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# A Conceptual Study of Drishti in Ayurvedic and Modern Point of View

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**Abstract-** There are five sense organs (Panch Gyanendriya) mentioned in Ayurvedic Samhitas i.e. eye(chakshu), ear(shrota), nose(ghrana), tongue(rasana) and skin(twak). One of these is eye (Drishti) which is most important sense organ in our body. Acharya Sushruta the eminent Ayurveda region, has described the Drishti very accurately in his treatise Sushruta Samhita. There are six Netra Patala told in Ayurvedic classics which can be anatomically correlated with different layers of eyes as explained in modern ophthalmology. Drishti is a controversial word in Shalaky Tantra, a lot of meanings of Drishti have been taken in the Sushruta Samhita<sup>1</sup>. So Drishti can be simply considered as the functional unit of eye, which performs vision. It is not mere an anatomical structure but the composition of all the essential dhatus of internal eye ball. In ancient Ayurvedic scriptures have explained Netra Rachna Sharir and Kriya Sharir in a beautiful descriptive manner, still there is need of exploring the terminologies for proper understanding of pathogenesis of Netra Rogas and their managements so that implementation of Ayurvedic concepts can be done in eradication of Drishtigata Rogas in a fruitful manner to serve the humanity.

**Keywords:** drishti, sense organ, acharya sushruta.

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# A Conceptual Study of Drishti in Ayurvedic and Modern Point of View

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**Abstract-** There are five sense organs (Panch Gyanendriya) mentioned in Ayurvedic Samhitas i.e. eye(chakshu), ear(shrota), nose(ghrana), tongue(rasana) and skin(twak). One of these is eye (Drishti) which is most important sense organ in our body. Acharya Sushruta the eminent Ayurveda region, has described the Drishti very accurately in his treatise Sushruta Samhita. There are six Netra Patala told in Ayurvedic classics which can be anatomically correlated with different layers of eyes as explained in modern ophthalmology. Drishti is a controversial word in Shalaky Tantra, a lot of meanings of Drishti have been taken in the Sushruta Samhita<sup>1</sup>. So Drishti can be simply considered as the functional unit of eye, which performs vision. It is not mere an anatomical structure but the composition of all the essential dhatus of internal eye ball. In ancient Ayurvedic scriptures have explained Netra Rachna Sharir and Kriya Sharir in a beautiful descriptive manner, still there is need of exploring the terminologies for proper understanding of pathogenesis of Netra Rogas and their managements so that implementation of Ayurvedic concepts can be done in eradication of Drishtigata Rogas in a fruitful manner to serve the humanity.

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## I. INTRODUCTION

Shalaky Tantra is an important branch in Ashtang Ayurveda which deals with the diseases manifesting above supraclavicular region (Urdhwajatrugata roga)<sup>2</sup>. Netra Sharira deals with three major parts of eye-Mandala, Sandhi and Patala<sup>3</sup>. Among five Drishti Mandala is one which is situated in the innermost part of eyeball and in context with this all Drishtigata Rogas have been described. Drishti is made up of Panchamahabhuta, but Teja mahabhuta is predominant in the form of Alochaka Pitta. There are two types of Alochaka pitta-1. Chakshu vaisheshika (Dristipatala-image formation occur). 2. Buddhi vaisheshika (Higher visual center-image analysed and perceived by buddhi). Drishti is an important part of eye and in classics it is interpreted in various aspects.

**Drishti:** The word “drishti” is derived from the “drish” dhatu by adding the “ktin” pratyaya. The meaning of the drishti is process by which we see. Different Acharyas have different view regarding meaning of drishti which are follows.

1. Drishti (Retina)
2. Drishti (Vision)
3. Drishti mandala (Pupil)
4. Drishti mani (Crystalline lens)

**Drishti (Retina, Optic nerve)-** Some drishtigata rogas like Shleshma vidagdha drishti, Dhundarshi, Pitta vidagdha drishti, Nakulandhya, Haswajadya, Gambhirika can only be explained if drishti word is taken as retina or optic nerve.

**Drishti (Vision or power to see things)-** Acharya Sushruta has explained that Adhimantha destroys the drishti if not treated well in time<sup>4</sup>. From this fact it can be deduced that drishti is the power to see things.

**Drishti mandala (Pupil)-** Acharya Sushruta has described five Mandala's in the eye out of which innermost one is Drishti mandala<sup>5</sup>. Drishti Mandala is said to be situated just next to Krishna Mandala. As per modern ophthalmology the eyeball comprises three coats<sup>6</sup>:

**Outer (Fibrous coat):** anterior 1/6th cornea and posterior 5/6th sclera

**Middle (vascular coat):** ciliary body, iris, choroid

**Inner (nervous coat):** retina

Also according to modern ophthalmology as we go anteroposteriorly, the structure next to cornea is pupil.

**Pramana of Drishti Mandala:** Size of drishti as per Sushruta acharyas<sup>7</sup> is 1/7th of Krishna Mandala. At some places it is written 1/9th of Krishna Mandala<sup>8</sup>. This is in accordance with the fact that pupil is reactive to light and always keep constricting and dilating physiologically. In other words, pupil size is not constant throughout a day. Moreover, drishti is vivarakriti<sup>9</sup> which means like a hole or like a shutter of camera, this supports that drishti is pupil.

**Drishti mani (Crystalline lens)-** Intraocular crystalline lens placed in posterior chamber of eye ball. As per Sushruta Samhita drishti is masoordal tulya<sup>9</sup> (similar to cotyledons of pulses in shape), which is biconvex in shape. It supports the fact that Drishti is lens as lens is biconvex<sup>10</sup> in shape.

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## II. AIM AND OBJECTIVE

1. Describing Drishti from an Ayurvedic and Modern point of view.
2. Detailed consideration of all points of Drishti.

## III. MATERIALS AND METHODS

**Material-** Different Ayurvedic scriptures like Sushruta Samhita, Charak Samhita, Bhela Samhita Modern texts books, Medical journals, Published research paper and Articles.

**Method-** Study type – Review.

Literature related to the title is searched from all authentic Ayurvedic Scriptures, Ayurvedic journals and internet and Modern texts books.

### a) Drishti in Ayurvedic View

#### *Drishti in Anatomical Point of view-*

Name	Constituting factor
1 st Patala	Tejas + Jala (Tejojalaashrita)
2 st Patala	Mamsa (Mamsaashrita)
3 st Patala	Medas (Medoaashrita)
4 st Patala	Asthi (Asthyaashrita)

According to Ayurveda the vitiated doshas travel through siras and reach the eye then get localized in the vartmapradesha, sita-asitamandala, sarvakshi or drishti and different diseases of eye are manifested. It is described in Sushruta Samhita that Drishti as a structure itself is covered externally with outer coat (Avrataam bahayen patalen akshi). It has also been told by Acharya Sushruta that while doing Agnikarma (thermal cauterization) on vartma (lids), Drishti should be covered with wet gauze (Drishti achchhadana)<sup>14</sup>. According to Acharya Charaka also there is indication for Mridusweda (mild fomentation) for Drishti by covering it with padmaupalapatra (leaves of lotus) (Drishti swedayeta mridu naiv va)<sup>15</sup>. Here Drishti can be considered as an anatomical entity. Appearance of Drishti has been described as glow like a lightening bug or that of minute particle of fire (Khadhyota visfulingabha). Structure of Drishti has been explained as a hole or aperture (Vivarakriti)<sup>16</sup>.

### b) Drishti in Physiological Point of View-

**Properties of Drishti-** cold atmosphere (Sheet satmya).

**Drishti as knowledge-** Drishti visharada is a term used for having extreme knowledgeable person.

**Drishti as Vision-** In Ayurvedic classics there are several references which indicate that

Drishti term is used for vision. Few textual references are as following

- When Tejo Dhatu does not reach Drishti, congenital blindness (Jatyandha) is developed<sup>17</sup>.
- If poison is given in Anjana form (Visha Samsrishta Anjana) then blurring of vision (Drishti vibhrama) occurs<sup>18</sup>.

According to Sushruta Samhita “5” Mandals<sup>11</sup> in the eye ball -

Pakshma mandala.

Vartma mandala.

Shweta mandala.

Krishna mandala.

Drishti mandala.

“6” Sandhi<sup>12</sup> in the eye ball-

Pakshma-Vartamagata Sandhi.

Vartama-Shuklagata Sandhi.

Shukla-Krishnagata Sandhi.

Krishna-Drishtigata.

Kaninaka Sandhi.

Apanga Sandhi.

“6” Patalas<sup>13</sup> in the eye ball-

Vartmagata Patalas-2

Akshigata Patalas-4

- Controlling vega (natural urges) like Kshudha and Adhovayu leads to defective vision<sup>19,20</sup>.
- If Adhimantha is not treated properly it leads to loss of vision (Drishtihanana)<sup>21</sup>.
- Acharya Vagbhata used term Drishti Mushita darshanam for loss of vision in Aupsargika Lingnasha<sup>22</sup>. Acharya Sushruta used term Drishti runaddhi for loss of vision in Lingnasha<sup>23</sup>.

### c) Drishti in Modern View<sup>24</sup>

In Modern Ophthalmology there are few structures related to vision which can be comparable to the description given in Ayurvedic texts for Drishti. Structures related to visual axis and vision are as following-

**Cornea:** Cornea is a clear, transparent and elliptical structure with a smooth shining surface.

**Aqueous humour:** The aqueous humour is a clear watery fluid filling the anterior chamber (0.25 ml) and posterior chamber (0.06 ml) of the eyeball. It plays an important metabolic role by providing substrates and by removing metabolites from the avascular cornea and lens. It maintains optical transparency.

**Pupil:** Pupil is central opening in the iris and its size varies between 1 and 8 mm. Constriction of pupil regulates the entry of light inside the eye and allows the retina to adapt to the changes in the illumination<sup>25</sup>.

**Lens:** The lens is a biconvex and transparent structure. The lens has nodal point (optical centre of lens) on its posterior part through which rays of light pass to retina.

**Retina:** It is the innermost tunic of the eyeball and the most highly-developed tissue and consists of 10 layers. Grossly it is divided into two distinct regions: Posterior Pole and Peripheral Retina separated retinal equator. The posterior region of the retina is called the posterior pole, the posterior pole of the retina consists of two regions: the macula lutea and the optic disc.

**Optic disc:** The optic disc is also called the “blind spot” or the “physiological blind spot”. It is called this because there are no receptors in this part of the retina. This is where all of the axons of the ganglion cells exit the retina to form the optic nerve. There are no light sensitive rods or cones to respond to a light stimulus at this point.

**Macula lutea:** It is about 5.5 mm in diameter. Fovea centralis is the central depressed part of the macula. It is about 1.5 mm in diameter and is the most sensitive part of the retina. In its centre is a shining pit called Foveola (0.35 mm diameter) which is situated about 2-disc diameters (3 mm) away from the temporal margin of the disc and about 1 mm below the horizontal meridian. An area about 0.8 mm in diameter (including foveola and some surrounding area) does not containing retinal capillaries and is called foveal avascular zone (FAZ).

**Visual Axis:** Visual axis is the line joining the Gaze or fixation (O), nodal point (N), and the fovea (F).

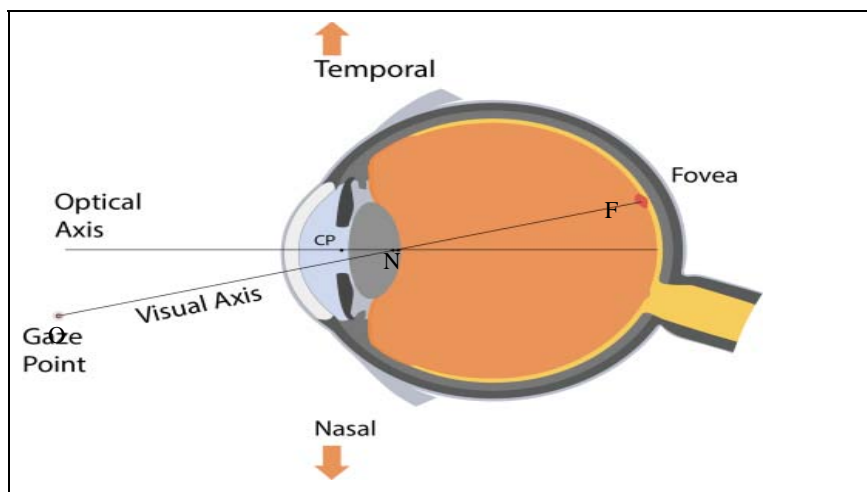


Figure 1: Visual axis (OF)

**Visual pathway system:** The visual pathway consists of- Optic Nerve, Optic Chiasma, Optic Tract, Lateral Geniculate Body Optic Radiations and Visual Cortex.

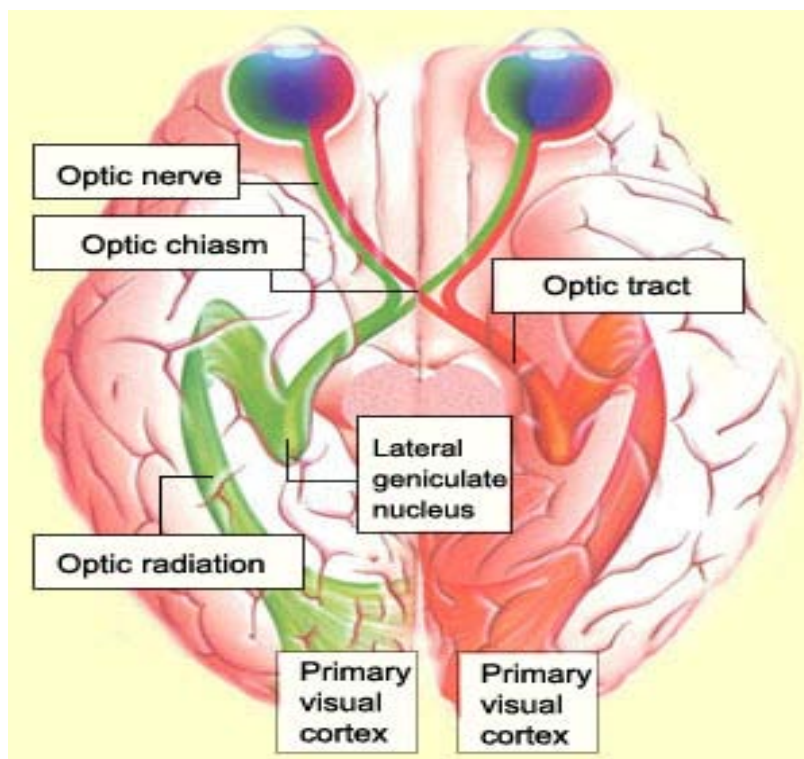


Figure 2: Visual Pathway

*Drishti as Retina:* Drishti is made up of sara of Panchamahabhoot, but Teja mahabhoot is predominant in the form of Alochaka Pitta which is considered as light media for eye. Roopa with the help of teja travels into chakshu and then reached to chaksurendriya and then to chakshubudhhi where perception of the object occurs and finally perceived by atma which provide information of the object and all this can be considered as pathway for visual impulse received by eyes and thus enabling it to see.

Indriyaartha (object has form)

Indriyadravya (light media)

Indriyaadhisthana (eyes)

Indriya (photoreceptor cells of retina (rods and cones))

Indriyabuddhi (transmission of image via visual pathway)

Atma (higher centre i.e. visual cortex)

#### d) Concept of physiological aspect of drishti

Patalas are the main seat for the disease where the feature is impairment in vision. It may blurred vision for distance or near, metamorphopsia, diplopia and visual field defects. Acharya Bhela has described two types of alochaka pitta-

1. Chaksyu vaisheshika - The former is responsible for proper formation of image on the retina and transmission of impulses (conditions wherein the media of the eye and retina is involved).
2. Buddhi vaisheshika (Higher visual center-image analysed and perceived by buddhi)<sup>26</sup>.

#### e) Concept of pathological aspects of drishti

The diagnosis of a disease with impairment in the vision is based only on the symptoms. When prathama and dwiteeya patala is invaded by the doshas, it is called as timira, triteeya patala is kacha and chaturtha patala is linganasha. These timira, kacha, linganasha are the progressive stages of a disease which starts with the blurring of vision, ending with complete loss of vision. Clinical application of concept of drishti Myopia: characterised by blurring of vision for distant objects<sup>27</sup>. This feature is seen in pratama patalagata dosha lakshana. Dosha is vata. Hence, vatajatimira line of management should be followed. Presbyopia is difficulty in near vision seen as a symptom

in dwiteeya patalagata dosha. Dosha involved is vata. Vitreous degeneration, floaters are seen. This feature is seen in dwiteeya patalagata lakshana. Dosha is vata (responsible for degeneration). Diplopia wherein there will be double vision is seen as triteeya patalagata lakshana. Metamorphopsia which is seen in many conditions where there is distortion of vision<sup>28</sup>. This feature is seen in triteeya patalagata dosha lakshana (karna nasa kshi yuktani viparitani ca veekshyate). Dosha can be either vata or pitta. Visual field defects characterized by different pattern of vision loss. The pattern of visual field defect corresponds to the site of lesion in the visual pathway. For instance, if nasal fibres of right eye are affected it leads right temporal visual field defect<sup>29</sup>. In triteeya patalagata dosha, depending on the lodgement of dosha the corresponding side of vision will not be seen. For example, if the doshas are situated in the side of drishti then lateral part of field of vision is lost. This is seen as triteeya patalagata lakshana and also in sannipataja timira. Hence, sannipataja timira line of management should be followed.



The features of patalagata doshas are listed in the table below-

S.No.	Patalas	Lakshana	Interpretation of Symptoms and signs
1	Prathama	Disturbance in vision <sup>30</sup>	Blurred of vision
2	Dwiteeya	Patient sees objects like insects, hairs and webs, unable to perceive certain parts in a face, sees certain luminous objects like stars, objects which are near appears to be far and vice versa, unable to thread a needle <sup>31</sup> .	Floaters, metamorphopsia, photopsia, loss of depth perception and presbyopia
3	Triteeya	There will be raga prapthi – different colours will be imparted to the patalas corresponding to the dosha involved. Vatadosha – reddish black, pitta – yellow or blue, kapha – white, rakta – red, sannipataja as multiple colours and parimlayi as yellow, red or blue <sup>32</sup> .	Visual pathway defects, retinal tear or detachment, metamorphopsia. Raga prapthi to the patalas as any change in the general back ground. Example: vitreous haemorrhage – as pittaja, Retinitis pigmentosa as vataja.
4	Chaturtha	Complete loss of vision but still the patient sees bright objects like sun, moon and Lightening <sup>33</sup> .	Conditions where in the patient is said to be legally blind, conditions where there is retinal traction leading to flashes.

#### IV. DISCUSSION

In Ayurveda, Drishti is used as a broad terminology and is used accordingly in different aspects. From the present study it can be concluded that Drishti is not just a single entity but composed of many structures that can be correlated in modern ophthalmology. The structures which come across visual axis and their functional output in total can be taken as Drishti. In view of this definition the structures i.e. central part of Cornea, Pupil, Lens, Vitreous, Retina, Visual pathway all come under the broad view of Drishti along with functional outcome i.e. vision. For treating the diseases related with Drishti there should be proper knowledge of different terminologies and their practical implementation so that the basic aim of Ayurveda- to maintain the health of healthy person and to cure the unhealthy person can be achieved. In Ayurveda, Drishti is used as a broad terminology and is used accordingly in different aspects. From the present study it can be concluded that Drishti is not just a single entity but composed of many structures that can be correlated in modern ophthalmology. In this literary study we collected various data from the deferent Ayurvedic scriptures with the available commentaries, as well as text books of modern medical sciences, various articles for better understanding of the netra sharir and its comparison with contemporary science. Acharyas have explained prakriti also has described the anatomy of eye in relation to their shape, size of various anatomical components. Sushruta has explained seventy-six different kinds of eye diseases and their treatment in uttara tantra. The Netra execute both physiological functions roopagrahana and buddhigrahana as it is the

seat of Alochaka pitta. It is predominant of tejo mahabhuta so, there is always dread of kapha to eye.

#### V. CONCLUSION

It is also said that all types of eye diseases originate from the Abhishyandha. Therefore, the wise doctor should first treat the disease Abhishyandha (Prayena sarve nayanaamyastu bhavantyaabhishand-nimittamula)<sup>34</sup>. The eye sees the images with the help of mind not by the eye (itself) and the eye dose not(actually) see the images when the mind is perturbed even if it (physically) sees them. It has to be understood what it implies in relation to where the word drishti is being used. As explained above, in context of anatomy it should be referred as pupil, in context of kanch, timir, linganaash (drishtigata rogas) it should be considered as intraocular lens whereas in pitta vidagdha drishti, shleshma vidagdha drishti etc. drishtigata rogas it must be taken as optic nerve or retina as a whole.

#### REFERENCES RÉFÉRENCES REFERENCIAS

1. Kaviraj Shastri Ambikadutta Aupdravikam adhyaya. in: Ayurveda Tattva Sandipika Hindi Commentary Susruta Samhita Uttaratantra 2013 reprint edition Chaukhambha Sanskrit Sansthan Varanasi 2013: pp 6-11
2. Charak Samhita, Vidyotini Hindi Commentary by Pt. Kasinatha Sastri and Dr. Gorakha Natha Chaturvedi, Editor by Pt. Rajeshwardatta Shastri, Vol-1, Chaukhambha Bharati Academy Gokul Bhawan Varanasi, Reprint: 2017, Sutrasthana 30/26, Page no.589.

3. Kaviraj Shastri Ambikadutta uttaratantra Aupdravikam adhyaya.in: Ayurveda Tattva Sandipika Hindi Commentary Susruta Samhita Uttaratantra 2013 reprint edition Chaukhambha Sanskrit Sansthan Varanasi 2013: pp 8-11 shloka 14-18
4. Shastri Ambikadutt, Sushruta Samhita edited with Ayurveda tatva sandipika Hindi Commentary, Uttar tantra 6th chapter, Sarvagatarogavigyaniya adhyaya 6/20, Varanasi, Chaukhambha Sanskrit Sansthan, reprint edition; 2009 p-36
5. Shastri Ambikadutt, Sushruta Samhita edited with Ayurveda tatva sandipika Hindi Commentary, Uttar Tantra 1st chapter 1/15, Aupdravikam adhyaya Varanasi, Chaukhambha Sanskrit Sansthan, reprint edition; 2009. p.08
6. Khurana AK, Comprehensive Ophthalmology, fourth ed. Chapter 1, Anatomy & development of eye, New age International Publishers, New Delhi. P-3
7. Shastri Ambikadutt, Sushruta Samhita edited with Ayurveda tatva sandipika Hindi Commentary, Uttar Tantra 1st chapter, Aupdravikam adhyaya 1/13, Varanasi, Chaukhambha Sanskrit Sansthan, reprint edition; 2009. p.07
8. Shastri Ambikadutt, Sushruta Samhita edited with Ayurveda tatva sandipika Hindi Commentary, Sutra Sthana, 35th chapter 35/12, Aaturupkramaniya adhyaya, Varanasi, Chaukhambha Sanskrit Sansthan, reprint edition; 2009. p.07
9. Shastri Ambikadutt, Sushruta Samhita edited with Ayurveda tatva sandipika Hindi Commentary, Uttar tantra 7th chapter, Drishtigatarogavigyaniya adhyaya 7/3-4, Varanasi, Chaukhambha Sanskrit Sansthan, reprint edition; 2009 p-40.
10. Khurana AK, Comprehensive Ophthalmology, fourth ed. Chapter 8, Diseases of Lens, New age International Publishers, New Delhi. P-167.
11. Dr. Anant Ram Sharma, Sushruta Samhita edited with Susrutavimarsini Hindi Commentary, Uttar Tantra 1st chapter Aupdravikam adhyaya 1/17, Varanasi, Chaukhambha Sanskrit Sansthan, reprint edition; 2013. p.6
12. Dr. Anant Ram Sharma, Sushruta Samhita edited with Susrutavimarsini Hindi Commentary, Uttar Tantra 1st chapter Aupdravikam adhyaya 1/17, Varanasi, Chaukhambha Sanskrit Sansthan, reprint edition; 2013. p.7
13. Dr. Anant Ram Sharma, Sushruta Samhita edited with Susrutavimarsini Hindi Commentary, Uttar Tantra 1st chapter Aupdravikam adhyaya 1/17, Varanasi, Chaukhambha Sanskrit Sansthan, reprint edition; 2013. p.8
14. Kaviraj Shastri Ambikadutta Agnikarmvidhi adhyaya. in: Ayurveda Tattva Sandipika Hindi Commentary Susruta Samhita Sutrasthana Part 1 2013 reprint edition Chaukhambha Sanskrit Sansthan Varanasi 2013 pp 52 shloka9.
15. Chakrapani Datta Acharya Swedadhyaya ed. Vaidya Jadavaji Trikamji Acharya in Ayurveda Dipika commentary of Agnivesha pranita Carakasamhita—Elaborated by Charaka and Dridhabala Sutra Sthana 5th ed. Reprint 2000 Chaukhambha Surbharati Prakashan Varanasi 738 pp, P 88
16. Kaviraj Shastri Ambikadutta uttaratantra Drishtirogavijaniya adhyaya. in: Ayurveda Tattva Sandipika Hindi Commentary Susruta Samhita Uttaratantra 2013 reprint edition Chaukhambha Sanskrit Sansthan Varanasi pp 40 shloka 3,4.
17. Kaviraj Shastri Ambikadutta Shukrashonitshuddhisharira adhyaya. in: Ayurveda Tattva Sandipika Hindi Commentary Susruta Samhita Sharirasthana Part 1 2013 reprint edition Chaukhambha Sanskrit Sansthan Varanasi 2013 pp 20 shloka 38.
18. Kaviraj Shastri Ambikadutta Kalpasthanam annapaanarakshakalpa adhyaya. in: Ayurveda Tattva Sandipika Hindi Commentary Susruta Samhita Uttaratantra 2013 reprint edition Chaukhambha Sanskrit Sansthan Varanasi 13 shloka 69.
19. Vaidya Upadhyaya Yadunanadana ed. Uttarasthana Drishtirogavijaniya in Vidyotini Hindi Commentary of Ashtangahridayam of Vagbhata by Kaviraja Gupt Atridev Uttarasthana reprint 2016 Chaukhambha Prakashana Varanasi pp 669 shloka 31.
20. Kaviraj Shastri Ambikadutta uttaratantra Udavartapratishedha adhyaya. in: Ayurveda Tattva Sandipika Hindi Commentary Susruta Samhita Uttaratantra 2013 reprint edition Chaukhambha Sanskrit Sansthan Varanasi pp 519 shloka 16.
21. Vaidya Upadhyaya Yadunanadana ed. Sutrasthana Roganutpadniya adhyaya in Vidyotini Hindi Commentary of Ashtangahridayam of Vagbhata by Kaviraja Gupt Atridev Sutrasthana reprint 2016 Chaukhambha Prakashana Varanasi p 46 shloka 2.
22. Kaviraj Shastri Ambikadutta uttaratantra Sarvagatarogavijaniya adhyaya. in: Ayurveda Tattva Sandipika Hindi Commentary Susruta Samhita Uttaratantra 2013 reprint edition Chaukhambha Sanskrit Sansthan Varanasi pp 33 shloka 20.
23. Kaviraj Shastri Ambikadutta uttaratantra Drishti gatarogavijaniya adhyaya. in: Ayurveda Tattva Sandipika Hindi Commentary Susruta Samhita Uttaratantra 2013 reprint edition Chaukhambha Sanskrit Sansthan Varanasi pp 42 shloka 16.
24. Khurana AK Khurana Aruj K Khurana Bhawna diseases of eye section 3 Comprehensive Ophthalmology Sixth edition 2015 Jaypee Brothers Medical Publishers (P) Ltd. New Delhi p59-179,263
25. Nema HV Nema pupil in Neurology of Vision Textbook of Ophthalmology Fifth edition 2008 Nitin Jaypee Brothers Medical Publishers (P) Ltd. New Delhi p12-13.

26. Bhela Samhita (Hindi commentary) sriabhaykatyayan, choukhamba surbharati-prakashana, sarirasthana, 2008,4/4, p212.
27. Parson's diseases of the eye, Ramanjitsihota, radhika tendon, 22nd edition, Elsevier publication, Haryana, 2015, pg. 28, 29, 30
28. Parson's diseases of the eye, Ramanjitsihota, radhika tendon, 22nd edition, Elsevier publication, Haryana, 2015, pg. 71
29. Parson's diseases of the eye, Ramanjitsihota, radhika tendon, 22nd edition, Elsevier publication, Haryana, 2015, pg. 58, 343, 435, 256
30. Dr. Anant Ram Sharma, Sushruta Samhita edited with Susrutavimarsini Hindi Commentary, Uttar Tantra 7st chapter Drishtirogavigyaniyaadhyaya 7/6, Varanasi, Chaukhambha Sanskrit Sansthan, reprint edition; 2013. p.54
31. Dr. Anant Ram Sharma, Sushruta Samhita edited with Susrutavimarsini Hindi Commentary, Uttar Tantra 7st chapter Drishtirogavigyaniyaadhyaya 7/7-10, Varanasi, Chaukhambha Sanskrit Sansthan, reprint edition; 2013. p.55
32. Dr. Anant Ram Sharma, Sushruta Samhita edited with Susrutavimarsini Hindi Commentary, Uttar Tantra 7st chapter Drishtirogavigyaniyaadhyaya 7/11-14, Varanasi, Chaukhambha Sanskrit Sansthan, reprint edition; 2013. p.55
33. Dr. Anant Ram Sharma, Sushruta Samhita edited with Susrutavimarsini Hindi Commentary, Uttar Tantra 7st chapter Drishtirogavigyaniyaadhyaya 7/15-17, Varanasi, Chaukhambha Sanskrit Sansthan, reprint edition; 2013. p.56
34. Dr. Anant Ram Sharma, Sushruta Samhita edited with Susrutavimarsini Hindi Commentary, Uttar Tantra 6st chapter Sarvarogavigyaniyaadhyaya 6/5, Varanasi, Chaukhambha Sanskrit Sansthan, reprint edition; 2013. p.43

