

# Concept of *Netra Patala*: A Review

Dr. Sangita Kamaliya

Associate Professor Dept. of Shalaky Tantra, Ayurvedic college and hospital, RK University, Rajkot. Gujarat, India  
Email: [sokamaliya\[at\]gmail.com](mailto:sokamaliya[at]gmail.com)

**Abstract:** *Shalaky Tantra* is a branch of *Ayurveda* that deals with diseases occurring above the clavicle region. According to *Acharya Sushruta*, the eyes are the prime sense organ among the five senses. *Acharya Vagbhata* advised that one should make constant efforts to maintain healthy eyes. Because the day and night are the same for blind people, and there is no use of a lot of wealth. Firstly, *Acharya Sushruta* has described the gross anatomy of the eye in the first chapter of *Uttar Tantra*. *Acharya Sushruta* has explained six *Patala* (Layers) in *Netra Sharira*. He described seventy-six *Netra Roga* with its classification in a very systemic manner. To understand the signs, symptoms, site of diseases, prognosis and management, first, we have to understand the concept of *Netra Patala*. The importance of *Ayurveda* is increasing in the present era, it is required to understand the depth of *Ayurvedic* concepts easily. Here, an effort was made to establish the concept regarding the anatomical structure of *Netra Patala*.

**Keywords:** *Netra*, *Patala*, *Roga*, *Sharira*

## 1. Introduction

*Shalaky Tantra* is one of the eight branches of *Ayurveda*. It is a branch dealing with the treatment of disease seen above the clavicle region i. e. eyes, ears, nose, throat, head and neck. According to the *Acharya Vagbhata*, for the man who is blind, this world is useless and, the day and night are the same even though he may have wealth. [1] So, one should make constant efforts to protect the eyes throughout life.

*Acharya Sushruta* has described the gross anatomy of the eye in the first chapter of *Uttar Tantra*. A total of seventy-six eye diseases are narrated by him. *Patalagata Rogas* i. e. diseases responsible for visual impairment, are one group of diseases mentioned in the classification of eye diseases as per pathological site. To understand the pathogenesis and management of these diseases, concepts of *Netra* and *Patala* must be clear. To understand this concept, references about the *Netra Patala* have been compiled from *Ayurvedic* classics and available commentaries and different textbooks of modern science.

*Acharya Sushruta* has explained six *Netra Patala* (Layers) [2] in *Netra Shareera*. *Acharya Vagbhata*, *Acharya Madhavakara* and *Acharya Bhavmishra* also described the division of the eyes as *Acharya Sushruta*.

### **PATALA:**

Etimology:  $\sqrt{Pat} + "Klach" Pratyaya$  [3]

The word *Patala* literally means a thin membrane or coat. In the description of *Drashti*, *Acharya Sushruta* said that '*Avrutam Patalena Akshno*'-*Patala* is understood as a thin layer that covers the *Drashti Bhaga*. [4]

There are six *Patala* among them two are in the eyelids and are called as *Bahya* (outer) *Patalas*; four *Patalas* are situated

inside the eye. [5] The involvement of successive *Patalas* is explained in the *Drashtigata Rogas* as a *Timira Roga*. Thus, the disease *Timira* is caused by vitiation of *Patala*. [6] And the pathogenesis and prognosis of the diseases depend on the involvement of respective *Patala*.

Two *Vartma Patala* / two layers of the eyelids are

- 1) *Urdhwa Vartma* / Upper eyelid
- 2) *Adho Vartma* / Lower eyelid

### **Position of each Patala:**

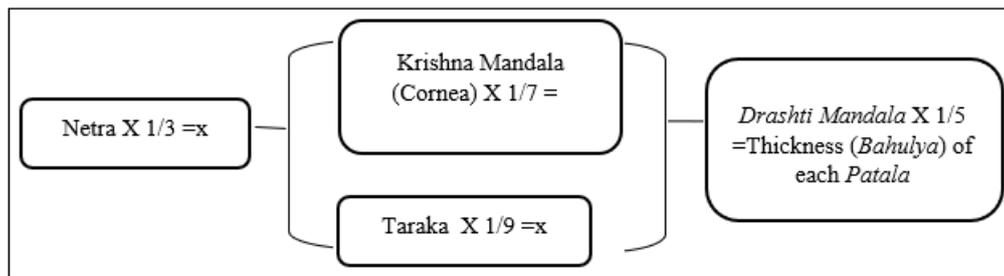
First *Patala* among the four *Patalas* in *Netra* is known as *Bahya* or outer, this means that the other three are relatively inner to the former. While describing the features of *Timira* *Acharya Sushruta* says that, now, 'I will describe the clinical features of successive *Patalas* vitiating *Timira*.' In other words, the disease *Timira* vitiates the first *Patala* and follows the second, third and fourth. Therefore, when the first *Patala* is the outermost, the successive i. e. second lies inner to the former and thus the fourth *Patala* should be the innermost. The commentary given by *Acharya Dalhana* doesn't correspond to *Sushruta's* view and he has reversed the relative position of each *Patala*. The names of *Patalas* and the constituting factor of each *Patala* [7] are mentioned in Table no 1.

**Table 1:** Name of *Patalas* and constituting factor of each *Patala*

S. No.	<i>Patala</i> Name	Constituting Factor
1	<i>Bahya/ Prathama</i>	<i>Teja, Jala</i>
2	<i>Dwitheeya</i>	<i>Mamsa</i>
3	<i>Thriteeya</i>	<i>Medas</i>
4	<i>Chaturtha</i>	<i>Asthi</i>

## 2. Thickness of each *Patala*

The thickness of each *Patala* is equal to 1/5th of *Drishti Mandala*. [8]



### 1) First Patala (Bahya Patala) Patala:

It is the outermost *Patala* among the four *Patalas* and covers the *Drishti Mandala* (Pupil). This first *Patala* is formed of *Tejas* and *Jala Mahabhootas*. *Acharya Dalhana* interprets the word *Teja* as *Alochaka Teja (Pitta)* present in the blood of blood vessels and *Jala* as *Dhatu* present in *Twaka*. [9] The *Shuklamandala* is the derivative of *Jala Mahabhoota* and the *Krishnamandala* has its origin from *Tejo Mahabhoota*. The nourishment of this *Patala* is by *Rasa* and *Rakta Dhatus*. [10] If the counting begins from outside to inside, the outermost structure of the eyeball: the sclera, and cornea can be taken as the first *Patala*. The only clinical feature of the first *Patala* pathology is blurred/indistinct vision which becomes clear sometimes without any reason i. e. low-grade refractive error which can be corrected by accommodation. [11]

### 2) Second Patala:

This *Patala* is based on *Mamsa (Pishita)*. The function of *Mamsa* is *Bandhana* or tightly holding the structures. Also, it should have nutritive as well as contraction and relaxation properties. [12]

Structures to inner *Patala* having such properties are uveal tract.

Clinical Features of 2<sup>nd</sup> *PATALA TIMIRA* can be grouped as follows-[13]

- More dimness of vision.
- Floaters in the visual field.
- Scotoma or blind areas in visual field giving rise to field defects in vision.
- Accommodation anomalies and increasing hypermetropia.
- Metamorphopsia, micropsia.
- Diplopia etc.

The iris and ciliary body are the most sensitive tissues of the eyeball and develop inflammatory reactions following innumerable exogenous causes. The iris and ciliary body are inherently autogenic tissues and therefore hypersensitive reactions due to exogenous and silent systemic conditions are the commonest causes of their inflammation i. e. iridocyclitis. Each episode of inflammation results in a fall in vision. Inflammatory vitreous opacities result from an inflammatory process in the posterior uveal tract or retina, which results, in floaters front of the eye. The retina overlying the healed patch (of the inflamed choroid) suffers because of the disappearance of chorio-capillaries resulting in relative or absolute scotoma depending on the severity of pathological change in the choroid. Peripheral lesions of the choroid inflammations may be symptomless but when near the macular area vision may be grossly affected; because the visual cell layer of the retina depends upon chorio capillaries for its nutrition.

Central serous chorioretinopathy (CSR) usually occurs in young adults who present symptoms of blurred vision, metamorphopsia, micropsia a central dark spot in the visual field and increasing hypermetropia. In the epi-retinal membrane patients present with blurred vision, diplopia, metamorphopsia or positive scotoma. [14] Accommodation means the capacity to focus objects at different distances in quick succession. This is brought about by the physiological component of the ciliary body and the physical component of the lens. [15] Thus morphological, physiological and pathological characteristics of 2<sup>nd</sup> *Patala* are alike that of uveal tract and retina.

### Third Patala:

The third *Patala* is made up of *Medas*. [16] This part of the eye inner to the uveal tract is very much relative to *Drishti* and particularly the cortical part of the lens is *Meda-like*.

Clinical Features of 3<sup>rd</sup> *Patala Timira*: [17]

- Gradual vision loss.
- Pupillary leucokoria.
- Even a big object appears blurred.
- Visual perception altered based on field defects according to the location of Doshas in *Drashti*.
- Diplopia, triplopia and polyopia.

The part of the eye inner to the uveal tract, which is very much related to *Drishti* (pupil and vision), is particularly the lens. The cortical part of the lens has *Meda* like i. e. viscous, lipo-proteinaceous and whitish in colour. Clinical features of 3<sup>rd</sup> *Patala Timira* are very much similar to the cortical part opacity of the lens i. e. cuneiform cataract. The visual symptoms due to cataracts depend on the site of the lens opacity and the degree of opacification of the lens. Some patients also complain of polyopia observed while sleeping under the sky and seeing one moon. This is due to a clear segment in a cataractous lens acting like a separate pupil i. e. in a cuneiform cataract. The vision however gradually reduced markedly in all types of cataracts when the lens opacity has involved a large part of the lens by which time the cataract has reached the stage of near maturity. Change of colour of a pupil from black at a young age to grey is a physiological change after the age of 45-50 years and this is due to the increased density of the nucleus with age, which causes some light to be reflected giving the pupil grey colouration. Any early cataract should never be diagnosed by oblique illumination alone. [18]

3<sup>rd</sup> *Patala* is relative inner to the 2<sup>nd</sup> *Patala* i. e. uveal tract and retina, and the symptoms arising due to its pathology are similar to the cortex of the lens which can be taken as 3<sup>rd</sup> *Patala*.

**Fourth Patala:**

This fourth *Patala* is innermost *Patala* and it is constituted by *Asthi*- hard tissue which is supportive in function. [19]

Clinical Features of 4<sup>th</sup> *Patala Timira*:

- Loss of vision.
- *Drishti Mandala* is covered by vitiated *Doshas*.
- Perception of bright illuminations unless there is some gross pathology in the *Netra*.

Inner to 3rd *Patala* i. e. cortical part of the lens, the hard and supportive structure is the lens nucleus, which gives support to the new-formed lens fibers. The nucleus part is soft at in early age, and becomes harder later on. The embryonic nucleus acts as a nidus around which the infantile, adult nuclear zone and cortex are arranged in layers. The clinical features of 4th *Patala Timira* i. e. complete loss of vision – *Linganasha* occurs in complete opacity of the lens i. e. matured cataract. With the advancement of the cataract (mature) nearly complete loss of vision is there; where a change in pupillary colour to dense grey or white and of fundal glow is visible with the ophthalmoscope. It is important to remember that however advanced the cataract may be, some light does pass through the lens and iris and reach the retina and hence perception and projection of light is always maintained so long as it is cataract alone and there is no other pathology affecting the retina. [20]

**3. Discussion**

While analyzing the description about *Netra Mandala*, *Sandhi* and *Patala*, it is quite easy to understand *Mandala* and *Sandhi*. But to understand the *Netra Patala* is difficult because it has several meanings in the context of *Netra Rogas*. First *Patala*, is known as *Bahya* or outer; this means that the other three are relatively inner to the first *Patala*. Diseases *Timira* vitiates the first *Patala* then it goes to the second, third and fourth *Patala* according to Acharya Sushruta. [21] Thus, the first *Patala* is the outermost and the fourth *Patala* is considered as innermost *Patala*. But Acharya Dalhana reversed the relative position of each *Patala* in his commentary. According to him first *Patala* is *Kalakasthi Ashrita* and it is the innermost *Patala*. He considered the second *Patala* to be *Medoashrita*, third *Patala* to be *Mamsashrita* and the fourth *Patala* to be *Tejojalashrita*. [22] Anatomically and clinically this concept is not accepted and it can be considered a misinterpretation.

There is another view that considers first *Patala* as sclera and cornea, second *Patala* as iris and ciliary body, third *Patala* as vitreous and fourth *Patala* as a retina. Third *Patala* is made up of *Meda Dhatu* and *Meda* is viscous, lipo-proteinaceous and whitish in colour. Somewhat it can correlate with vitreous, but is not related to *Drishti* (pupil and vision), because Pupil is away from vitreous and retina.

While describing the prognosis of *Kshata Shukra*, Acharya Vagbhata has said that the disease is *Krichchhra Sadhya* (cured with difficulty) when it involves the first *Patala*, *Yapya* (paliable) when it involves the second *Patala* and *Asadhya* (incurable) when it involves third *Patala*. [23] Due to this description, *Netra Patala* is considered as the layer of the cornea by some groups of people. This disease is occurring in the cornea only. So, this concept is also not accepted.

According to some other views, different layers of the lens are considered as *Patala* because the lens is the only structure where the changes of the *Timira*, *Kacha* and *Linganasha* are taking place. The anterior lens capsule is considered the first *Patala* and nucleus as the fourth *Patala*.

One more view considered *Patala* as a different layer of the retina. *Pittavidagdha Drishti* and *Kaphavidagdha Drishti* are diseases where patients complain of day and night blindness respectively. It may occur due to degeneration of photoreceptors and it can be considered as a third *Patala* involvement. But by taking the retina as *Patala*, we are not able to explain the clinical entity of *Timira*.

In some other view, the thickness of *Patala* is 1/5 of *Drashti Mandala* and they are seated in *Drashti Mandala*. For this, they divide the *Drashti Mandala* (Retina) into four layers mentioned below-

**Bahya Patala/ first Patala:** Retinal pigment epithelium, photoreceptor layer

**Second Patala:** Outer and inner nuclear and plexiform layer

**Third Patala:** Layer of ganglion cells

**Fourth Patala:** Layer of optic nerve fibres

According to the critical analysis of *Patala* mentioned above, we can consider the structure that is more suitable for *Patala* and mentioned in Table no 2.

**Table 2:** Name of structure as per Ayurveda and its most suitable correlation as per modern

Sr. No.	Name of structure as per Ayurveda	Most suitable Correlation as per modern
1	<i>Pakshma Mandala</i>	Eyelashes when eye is open
2	<i>Vartma Mandala</i>	Eye lids
3	<i>Shweta Mandala</i>	Sclera
4	<i>Krishna Mandala</i>	Cornea and iris.
5	<i>Drishti Mandala</i>	Pupillary area or circle
6	<i>Pakshma Vartma Sandhi</i>	Lid margin
7	<i>Vartma Shukla Sandhi</i>	Conjunctival Fornix
8	<i>Shukla Krishna Sandhi</i>	Sclero-corneal junction
9	<i>Krishna Drishti Sandhi</i>	The central free margin of the iris
10	<i>Kaninika Sandhi</i>	Inner canthus of eye
11	<i>Apanga Sandhi</i>	Outer canthus of eye
12	<i>Two Vartma Patala</i>	Upper and lower eyelids.
13	<i>Bahya/ Prathama Patala</i>	Cornea and sclera
14	<i>Dwitheeya Patala</i>	Uveal tract and retina
15	<i>Thriteeya Patala</i>	Cortex of lens
16	<i>Chaturtha Patala</i>	Nuclear part of lens

**4. Conclusion**

*Patala* is the most important part of *Netra Sharira*. For the proper diagnosis and management of *Netra Rogas*, the detailed study of the location, size, shape, thickness, constitutions etc. of *Netra Patala* are very essential. When vitiated *Doshas* accumulate in *Patala*, they produce various types of eye diseases like *Timira*, *Kacha*, *Lingnasha* etc. And the pathogenesis and prognosis of the diseases depend on the involvement of respective *Patala*. In this article, we considered the structure that is more suitable for *Patala* by anatomically, functionally, clinically and practically.

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