



REVIEW ARTICLE

AN AYURVEDIC PERSPECTIVE OF ANATOMY AND PHYSIOLOGY (SHAREERA) OF PANCHAGNANEDRIYA

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Abstract: The body is divided into six parts majorly and as *Shadanga shareera* (Six part of body) and all these comprises of *Anga and Pratyangas*. The *Shiras* is said to be one among them and it is said to be *Utthamanga* (superior) because all sense organs are located in Head. Achaya Vagbhata said while explaining *Abhyanga* (Massage) especially *Abhyanga* (Massage) is done to *Shiras* (Head) and *Shravana* (Ear) the intension is to nourish all sense organs and prevent respective diseases related to that particular organ. Normally all sense organs have normal perception of their subject and when *Atiyoga* and *Ayoga of these Indriyas* may lead to different diseases related to sense organs.

Key words: *Panchagyanendriya, Sense organs, Panchamahabhutas, Shareera, Dosha, Srotas, Marma, Asthi etc.*

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INTRODUCTION:

Utthamanga that is *Shiras* (Head), where *Prana* (life) is located. Where all sense organs are situated, it is said to be *Shreshta* (the best) as all sense organs are situated in *Shiras* [1].

The organ connected with the vital and important activities like *Chesta* (motor) and *Sangnavha* (Sensory) Acharya Charaka and Sushruta used the word *Uttamanga*. Acharya Vagbhata used the word as *Urdhwanga* [2].

According to Acharya Kashyapa *Shiras* has been coated as *Urdhva kaphasaya*. *Shiras* is one among *sadhya pranahara marma* (Vital part) and any *aghata* (Trauma) to it leads to *Marana* (Death) [3].

Shiras is the *adhithana for Indriya* (senses), *Indriyavahi* and *Pranavahisrotas* (Respiratory system). It is *adhithana* (location) for *Prana* so it should be protected [4].

Shiras is said to be *Uttamanga* because all sense organs are located in Head along with Brain that is *Mastishka*, and *Manas* (Mind). The sense organs are Eye, Ear, Nose, Tongue and Skin.

Synonyms: *Mastaka, Urdhvakaya, Urdhwanga, Uttamanga, Munda. Sheersha, Urdhva hrudaya, Urdhvakaphashaya, Urdhvajathru, Devakosha, Shirohrudaya.*

The *Panchagnanendriyas* (sense organs) are *Netra* (Eye), *Nasa* (Nose), *Karna* (Ear), *Jiwaha* (Tongue) and *Twacha* (Skin). Here an attempt is made to Discuss about all basic aspects of Sense organs and Anatomy and Physiological aspects of *Panchagyanendriya* from all classical samhita granthas.

Definition of indriya: The one which does action and helps to do karma (pratyanga) or *karya* is called as *Indriya*. For the same Acharyas have been said five sense organs. The one who is consisting of *Indriyas* and *Manas* (Mind) and *Athma* (Soul) is said to be *Chetana shareera*. In Ayurveda there are total *Ekadasha Indriyas* in which *Panchagnanendriya, Panchakarmenriya and Manas* are involved.

Indriya Vyutpatti: *Indriya vyutpatti taken place by Panchamahabhutas* [5].

Panchabouthikata of panchagyanendriya:

Netra (Eye): *Akasha, Vayu, Agni, Jala and Rupagrahana is its action*

Nasa (Nose): *Akasha, Vayu, Agni. Jala, Prithvi and Gandhagrahana is its action*

Rasanendriya (Tongue): *Akasha, Vayu, Agni and Jala and Rasagrahana is its action*

Karna (Ear): *Akashatatva and Shabdagrahana is its action*

Twacha (Skin): *Akasaha and Vayutatva and Sparshagrahana is its action*

**Shabdha sparshascha rupamcha
rasougandhancha tadgunaha** ^[6]

By the proper perception of subject by an individual organ is said to be properly functioning and come to know its existence.

NETRA (EYE)

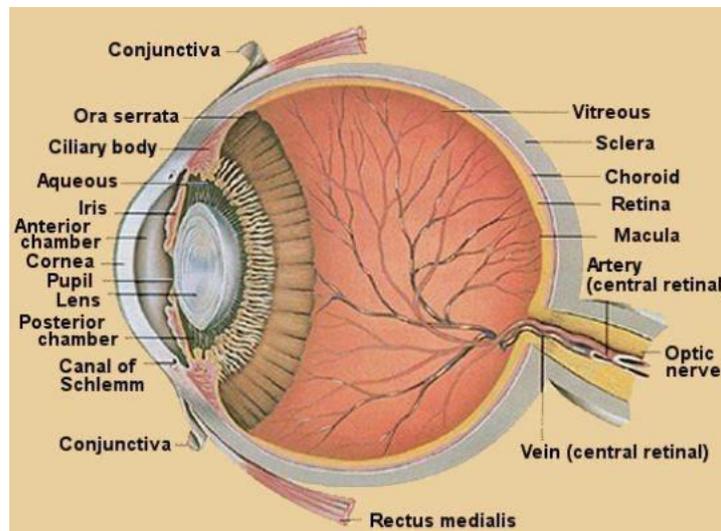
The human body is divided into six parts that is *Shaddanga shareera* and further divided into *pratyanga* ⁷. *Akshi vartma, Akshi kaninika, Bhru, Akshikuta* are named as *pratyangas* ^[8].

Panchabhoutikatva:^[9]

Table No 1- Panchabhoutika constituency of eye

MAHABHUTA	PARTS OF THE EYE
<i>Prithvi</i>	Flesh and Skin, tendon
<i>Jala</i>	Fluid, blood, mucous, tears, and exudates
<i>Agni</i>	Visual faculty
<i>Vayu</i>	Opening and closing of lid
<i>Akasha</i>	Gross and minute channels of the eye

Fig-1: Anatomy of eye



The Agni of respective *Mahabhuta* will digest the channels of *Kapha* and *Rakta* to develop sense organs ^[10]. *Indriyas* are

considered as *Atmaja bhavas* by Acharya Charaka and Sushruta. The clearness of senses however is attributed by *Satmyaja bhava* ^[11].

The shape of *Netra* is precisely described with three words *Nayana budbudam*, *Suvrttam* and *Gostanakaram*. The eye ball is round like the breast; there is also small projecting nipple like structure. *Budbudam* indicates smoothness, fragile nature, cystic shape and the possibly reflective or refractive property.

Measurements: Bahulya: From front to back antero posterior diameter is-two *angula* (The central part of an individual thumb is one *angula* for his measurement).

Ayama: *Vistara* from above downwards vertical diameter- two *angula* and from side to side horizontal – two and half *angula*.

Sarvatah: The circumference is three and half *angula*. Acharya Yogaratnakara has substituted the word *Budbuda* with *Mandala* [12].

The total width of all the *mandalas* is two and half *angulas*. Whereas width excluding *varthma mandala* is two *angula*.

The size of *Krishna mandala* is one third of *ayama* (2.5*angula*) and the size of *dhrishti mandala* is one seventh of *Krishna mandala*.

Parts of Netra: *Netra* is composed of *Mandala*, *Sandhi* and *Patala* [13].

Netra Mandala: The term *Mandala* is used to describe visible parts of the eye. *Mandala*

means to cover a circular field literally mean covering a circular structure.

Five *mandals Dhrishti, Krishna, Sukla, Vartma and Pakshmamandalas*. They are arranged in concentric circles. The space between the two eyes is four *angula*.

Doshas in Vartmamandala: *Pranavayu* situated in *Murdha* has intricate connection with *Hridaya* (Heart) and *Indriya*. Hence other disease of Head can also produce symptoms in eye lids [14].

Netra Sandhi: *Netra sandhi* is the junctional area of *Netra mandalas* they are of six in number *Pakshma, Vartma, Sukla, Krishna, Kaninika and Apanga*.

Akshi Patala: The word *Patala* literally means a thin membrane or coat. There are six *patalas*. Among them two are in the eye lids and are called as *bahya patala*, four are situated inside the eye. **Su.Utt. 1/17.** *The patala is formed by Teja and Jala mahabhuta.*

Akshi bandhana: The internal parts of the eye are properly aligned by *Akshi bandhana*.

The components are *Sira, Kandara, Meda and Kapha* [15].

Marma: There are three *Marmas* related to Eye they are *Apanga, Avarta and Sringataka*. *Apanga* is situated in the lateral end of the lower side of the eye. It is a *Sira marma* of half

angula size ^[16] .

Avarta is a *sandhimarma* lying above eyebrows. It is half *angula* in size. Damage to these two will result in either blindness or visual impairment ^[17].

Sringataka is the junctional area of the channels of nutrition of sense organs like nose, ear, eye and tongue. It is situated between two eye brows. It is *Siramarma of four angula*. There are four such *Marmas* and are linked to nose, ear, eye and tongue.

Sira: There are 38 *siras* to carry doshas among them *Vata- 8, Pitta and Kapha- 10 sira* each.

Dhamani: There are *Rupavahinidhamani* to transmit visual perception and *Ashruvahi dhamanis* for the flow of tears, one in each eye.

Snayu and Pesi: There is a *snayu of prithu* type in eyes. One *pesi* is situated in each eye which is circular in shape ^[18].

Growth and decline of Dhrishti: The growth of *dhrishti* is comparatively less in adult life.

The abilities of human body will gradually reduce in every decade of life. The visual efficiency according to Sharangadhara samhita starts diminishing from the age of 60 years ^[19].

NETRA KRIYA SHAREERA:

Sense of vision one of the choicest possessions of living beings.

This takes place in three stages

1. Stage of *Indriyartha sannikarsha* (contact between eye and object)
2. Stage of *Rupa alochanam* (Analysis of Images)
3. Stage of *Chakshu Buddhi* (Visual perception)

Stage of *Indriyartha sannikarsha* (contact between eye and object):

This called as *pratyaksha* the image travels in the media of light *jyoti* towards *akshi*. The perception of *indriyartha* takes place in complex mechanisms' like conduction of the light rays reflected by the object towards the eye, refraction inside the eye and convergence into *dhrishti*. *Vata* is the functioning dosha in this stage in the presence of normal *Pitta* and *Kapha*.

Rupa Alochanam: This is the stage of receiving and analyzing the images. *Rupa grahana* is done by *pitta* in general and *Alochaka pitta* in particular.

It is situated in *antah taraka* of eye. Two aspects of *Alochaka pitta* like *Chakshuvaisheshika* and *Buddhi vaisheshika* to carry out this function.

Functions of *Chakshuvaisheshika Alochaka pitta:* *Jnana udirana* after the contact of *Atma*,

Mana, Indriya and Artha. Bringing this to Chitta.

Informing *Lakshana, Samsthana, Rupa, Varna, Swara Pranipata Jnana and Vaisheshika Jnana. Such information received in Akshigolaka is forwarded to Chakshubuddhi* [20].

Chakshurbuddhi: Though *Chakshuvaisheshika is situated in eye ball, Buddhi vaisheshika is situated in Sringataka.*

Functions of *Buddhivaisheshika*:

- Perceives minute details by jnana
- Provides complete visual perception
- Records visual images and remembers these images for long time
- Recalls and recollects when necessary
- Helps to see the future things. It is instrumental in *Dhyana, Pratahara and Yojana.*

Chakshrubuddhi takes place in two phases *kshanika and nischatmaka.*

Mind motivates the sensory faculties to perceive their respective objects [21].

Role of *Dosha, Dhatu and Mala*: Vata dosha regulates all the movements of the body. Vyanavayu is the inspirator of the eye lid movements. Pranavayu supports all the sensory faculties.

The vitiations of Vayu will prevent *indriyarthasannikarsha* and produce dysfunctions of the eye [22].

Dhatu: *Rasadhatu*- By providing *preenana*

The watery portion of the eye is *Malas of Rasadhatu*

The first *patala of dhrishti* is composed of *Rasa and Rakta* [23].

Raktadhatu: The *Sira and Kandara* are the *Upadhatu of Rakta* and they will fix the eye ball in the bony socket. The increased *Raktadhatu* will result in engagement of blood vessels and redness in the eye (**Su.Su.15/15**). *Raktasara purusha* will have *snigdha* and coppery colored eyes (**Su.Su.35/16**). The reduction of Rakta in the body is evident as in case of *Panduroga*.

Mamsadhatu: *Mamsadhatu* forms the second *dhrishti patala* and provides *pushti*. Components of the eye like *Sira, Khandara, Snayu, Asthi and Sandhi* get stronger by the support of *Mamsadhatu*.

Medodhatu: *Medodhatu* provides strength to the eyes.

Asthidhatu: The eye lids have cartilage. The eye lashes *Pakshma* are the *Malas of Asthidhatu*.

The visual efficiency will be reduced when *Asthi and Majjadhatu* are depleted.

Majjadhatu: The excellence of *Majjadhatu* will provide *Mahanetra* or excellent eyes.

Shukradhatu: The excellence of *Shukradhatu* makes the eye most pleasing as if eye is filled with milk.

Ojas: The expression feelings like happiness, anger, and sorrow in the eyes is brought about by *Ojas*.

Malas: *Netra dushika* and *Akshi sneha* are the *Malas* of *Mamsa* and *Medodhatu* respectively. The increase and decrease of mala will have direct impact on the eye.

Srotas: Though all channels are linked with the eyes and damage to *Annavahasrotas* and *Raktavahasrotas* will immediately lead to Visual loss. Damage to *Annavahasrotas* can make person blind. *Viddha lakshana* of *Raktavahasrotas* is redness of the eye [24].

KARNA (EAR)

Indriya dravya- Akasha

Indriya Vishaya- Shabdha

Indriya Buddhi- Shabdagrahana

Karna is one among *Panchagyanendriya* which is *adhithana* for *Shrotrendriya*.

Paryaya: *Shrortam*, *Karna*, *Shrotrendriya*, and *Shruti*

Mahabhuta: *Akasha Mahabhuta*

Acharya Sushruta considered *Karna* in *Bahirmukhasrotas*.

Acharya Charaka said two *Karna shaskuli* and two *Karnaputraka*.

In *Karna dasha Siras* and *Shabdhavahini Sira*. From two *Dhamani Shabdagrahana* is done.

Acharya Sushruta while explaining about the different types of *Asthi*, mentioned the type of *Asti* in *Nasa*, *Karna*, *Greeva* and *Akshikuta* as *Tarunasti*. While explaining *Asti sandhi Gandha*, *Karna* and *Shankha* as a *sandhi*. Further said there are 8 types of *Asthisandhis* among them *Shrotra* and *Shringataka* are present [25]. *Shrorta* is considered as *Buddhi indriya* among five *buddhendriya*.

Karnapali (Pinna): It is lobule of external ear; *Karnavyadhana* is done for the same.

Karna peetha is the seat for auricle

Karna putrika is the auricle or pinna

Karna shaskuli it is external auditory meatus

Karnapataha means *Tympanic membrane*

The distance between *Karna* and *apanga* is 5 *angula* which is supplied by 2 *dhamani* and 10 *Sira*.

NASA (NOSE)

Embryology

- Development of *Nasa* is seen during the third month of gestation
- Development of *Mukha* (oral cavity), *Nasa* (nose), *Akshi* (eyes) and *Shrotra* (ears) occurs in 6th month of gestation.

Etymology

The word 'NASA' is derived from the root Nastru, which becomes Nasry by the principle

"Nonah" and with the addition of suitable suffix the root gets the position of Hal and thus word Nasa is derived which means to sound.

Nasa is one among Panchagyanendriya which is adhisthana for Ghranendriya.

Nasa is one among Panchapanchaka

Indriya dravya- Prithvi Gandha

Indriya adhisthana- Nasa 2 nostril

Indriya Vishaya- Gandha

Indriya Buddhi- Gandhagyana

Paryaya: *Nasa, Ghranendriya Ghrana is Buddhi adhisthana so called Buddhindriya.*

Mahabhuta: *Prithvi Mahabhuta*

Acharya Sushruta considered Nasa in Bhirmukhasrotas.

Nasaputa: *Nasaputa prama is 1, 1/3 or 2/3 angula (Tribhagangula visthara) [26].*

It contains Tarunasti and 3 bones. It contains 2 Peshi [27].

It contains 2 Phana marma and helps for Gandhagyana Shringhataka marma.

Consists of 24 Siras and 2 Dhamani for smell.

JIWHA (Tongue):

Jiwha is originated from Mamsa, Rakta Kaphaprasadabhagha.

Jiwha is one among Panchagyanendriya and helps in perception of Taste which is single and located in Oral cavity. It is also one among Dashapranayatana [28].

It is Jalatatvapradhana pratyanga and is adhisthana for Bhodhakakapha, Pranavayu and Udanavayu. Because of Bhodhaka kapha there will be Rasagyana and reaches to Brain by Pranavayu and Movement of Tongue and Speech by Udanavayu.

Vyutpatti (origin):

Kaphashonita mamsanam saro jiwha prajayate

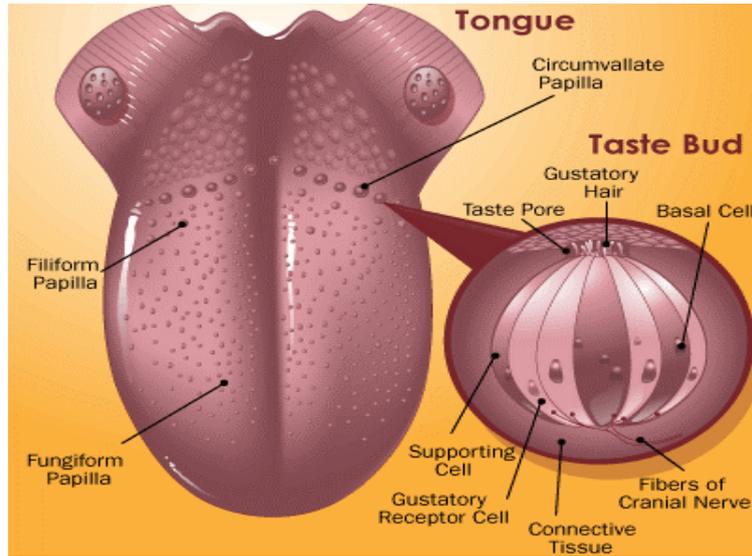
The vyutpatti of Jiwha is from Kapha Mamsa and Raktasarabagha [29].

Swarupa of Jiwha:

The Natural Tongue is Ayama and Vistarokta, Slaksha, Tanvi and Patala pushpavarna sadrusha means Raktavarna.

There are total seven sevanis in the body Jiwha sevani is one among them.

Fig. 2: Anatomy of tongue



Jiwha and Shaddrasagyana:

Madhurarasagnana: Jiwha purvabhaga

Amlarasagnana: Jiwhadharabhaga

Lavanarasagnana Jiwhadharabhaga

Tiktarasagnana: Jiwhamula purvabhaga

Katurasagnana: Jiwha Agarabhaga

MUKHA (Mouth): Mukha consists of Ostha, Jiwha, Danta, Dantamula, Talu, Gala or Kanta.

Andakosha, Chibhuka, Danta, individual Nasaputa, Karnamula, Bhru and Netra and outer covering and inner covering of netra is of 2-2 angula pramana.

Distance of Greeva and Hrudaya and Mukhadairgya is of 12angula.

When the mouth is opened it is 4angula. Mukha and Greeva is of 24angula pramana [30].

Acharya Sushruta considered Mukha in Bahirmukhasrotas.

TWAK (SKIN) :

The word “Twak” is derived from the root “Twacha sam varnane” [31] it can be defined as the body substance that covers the internal tissues like Rakta, Mamsa, Medas etc. The outer protective covering of the body consisting of corium and the epidermis.

Paribhasha of Twak: Twacha is one among the panchajnanendriyas, which completely covers meda, shonita and all other Dhatus of the body and is extensive all over the body [32]. It is considered as the seat of Sparshanendriya as well as one among the main seat of Vata and Pitta.

Synonyms of Twak: Twak, Charma, Raktadhara, Asragdhara, Sparshanendriya etc

Panchabhoutikatwa of Twak: Twak is predominantly made of Vayu and Teja mahabhoota [33] along with rest of the mahabhootas like prithvi, Aap, Akasha.

Layers of Twak and Disease manifestation ^[34]

Avabhashini : *Sidhma and Padmakantaka* and its size is 1/12 of *Vreahi Dhanya*.

Lohita : *Tilakalaka, Nyaccha, Vyanga* and its size is 1/6th of *Vreahi* .

Shwetha : *Charmadala, Ajagallika* and size is 1/12th of *Vreahi*.

Tamra : *Kilasa kushta* and size is 1/8th of *Vreahi*.

Vedini : *Kushta, Visarpa* size is 1/5th of *Vreahi* .

Rohini : *Granthi, Alachi, Arbuda* size is equal to *Vreahi*.

Mamsadhara : *Bhagandhara, Arshas* size is double to *Vreahi*.

Twak kriya :

Importance of Sparshanendriya: Though there are five *Gnanendriyas*, still *Sparshanendriya* ranks first because it is present in almost all the *indriyas* and is *sarvashareeravyapi* i.e, present in all *indriyas* and whole body only *kesha* and *loma* have inseparable relation between them so wherever there is a feel of touch there will be the presence of mind so *vata* is present in *sanjnavahinadis of Manas* (Mind) because of which *jnana* or knowledge is acquired through *Atma*.

Dosha and Twacha :

Vata and Twacha : helps is *grahana* of all *indriyas*.

Pitta and Twacha : imparts *prabha* to the skin.

Kapha and Twacha: keeps the skin moist.

Dosha bheda and Twacha :

Pranavayu helps in *dharana* of *indriyas* and *Udanavayu* brings about *varna* to the skin.

Bhrajaka pitta is located in the skin and does the absorption of drugs used for *abhyanga*, *parisheka* and *lepa* does *pachana* and improves the *chaya* and complexion.

Tarpaka kapha provides nourishment to the skin.

Bhrajaka pitta and twacha varna: *Bhrajaka pitta* provides lusture and natural colour to the skin and even it governs normal and abnormal temperature of skin and even it maintains the colour of hair and eyes according to Acharya Bhela even Charaka has mentioned that normal colour of the skin and maintaining body temperature is done by *pitta* and he has not mentioned specifically as *Bhrajakapitta*. Whereas Chakrapani in his commentary has specified it as *Bhrajakapitta*

Conclusion:

- Shiras is said considered as *Uttamanga* because all sense organs are situated and *Pranavata* is mainly located any impairment may impact on all sense organs.
- Shiras is said to be one of the *Sadyapranaharamarma* one should

protect for the normal functioning of the *Mastishkya* and normal functions of all sense organs.

- Different causative factors may produce different diseases related to those particular sense organs. In such case *Nasya, Shirobasti, Lepa, Karnapurana, Dhupana Shamanayoga* may give fruitful results.
- All sense organs play important role in every human beings life one should protect these to lead healthy, happy and long life.

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