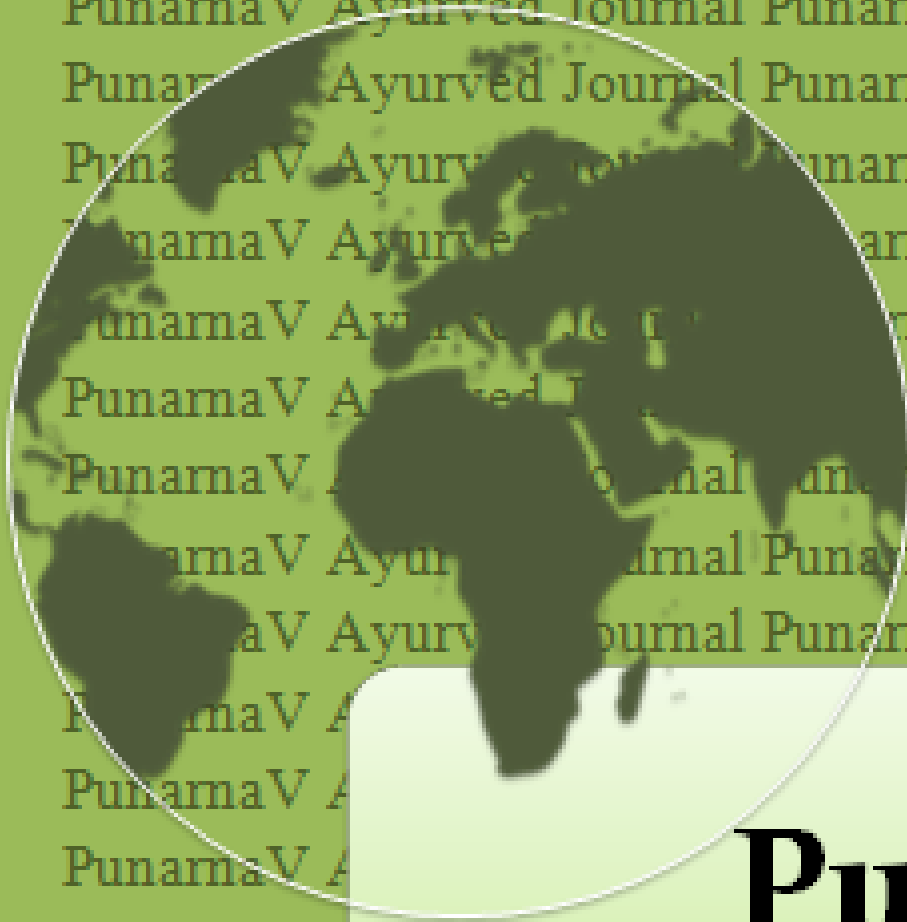


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## SANKHYA MARMA: A SUBTLE STUDY BASED ON DISSECTION

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**ABSTRACT:**

*Marma are the most vital and sensitive points in the body which are vulnerable to injury. The definition as it is the confluence of Māmsa, Sirā, Snāyu, Asthi and Saṁdhi very well denotes the vitality of the structures. The Marma are said to be 'Jīvasthanā' and are 107 in numbers. The Marma Śārīra has been explained by Suśruta in "Pratyekamarmanirdeśa Śārīra" and Vāgbhaṭa in Marmavibhāgam Śārīram. Suśruta and Vāgbhaṭa have mentioned various types of Marma depending upon their position, constituents, vidha- lakṣaṇa, and dimension. Depending upon after effect of injury to Marma, their 5 types like Sadya Prāṇahara, Kālāntara Prāṇahara, Viśalyaghna, Vaikalyakara and Rujākara Marma. Out of them, Sadya prāṇahara Marma are the points where injury causes instantaneous death sudden or within seven days depending upon the degree of affections after getting injured. Śaṁkha Marma is one of the Sadya Prāṇahara Marma which is located at lateral aspect of skull bones and it is completely formed by temporal bone. The structures found at this region are Temporalis Muscle, Superficial Temporal Vessels, Auriculotemporal Nerve and Middle Meningeal Artery etc. Middle Meningeal Artery has the great surgical importance because; it can be torn in head injury resulting into extradural hemorrhage.*

**KEY WORDS:** Marma, Middle Meningeal Artery, Sadya Prāṇahara Marma,

## INTRODUCTION

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Human body, the miraculous gift of god has been the topic of interest to pioneers and seers of different fields. From the time immemorial, they were keen in unraveling the secrets of this most sophisticated and complicated machinery. So also the *Āyurvedic* profounder with a broad approach had explained the human body considering its various aspects- metaphysical, philosophical, spiritual, anatomical and so on. According to them, an individual is the epitome of universe in whom 'Prāṇa' or the 'Jīvacaityanya' is manifested and which forms the substratum of treatment.

The description of anatomy as a whole is not obtained from the *Śārīra Sthāna* in the *Samhitā*. A thorough scrutiny reveals that almost the whole body is beautifully described in a scattered manner.

A very unique aspect of *Śārīra Sthāna* is the description of certain vital points of the body which are named as *Marma*. The

*Marma* are said to be 'Jīvasthāna' and are 107 in number. They are distributed throughout the human body. The *Marma Śārīra* has been explained by *Suśruta* in "Pratyekamarmanirdeśa Śārīra" and *Vāgbhaṭa* in *Marmavibhāgam Śārīram* of *Śārīra Sthāna*

## ETYMOLOGY

The term *Marma* is derived from the root 'mṛṇa prāṇatyāge'<sup>1</sup> meaning, that which causes *pranathyaga* or death.

## DEFINITION

*Marma* are said to be the sites where there is the conglomeration of *Māmsa*, *Sirā*, *Snāyu*, *Asthi* and *Samdhi* and at these places *Prāṇa* resides specially by nature<sup>2</sup>.

*Vāgbhaṭa* is also of the same opinion as *Suśruta* but he has additionally included *Dhamanī* along with other structures<sup>3</sup>.

*Suśruta* and *Vāgbhaṭa* have mentioned various types of *Marma* depending upon their position, constituents, *viddha-lakṣaṇa*, and dimension. Depending upon after effect of injury to *Marma*, there are 5 types like *Sadya Prāṇahara*, *Kālāntara Prāṇahara*, *Viśalyaghna*, *Vaikalyakara* and *Rujākara Marma*<sup>4</sup>. Out of them, *Sadya Prāṇahara Marma* are the points where injury causes instantaneous death within seven days depending upon the degree of affections after getting injured. *Prāṇahara* denotes

loss of life and *Sadya* means immediate. Any injury to these *Marma* causes spontaneous death. The symptomatology of muscles consciousness, hampering of sensory functions, disorientation, confusion, various types of pain and ultimately death appear<sup>5</sup>. Total number of this *Marma* is 19 and these are- (1) *Śṛṅgāmṭaka* – 4 (2) *Adhipati*-1 (3) *Śamkha*-2

(4) *Sirāmātrkā*-8 (5) *Guda*-1 (6) *Hradaya*-1 (7) *Basti*-1 (8) *Nābhi*-1<sup>6</sup>

Depending upon the structural classification, the *Śamkha Marma* is explained as *Asthi Marma* by *Suśruta* and *Vāgbhaṭṭa*.

Thus, this topic is selected for study to correlate with modern anatomy, so that the actual structures present at those sites which injured and causes sudden death.

## MATERIALS AND METHODOLOGY

### MATERIALS

For literary study:-

1. Available literature regarding *Śamkha Marma* from *Āyurvedic* texts and Modern texts.

For cadaveric dissection Study:-

1. Cadaver: Either male or female.
2. Dissection kit

### METHODOLOGY

- Literature Study: All the information regarding *Śamkha Marma* along with anatomy of temporal region was

collected from *Āyurvedic* texts and modern texts.

- Cadaveric Study: - Cadaveric dissection was done in the dissection hall of department of *Shareera Rachana* of NIA, Jaipur. While studying the dissected cadaver, photo images were taken with the help of digital camera.
- Cadaver was selected based on the inclusion and exclusion criteria explained below-

### INCLUSION CRITERIA

- Cadaver with fully developed body part.
- Cadaver of either sex.
- Having natural death.
- Preserved by proper methods of preservation.

### EXCLUSION CRITERIA

Death due to poisoning, accidental condition and any chronic disease conditions.

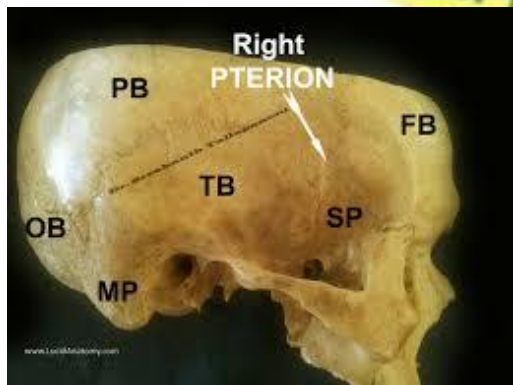
Dissection of the temporal region was done on cadaver by using dissection kit; Cunningham's manual of practical anatomy, Grant's Dissector, Frank H. Netter and B. D. Chaurasia's Human Anatomy for understanding the *Śamkha Marma*. Superficial and deep dissection is done carefully to study the structures present at the marked site.

### OBSERVATIONS

*Śamkha* means a conch shell which has a conical shape. This *Marma* is located

above the end of eyebrow (*Bhruvoh Pucchāntayorupari*) and between ear and forehead (*Karṇalalāṭayormadhye*)<sup>7</sup>. By considering all these points, a region was marked on cadaver in the temporal region. On the detailed dissection of the marked region following structures were seen-

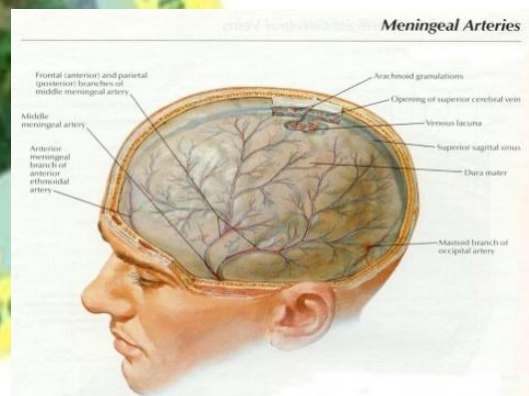
- a) Skin
- b) Superficial fascia
- c) Auriculotemporal Nerve
- d) Superficial Temporal Artery and Vein
- e) Temporalis fascia
- f) Temporal muscle
- g) Temporal bone
- h) Pterion- Pterion is the region where the frontal, parietal, temporal, and sphenoid bone join together. It is located on the side of the skull, just behind the temple. The 'Pterion' is known as the weakest part of the skull.



**Figure1. Location of Pterion**

- i) Middle Meningeal Artery- Middle Meningeal Artery is typically the third branch of the first part

(retromandibular part) of the Maxillary Artery, one of the two terminal branches of the External Carotid Artery. The Middle Meningeal Artery is the largest of the three (paired) arteries that supply the Meninges, the others being the Anterior Meningeal Artery and the Posterior Meningeal Artery. The anterior branch of the Middle Meningeal Artery runs beneath the Pterion. It is vulnerable to injury at this point, where the skull is thin. Rupture of the artery may give rise to an Epidural Hematoma.



**Figure 2. Meningeal Artery**

- j) Temporal lobe of Cerebral Cortex

## DISCUSSION-

The study was carried out in two parts literature study and cadaveric study. *Śamkha Marma* is present on lateral aspect of skull bones and it is completely formed by temporal bone.



The points to be understood regarding *Śamkha Marma* from literature study were that *Śamkha* means a conch shell, which has a conical shape and is in anatomical temple shape. It is located above and posterior to eyebrow (*Bhruvoḥ Pucchāntayorupari*) and between ear and forehead (*Karṇalalāṭayormadhye*). Total number of *Śamkha Marma* are two - 1 in each side.

Based on predominance of Material Matrix or anatomical structure, it is *Asthi Marma*. On the basis of fatal effect of injured *Marma*, *Śamkha Marma* is *Sadya Prāṇahara Marma*. *Āyurveda* tells that due to *Sadya Prāṇahara Marma* is *Āgneya* in nature because of dominance of *Agni Mahābhūta*. The *Prāṇa* or life is immediately extinguished like flame of lamp<sup>8</sup>. Any injury to *Sadya Prāṇahara Marma* causes spontaneous death. *Śamkha Marma* measures  $\frac{1}{2}$  *Aṅguli* (finger's width) or 1 cm in dimensions<sup>9</sup>. *Śamkha Marma* may be palpated by pressing the temporal depression on the temples.

Dissection provide a clear picture about above statement that, *Śamkha Marma* is located at the region of temple. Temple is the area between the temporal line and zygomatic arch. The skull is thin

*Śamkha Marma* is located above the end of eyebrow (*Bhruvoḥ Pucchāntayorupari*) and between ear and forehead (*Karṇalalāṭayormadhye*). So it is

here and covered by temporalis muscle, temporal fascia and a thin extension of the epicranial aponeurosis from which the extrinsic auricular muscle arises.

There is a superficial temporal artery and in the interior part of this artery there is a middle meningeal artery relating to this *Marma*, due to the injury on the temple region the death occurs from the *Sthbhdta* (shock). Therefore the possibility of Middle Meningeal Artery laceration is common. The chances of laceration of this artery more at the point where it leaves the bony canal at 'Pterion'. The 'Pterion' is the region where the frontal, parietal, temporal, and sphenoid bone join together. It is located on the side of the skull, just behind the temple. The 'Pterion' is known as the weakest part of the skull. The anterior division of the Middle Meningeal Artery runs underneath the 'Pterion'. Consequently, a traumatic blow to the 'Pterion' may rupture the Middle Meningeal Artery causing an epidural hematoma. The 'Pterion' may also be fractured indirectly by blows to the top or back of the head that place sufficient force on the skull to fracture the 'Pterion'<sup>10</sup>.

## CONCLUSION

a part of temporal bone and the main structures found at this region are-

- 1) Auriculotemporal Nerve

- 2) Superficial Temporal Artery and Vein
- 3) Temporalis fascia and muscle
- 4) Middle Meningeal Artery
- 5) Temporal lobe of Cerebral Cortex

Middle Meningeal Artery has the great surgical importance because; it can be torn in head injury resulting into extradural hemorrhage. Hemorrhage from Middle Meningeal Artery is an urgent matter, patient may stop breathing within 1 hour of the onset of first sign and hemorrhage compresses on the motor area, giving rise to hemiplegia of opposite side. In this study there is no doubt left about the vulnerability of pterion. Though the cause

of emergency is bleeding from Middle Meningeal Artery but classics have upheld the *Asthi* to be responsible for this condition. The study reveals that the anterior and posterior branches of Middle Meningeal Artery are sheltered by temporal bone, due to irregular 'H' shaped suture at the point of Pterion and the thinness of the bone convert this region into a weak area, therefore a comparatively trauma of less intensity causes fracture of bone which is main causes of the laceration of the artery<sup>11</sup>. So *Śamkha Marma* is considered as a *Sadya Prāṇahara Marma*.

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