structures were seen:**

Superior Extensor Retinaculum: It was attached to the lower part of anterior border of the tibia medially and to the lower part of anterior border of fibula laterally.

Inferior Extensor Retinaculum: It is Y shaped band of deep fascia, stem is attached to the non-articular part of the superior surface of calcaneum, and the upper band to anterior border of the medial malleolus and lower band passes downwards and medially to plantar aponeurosis.

Structures that pass beneath the Extensor retinacula from Medial to Lateral:

1. Tibialis anterior tendon.
2. Extensor hallucis longus tendon

3. Extensor digitorum longus tendons

4. Peroneus tertius. Anterior tibial artery Deep peroneal nerve

Flexor Retinaculum: It is dense deep fascia attached anteriorly to the posterior border and tip of medial malleolus and posteriorly and laterally to medial tubercle of calcaneum.

Structures that pass beneath the flexor retinaculum from medial to lateral:

1. Tibialis posterior tendon.
2. Flexor digitorum longus
3. Flexor hallucis longus.
4. Posterior tibial artery
5. Tibial nerve

Structures that pass beneath the superior peroneal retinaculum:

1. Tendon of peroneus longus
2. Tendon of peroneus brevis, Plantar aponeurosis

Flexor digitorum brevis, Abductor hallucis, Flexor hallucis brevis, Adductor hallucis were identified on the medial side of sole foot. Four lumbricals muscles are originating from the tendons of flexor digitorum longus. The three palmar interossei muscles were spotted positioned between the shaft of the metacarpal bones and four dorsal interossei muscles were also seen.

## **DISCUSSION**

From the 27 *Snayu Marma*, *Koorcha* and *Koorchasira* being the main heading, their anatomical structures were analysed through conceptual, cadaveric study. The shape and position, as per mentioned by *Acharayas* in our *classical* texts; we relate them with the structures found on the site of *Marma* through cadaveric study, to evaluate the symptoms of the *Marma* after the trauma, it is more important to understand the structural anatomy related to *Marma*.

**Koorcha:** The word *Kurcha* stands for the shape of the brush. According to *Shushruta*, it is mentioned two *Angula* above the *Kshipra Marma*. Two *Angula* is taken towards the region of wrist joint as the *Marmas* are described in human from the lower point of extremities to upwards. The *marma* is of *swapanitala paramana* and is *Vaikalyakara* type, as it causes *Has-*

*ta Bhramana* and *Vepana & Kampa* (according to *Vaghbatta*). As the position of *Koorcha Marma* is 2 *Angula* above the *Kshipra Marma*, now the position of *Kshipra* should be assumed. According to *Acharaya Shushruta*, *Kshipra* is located in area between the thumb and index finger (first and second metacarpal bone), and the *Pramana* of *marma* is half *angula*. So, we assumed a point for *Kshipra Marma* and measures 2 *Angula* from that point, here the brush like appearance is formed by the tendons of the flexor and extensor muscles and nerves and vessels coming out from the retinaculum in the palmar area of hand. The signs of *Marma Viddha Lakshanas* according to *Acharaya Shushruta* are *Hasta Bhramana* and *Vepana* and according to *Ashtanga Hrudaya* the signs are *Hasta Bhramana* and *Kampa*. This can be correlated as tremors and rotation of hand to the medial or lateral side. When supply to anyone of the group of twenty intrinsic muscles of the hand is impaired, it will lead to hyperextension of metacarpophalangeal joints as in claw hand and wrist drop. This can be related with *Hasta Bhramana*. In claw hand, deformity or abnormal attitude of hand develops due to paralysis of lumbricals (as they flex the MCP joint) caused by ulnar nerve injury, which shows the *Vaiykalyata*.

Same as in lower extremity, site of *Koorcha Marma* is assumed 2 *Angula* above the *Kshipra Marma*. As per the *Viddha Lakshana*, here it can be related with the rotation of foot to abnormal position. When supply to anyone of the tendons and intrinsic muscle gets obstructed due to some trauma, it will leads to weakness in muscles or inability to plantar flex the ankle and the toes, as in tibial nerve injury and foot drop which also shows *Vaiykalyata*; this can be related with *Padha Bhramana*. In tibial nerve injury, people are unable to plantar flex their ankle or flex their toes, loss of sensation also occurs on sole of the foot; in this tibial nerve supplies flexor digitorum longus, and lumbricals originates from their tendons. Here lumbricals also got paralysed and prevents the flexion of MCP joints. This has the effect of making the limb "too long", this shows the *Vaikalyakar* property of the *Koorcha marma*.

***Koorchashira Marma***: The etymology of the word suggests that, its name is so because it is like the structure which is fastened up at one end like a brush. According to *Acharaya Shushruta* its region is below and on both sides of the *Manibandha*, it is of one *Angula Pramana* and of *Rujakara* type because it causes *Ruja* and *Shopha*. The situation of *Koorchashira* is just below and both sides of the wrist joints. So, the anatomical structures would be the structures present at dorsal and palmar region of the hand just below the wrist joint. By assuming the shape of the *Marma*, it has to be considered as the flexor and extensor retinaculum, as it is a fibrous band merely 2.5-3cm transversely, with a similar proximodigital length; they bind or cover the tendons of muscles which comes out in form of brush. Here the *Koorcha* or brush like appearance is formed by the various tendons and the nerves and *Koorchashira* should be the structure resembling the *Shira* of *Koorcha*.

The reason for which *Koorcha* and *Koorchashira* is classified under *Snayu marma* is because of the predominance of *Snayu* in the region, injury to *Snayu* is very painful, and produce disability unparallel to bone, muscle, vein and joints in terms of intensity and loss of function. As it is mentioned under *Rujakara Marma* category, its *Viddhalakshana* are *Ruja* and *Shopha*. When a trauma occurs over the *Marma* area (retinacula), the nerves and tendons passing under the retinaculum get injured, leading to severe pain and inflammation, as in carpal tunnel syndrome; here the severe pain occurred by the trauma is the reason behind the *Rujakra* property of the *Marma*. In carpal tunnel syndrome, median nerve gets compressed in the carpal tunnel leads to severe pain and wasting of thenar muscles. So, the predominant sign of injury to this *Marma* has to be *Ruja*.

Same like in upper extremity, the lower extremity *Koorchashira* is under the *Gulpha* and so the anatomical structures would be present on the dorsal and plantar aspect of the foot. By assuming the shape of *Koorchashira* in foot, it is related with the retinacula of the foot as its reveals as *Koorchashira*. All the extensor and flexor tendons passing under the retinacula bind under the retinaculum, gives appearance of

*Sira* of *Koorcha*. There are three retinacula: flexor, extensor and peroneal. Also, here retinaculæ and structures lying under them also proves it as *Snayu Marma* by showing *Snayu* predominance. As per the *Marma Viddhalakshana*, trauma on *Koorchasira* region leads to *Ruja* and *Shopha*, it may occur by injury to structures like nerves and tendons underlying the retinacula. As in tarsal tunnel syndrome, the compression of tibial nerve within the fibrous tunnel due to some trauma under flexor retinaculum, this is associated with pain and parasthesia in sole. As the pain is the chief complaint after the injury, it shows the

*Rujakara* property of the *Koorchasira Marma*.

## CONCLUSION

We concluded by assuming the flexor and extensor tendons in hand and the feet as *Koorcha Marma*, as trauma over lumbricals in this region gives the symptoms as per mentioned by our *Acharayas*. And retinaculæ are taken as the *Koorchasira Marma*; median nerve (in hands) and tibial nerve (in feet), if gets injured produces the symptoms as mentioned by our *Acharayas* in *Samhitas*.

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**Source of Support: Nil**

**Conflict of Interest: None Declared**

How to cite this URL: Bhageshwari Sharma & A. N Pandey: A Critico Anatomical Study Of Koorcha And Koorchasira Marma. International Ayurvedic Medical Journal {online} 2020 {cited May, 2020} Available from: [http://www.iamj.in/posts/images/upload/3569\\_3573.pdf](http://www.iamj.in/posts/images/upload/3569_3573.pdf)