



Review Article

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A COMPREHENSIVE REVIEW ON APANGA MARMA

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ABSTRACT

The concept of *marma* is one of the unique principles mentioned in ancient *Ayurvedic* texts. *Marma* are the vital sites in the body where there is confluence of *mamsa*, *sira*, *snayu*, *asthi* and *sandhi* where *prana* resides. These generate the symptoms from excruciating pain to fatal effect when exposed to trauma. Ancient ayurvedic seers have mentioned 107 such vital areas in the body. *Apanga marma* is one among them, present in the head region, at the area outer to lateral canthus and below the tail end of eyebrow within half *angula* dimension. It is a *vaikalyakara marma* and results in blindness or visual impairment on injury. Knowledge of *marma* is very important in clinical field in preventing the complications during the surgical and parasurgical procedures. Details are collected from *ayurvedic* texts and published papers aiming to provide a comprehensive overview on *Apanga marma*.

Keywords: *Ayurveda*, *apanga marma*, *andhyatwa*, *drishti upaghata*, blindness, visual impairment, *vaikalyakara*

INTRODUCTION

Numerous scientific concepts of *Ayurveda* need detailed scrutiny 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 of weapons like arrow 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*.¹

Marma are 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.² Considering the origin and the practical utility of 107 *marma*, *Acharya Charaka* has given great importance to three *marma* namely *Basti*, *Hridaya* and *Shira marma*. These vital points in the body when exposed to trauma generate the symptoms from excruciating pain to fatal effect.³

This science of *marma*, regarding its practical application, had fallen long into oblivion, like many other branches of *ayurvedic* literature. The knowledge of *marma* is very important in prevention of complications during the procedures of *agni karma*, *kshara karma* and *shastra 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 skillful physician, he is sure to suffer from deformities.²

Etymological description of the term *Apanga*

The term *Apanga* is meant for outer corner of eye, a sectorial mark or circlet on the forehead, without limbs or without body. *Apanga desha* is the place round the outer corner or angle of the eye.⁴

Description of *Apanga marma* in ancient literatures

Apanga marma is one among the *vaikalyakara marma* present in the *Urdhwajatrugata* (Head and Neck) region. The opinion of different *acharyas* regarding the identification of structural entity of this *marma* differs. The predominant structure identified in *Apanga marma* by *Sushruta* is *Sira* while that by *Vagbhata* is *Snayu*.

Classification of *Apanga marma*

Table 1: Classification of *Apanga Marma*

Basis of Classification	Types
Structural (<i>Rachananusara</i>)	<i>Sira 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>Urdhwajatrugata 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>

Location of *Apanga marma*

Apanga marma lies in the lower part of the tail end of each eyebrow, outer to the lateral canthus of the eye. Above it lies *Avarta marma* at the upper part of the tail end of eyebrow in a depressed region. According to *Arunadatta*, commentator of

Astanga Hrudaya, Apanga Marma are located one on outer aspect of each eye below the lower limit of tail of eye brow^{2,5}

Dimension

It is half angula in dimension.²

Injury effect

According to *Sushruta*, injury to *Apanga marma* leads to *Andhya* (blindness) or *Drishiti upaghata* (visual impairment).² *Vagbhata* has mentioned *Andhya* as injury effect of this *marma*.⁵

Description of *Apanga marma* in modern literatures

All the recent authors have tried to correlate the structural entity of *Apanga marma* with the structures lying on the lateral side of the eyeball, keeping traumatic effect as a parameter. Pathak opines that *Apanga marma* lies at the area below the tail end of eyebrow outer to the eye. Optic nerve, ophthalmic nerve and its ciliary branches, lacrimal, abducent nerves are the structures related to this *marma*. Injury to these structures and vessels of this region cause vision loss or defective vision.⁶

Lateral canthus has been quoted as a structural entity of *Apanga marma* as per Sharma.⁷

Ghanekar has mentioned that zygomatico-temporal vessels running near the outer corner or canthus of the eye and are the structural entity of *Apanga marma*.⁸

Patil V.S. has considered lacrimal nerve, frontal nerve, zygomatico-temporal vessels and lacrimal gland as structures related to *Apanga marma*. Injury to the structures may cause refractive errors leading to blindness in later stage.⁹

As per J. N. Mishra, lacrimal artery at the lacrimal gland is the structure responsible for the traumatic result observed by *Sushruta*. A very hard slap or blunt injury even the piercing injury on the lateral side of the face just behind the superolateral angle of the orbital margin may cause rupture of the lacrimal artery leading to hematoma. The vascular bleeding at this site may cause pressure resulting to partial or complete loss of vision. The blockage of the arterial supply to the lacrimal gland or the hematoma affecting the lacrimal nerve may lead to degeneration of lacrimal gland.¹⁰

Pathak and Awasthi have mentioned *Apanga marma* to be located lateral to the eye, just lateral to the orbital cavity and close to the zygomatic process. They have considered zygomatic and temporal vessels along with optic, lacrimal and abducent nerves as the structural entity of this *marma*.¹¹

According to Avinash Lele *et al.*, *Apanga marma* lies at the outer angle of eye on the lateral side of orbital fossa and the anatomical structures involved in the *marma* are anterior ciliary vessels, optic and ciliary nerves. Injury to the *marma* may produce blindness and deformity of the face also.¹²

P.V. Krishna Rao is of the view that optic, lacrimal and abducent nerves are the anatomical structures corresponding to *Apanga marma*.¹

Apanga sira

38 *sira* have been mentioned to be present in both eyes. Among them, 2 *Apanga sira* are situated on each lateral side of eye and are considered as unsuitable for venipuncture. *Ghanekar* opines

these *sira* to be Zygomatico-temporal arteries. To the vicinity of *Apanga sira* lie the *Avarta* and *Shankha sira*, each of which is 2 in number.⁸

DISCUSSION

Apanga marma lies one on outer side of each eye below the tail end of eyebrow within a half *angula* dimension. It is a *sira marma* injury to which produces blindness or some kind of visual impairments.² *Vagbhata* has identified *snayu* as the predominant structural entity of this *marma*.⁵ The probable structures related to *marma* lying extracranially within the half *angula* dimension based on the 5 components are listed below-¹³

Mamsa: Temporalis muscle, orbicularis oculi.

Sira- Zygomatico-orbital vessels.

Snayu- Epicranial aponeurosis, Superficial and deep layers of temporal fascia, Zygomatico-temporal nerve.

Asthi- Frontal, temporal, zygomatic bones greater wing of sphenoid bone.

Sandhi- Fronto-zygomatic suture, Fronto-zygomatico-sphenoid suture, temporo-sphenoid suture.

The regional anatomy shows that there is no any extracranial *sira* or *snayu* within the *apanga marma* area, to produce blindness or visual impairment when injured. Such structures should be present deep to the cranial bony wall. The area of *Apanga marma* within specified half *angula* dimension covers a small part of middle cranial fossa and a lateral most part of orbit. So, this *marma* consists some endocranial and intra orbital structures.

Endocranial Components

Sira- Middle meningeal artery, middle cerebral artery.

Snayu- Meninges of brain related to *apanga* area with neuroconnective tissue component

Intra orbital Component

Mamsa- Lateral rectus, superior oblique, inferior oblique muscles, inferolateral part of lacrimal gland.

Sira- Lacrimal vessels and orbital branch of middle meningeal artery, ophthalmic vessels including its central retinal and other branches lying in the deeper level.

Snayu: Orbital fascia, lateral palpebral ligament, check ligament, bulbar fascia (Connective tissue component) and lacrimal nerve, communicating lacrimal branch of zygomatico-temporal nerve, abducent nerve, ciliary ganglia and its short ciliary nerves, oculomotor and optic nerves were passing in the deeper level (neuroconnective tissue component).

As the *marma* consists of multiple structures, the above-mentioned structures are to be considered. This *marma* leads to blindness or visual impairment when subjected to injury. Effects of injury can be substantiated by literary review, case reports and clinical studies related to injury in the area of *Apanga marma*.

Iravati et al reported a case of RTA having blowout fracture of right superior, inferior and lateral rims, displacing the sphenoid wing to entrap the soft tissues. It resulted in traumatic optic neuropathy causing diplopia, restriction of eye movement in all directions and diminution of vision. However, the subject acquired visual acuity and eye movement almost to normal after surgical correction.¹⁴

J. N. Mishra is of the view that lacrimal artery at the lacrimal gland is the structure responsible for visual impairment. The vascular bleeding due to trauma at this site may cause pressure

resulting to partial or complete loss of vision. The blockage of the arterial supply to the lacrimal gland or the hematoma affecting the lacrimal nerve may lead to degeneration of lacrimal gland¹⁰.

Trauma on middle meningeal artery which also comes under the area of *Apanga marma* causes extradural hematoma and affects in venous drainage of eyeball causing papilloedema and it may lead to atrophy of optic nerve causing blindness¹⁵.

The injury to abducent nerve or/and lateral rectus muscle results in loss of abduction movement of eye and impairing of vision. These both structures come under the *Apanga marma* area. Raje VV and Nilesh K reported a case having blown in fracture of left lateral orbital wall with two medially displaced fractured fragments impinging on lateral rectus and globe without any retrobulbar hemorrhage and intracranial lesion. The case was presented with loss of visual acuity and restricted extra-ocular motion on lateral gaze and he was completely recovered with normal restoration of vision and ocular movements after surgical correction of the impinging fragments of bone.¹⁶

Middle cerebral artery is another structure that come within the *Apanga marma* area. Most of the part of optic pathway is supplied by this artery. A study on 915 patients of stroke revealed that 8.1% of cases due to middle cerebral artery rupture. Among these, 28 cases were having homonymous hemianopia, 6 cases having homonymous quadrantanopia and 2 were having constricted loss.¹⁷ All these studies related to injuries in the area of lateral aspect of eye are in concurrence with area of *Apanga marma* and its *Viddha lakshana* and highlights its importance that are mentioned in classics.

CONCLUSION

Apanga marma is one of the *Urdhwajatrugata marma*, lying in the temporal region on the lateral aspect of eye, below the tail end of eyebrow. *Sira* is the predominant structure of this *marma* identified by *Acharya Sushruta*. Injury to this structure results in blindness or visual impairment. *Vagbhata* has mentioned it as *snayu marma* and blindness as its injury effect. The case reports and clinical studies related to area of *Apanga marma* favors the opinions of ancient *Acharya*. Vision is considered as the most important sense of the body and likely to be affected by trauma on *Apanga marma*. So, it is pertinent to mention that the areas of *Apanga marma* are advised to protect from any kind of injury from any objects or during the surgery.

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