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Review Article

# *DWITIYA PATALGATA TIMIR* AND PRESBYOPIA: AN AYURVEDIC PERSPECTIVE

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## ABSTRACT

*Shalakya Tantra*, also known as *Urdhvanga Chikitsa*, is a specialised branch of Ayurveda that deals with diseases of the organs located above the clavicle, with prime emphasis on ocular health. Vision is considered the most vital among the sense faculties. In Ayurveda, visual disturbances are predominantly described under *Drishtigata Rogas* and are broadly encompassed within the *Timira-Kacha-Linganasha* spectrum. *Timira* is a significant disease entity within the *Drishtimandala*, presenting with a range of symptoms from mild blurring of vision to progressive impairment, depending on the involvement of specific *Patalas* and the dominance of vitiated *Doshas*. A detailed conceptual and clinical analysis of *Patalagata Timira* reveals that the symptomatology of *Dwitiya Patala* involvement-such as difficulty in seeing objects clearly, mainly near objects -closely resembles the features of refractive errors, particularly with Presbyopia. Additionally, *Dwitiya Patalagata Timira* exhibits clinical similarity with presbyopia, a physiological age-related decline in accommodation leading to progressive deterioration of near vision. With changing lifestyles and premature ageing trends, the early onset of such visual disorders is increasingly observed. Ayurveda offers a comprehensive approach for prevention and management through *Pathya–Apathya* regulation, *Rasayana* therapy, *Chakshushya* formulations, *Kriyakalpa, Panchakarma*, and other supportive measures aimed at preserving vision and improving ocular strength. Hence, exploring the Ayurvedic correlation and management of *Dwitiya Patalagata Timira* with special reference to presbyopia may provide a holistic and effective approach for clinical practice.

## INTRODUCTION

*Netra* is regarded as the most important of all the *Indriyas*. The Samhita highlights the importance of eye health by saying, "A person who seeks long life must care for his eyes throughout his life, as there is no difference between day and night for a blind man." That is why ancient scholars gave eye care a supreme place in health preservation. In Ayurveda, diseases affecting vision are mainly explained under *Drishtigata Rogas*. Among them, *Timira* holds special importance, as it is considered a progressive condition that can lead to severe visual impairment if ignored.

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*Acharya Sushruta* describes *Timira* in *Uttara Tantra* Chapter 7 under *Drishtigata Rogas* and explains 12 types of *Drishtigata* disorders, while *Acharya Vagbhata* describes 27 *Drishtigata Rogas*[1,2]. The seriousness of Timira is highlighted by referring to it as "*Paramdaruna Vyadhi*." Timira has been described in terms of *Patala* participation. Timira as "*Paramdarun vyadhi*", refers to the fact that the disease progresses irreversibly and may eventually cause total or partial blindness if not treated[3]. According to Dosha involvement, six types of *Timira*, i.e., *Vataja, Pittaja, Kaphaja, Raktaja, Sannipataja* and *Parimalayi* [4].

***Timira*:** The term *Timira* is derived from the root '*Tim*' (meaning the increase of watery substance in the eye or loss of light perception) with the '*Unadi*' suffix '*Kirach*' to form the *Timira*[6]. *Timira* has been mentioned in *Uttartantra*, in terms of the involvement of successive *Patalas*. In *Amarakosha*, the meaning of *Timira* is given as darkness.

***Patala****: Patala* is one of the structures told by *Sushruta* in *Netra Shareera*. So, it can be considered as the layers of the eyeball. The pathogenesis of *Timira* is explained beautifully through the concept of *Netra Patalas* [7]. The eye is described as having six *Patalas*-two *Bahya Vartmagata Patalas* (external layers related to eyelids) and these layers are not just structural components; they are clinically important because the disease progression of *Timira* is described stepwise according to the involvement of each *Patala*. In simple words, the deeper the *Doshas* enter into the layers of the eye, the more severe the symptoms become, and the prognosis also worsens accordingly.

Presbyopia is an inadequacy of accommodation characterised by a progressive decrease in near vision, a decrease in amplitude of accommodation as one ages, or an increase in punctum proximale. As people get older, their lenses lose their elasticity, causing reduction in accommodation causing development of near vision impairment, which is a physiological alteration. It begins in the fourth decade of life and the symptoms last for the rest of one's life.[9] As people age, the eyes gradually lose their youthful ability to shift focus smoothly from distant to near objects. Because of this reduced flexibility, near vision activities become challenging, such as reading small print or performing fine tasks like threading a needle.

"Timira is described in Ayurveda as *Aushadhi-sadhya*, if treated in its early stage. Management includes therapies such as *Langhana, Snehana, Nasya, Snehapana, Raktamokshana, Virechana,* and *Basti* [10] along with *Pathya Ahara-Vihara, Kriyakalpa, Chakshushya* drugs, and *Rasayana* to preserve vision."[11]

**AIMS**

1. To detail the conceptual aspect of *Dwitiya Patalagata Timira* and presbyopia.
2. To establish a correlation between *Timir* (*Dwitiya Patalgata Timir*) and presbyopia.
3. To identify, assess, and analyse the preventive as well as therapeutic measures described in *Ayurvedic* texts for the management of *Dwitiya Patalgata Timir*.

***Nidana***

According to various Ayurvedic classics, several causative factors have been described for *Timira*. According to *Acharya Sushruta Sukshma Nireekshanath, Swapnaviparyaya, Klesha, Vega-vinigraha, Atimaithuna,* etc*.,* are the factors that primarily vitiate *Doshas* and deplete *Dhatus,* leading to age-related decline in accommodative power, clinically comparable to presbyopia*.* According to *Acharya Charaka*, the primary causes of diseases include *Asatmya Indriyartha Samyoga*, *Prajnaparadha* (intellectual error), and *Parinama*. It is also stated that disease may arise due to the forceful suppression or improper expulsion of *Adharaneeya* Vegas. In such conditions, *Vata Dosha* becomes predominantly aggravated. Therefore, maintaining the normal direction of *Vata* through *Anulomana*, supported by appropriate diet, drinks, and medicines, plays an essential role in preventing disease. Further, *Acharya Charaka* has classified the causes related to sense organs into three categories-*Ati Yoga* (overuse), *Heena Yoga* (underuse), and *Mithya Yoga* (misuse)-based on the intensity and duration of their functioning. This concept is described as "voluntary transgression." For example, continuous staring at an object represents overuse, avoiding visual activity completely represents underuse, and exposure to improper visual stimuli-such as objects that are extremely near or far, frightening, unpleasant, disgusting, distorted, or abnormal-represents misuse of vision.

***Samprapti* (Pathogenesis)**

*Nidana Sevana + Dhatu kshaya* (Ageing)

↓

*Vata Prakopa + Pitta Anubandha*

↓

*Chakshuindriya Daurbalya* (decrease accommodative power)

↓

*Drishti Mandya* (for near vision)

↓

*Dwitiya Patalgata Timira* (Presbyopia)

***Purvarupa* (Prodromal Features) [12]**

*Purvarupa* refers to the early warning signs that indicate the approaching onset of a disease. In the case of eye disorders, symptoms like *Toda* (eye strain or headache) and *Ashru Agamana* (watering of eyes). These features may also be noticed in the early stage of presbyopia, where the eyes begin to experience difficulty during near vision tasks.

***Rupa* (Clinical Features) [13]**

In Ayurveda, *Rupa*-the observable signs and symptoms of a disease-plays a major role in assessing prognosis and determining the correct line of treatment. The diagnosis of *Dwitiya Patalgata Timira* is primarily based on the clinical signs and symptoms presented by the patient. The manifestations of Presbyopia depend upon the involvement of second *Patala* of the eye.

***Dwitiya Patalgata Timir Lakshana***

| **Symptoms** | |
|---|---|
| *Vihwala Darshana* | More blurred/vitiated vision |
| *Gochara Vibhrama* | Confusion in seeing objects |
| *Suchipasham Na Pashyati* | Unable to see the hole of the needle |

**Management of *Dwitiya Patalgata Timira***

The management of *Timira* primarily focuses on avoiding the causative factors *(Nidana Parivarjana)* and restoring the normal balance of the vitiated *Doshas*, especially aggravated *Vata*, along with other involved *Doshas*.

The line of treatment in *Timira* is decided according to the stage of the disease and the predominance of *Dosha*. In the early stage, when the vitiated *Doshas* are present but have not yet extensively affected the ocular structures, *Shodhana* such as *Nasya* can be beneficial in preventing further progression and relieving initial symptoms.

***Samanya Chikitsa* (General Management) [14]**

Depending upon the involvement of specific *Doshas*, therapies like *Snehana, Snehana Nasya* and *Virechana* are advised. Along with these, various local therapeutic procedures are described, such as *Anjana, Basti, Tarpana, Lepa, Putapaka* and *Seka*. These measures collectively help in improving ocular health, reducing *Dosha* aggravation, and supporting the maintenance of vision.

**A. Curative Measures**

The management of *Dwitiya Patalgata Timira* also includes local as well as systemic therapeutic interventions.

Local ocular procedures known as *Kriyakalpa* play an important role in the treatment of *Timira*. *These include Tarpana, Putapaka, Seka, Aschyotana,* and *Anjana*[15], which are commonly used to support vision, improve ocular strength, and slow down the progression of the disease.

**B. Systemic Measures**

***Shodhan Chikitsa***

**a) *Virechana***: It is beneficial for *Anulomana* of *Doshas*, especially vitiated *Pitta*, because the eye is the sight of *Pitta* predominance. Castor oil combined with milk is used in *Vataja Timira. Triphla Ghrita* is a general evacuative that is excellent in disorders of *Rakta and Pitta*. *Virechan* with ghee processed with *Trivrit* is advised in *Kaphaja* type, while oil processed with *Trivrita* is useful in *Tridoshaja [16].*

***b) Basti***: In *Vataja timira, Nirooha* and *Anuvasana bastis* are effective because there is no other therapy for vitiated *Vata* besides *Basti*.

***Shamana chikitsa:*** *Shamana Chikitsa* can be divided into: a) *Sthanika Chikitsa* (local measures) b) *Sarvadaihika Chikitsa* (systemic measures)

**a) *Sthanika Chikitsa***: *Tarpana* with *Patoladi ghrita*, *Jeevantyadi ghrita, Drakshadi ghrita,* and *Shatahwadi ghrita,* and *Triphala ghrita* help treat *Timira*.

**b) *Shamana Chikitsa***

1. ***Ghrita Kalpanas***: Various medicated *Ghrita,* e.g. *Patoladi ghrita, Phalatrikadi Ghrita, Triphla Ghrita, Mahatriphaladya ghrita, Dwitiya Triphaladya Ghrita, Laghu Triphala Ghrita, Rasnadi ghrita, Dashamoola ghritam, Drakshadi ghrita, Jeevantyadi ghritam, Shatahwadi ghrita* are beneficial in managing *Timira*.[18,19]
2. **Use of *Triphala***: In *Pittaja timira*, it is advised to take *Triphala* mixed with *Ghrita* regularly; in *Vataja timira*, it is indicated to take *Triphala* mixed with *Taila*; and in *Kaphaja*, it is indicated to take *triphala* mixed with *Madhu*.[20]
3. ***Saptamrit Lauha:*** It can also be given in (*Dwitiya patalgata timira)*

**B. Prophylactic Measures**

For the prevention of *Timira*, Ayurvedic texts recommend the regular intake of preserved *Ghrita*, along with dietary inclusion of *Triphala, Shatavari, Patola, Mudga, Amalaki*, and *Yava*. Additionally, preparations such as *Payasa* made from *Shatavari*, *Amalaki*, or barley meal, cooked with an adequate quantity of *Ghrita* and *Triphala Kwatha*, are described as effective prophylactic measures. These practices help in maintaining ocular nourishment and preventing the onset or progression of *Timira*.

**Presbyopia**

**Definition[21]**

**Presbyopia**- (Means 'the eyesight of old age'). This is a physiological ageing process, in which the near point gradually recedes beyond the normal reading or working distance. It is a physiological anomaly of accommodation, which is very common and almost occurs in all persons around in their early 40 yrs of age. The patient cannot accommodate the near object distinctly due to gradually loss of elasticity of the lens due to the ageing process. During middle age, usually beginning in the 40s, people experience blurred vision at near points, such as reading, sewing or working at a computer.

**Accommodation-** Accommodation refers to the ability of the eye to increase its refractive power of the crystalline lens to focus near objects on the retina.[22] The most significant decrease in accommodative power occurs in between the ages of 20 and 50. In the first two decades of life accommodative amplitude is relatively stable in the

range of 7-10 diopters. By the age of 50, accommodative amplitude has typically decreased to about 0.50 diopters

**Classification of Presbyopia** [23]

1. **Incipient Presbyopia:** This initial stage marks the earliest signs of reduced near vision performance. Individuals may experience mild difficulty in reading fine print or require additional effort for near tasks. Though clinical findings may reveal minimal visual impairment, patients often note the onset of visual strain during prolonged close work.
2. **Functional Presbyopia:** At this stage, a noticeable decline in accommodative amplitude affects near-vision tasks. Individuals begin to experience persistent visual discomfort or blurred vision during near work, which becomes evident upon clinical evaluation.
3. **Absolute Presbyopia:** This is the advanced stage where the loss of accommodation becomes complete, leaving the individual with virtually no ability to focus on near objects. The condition represents the culmination of the gradual physiological decline associated with ageing.
4. **Premature Presbyopia:** Premature presbyopia refers to the early onset of reduced accommodative power, occurring sooner than the expected age range. It may result from various factors such as environmental strain, poor nutrition, systemic illnesses, or prolonged use of certain medications. Individuals develop symptoms of near vision difficulty earlier than normal due to these contributory influences.
5. **Nocturnal Presbyopia:** Nocturnal presbyopia is a condition where visual difficulties for near tasks arise primarily under low light conditions. In dim illumination, a decrease in accommodative amplitude occurs due to increased pupil size and reduced depth of focus, leading to blurring or strain during close work in such lighting environments.
6. **Pathological Presbyopia:** Caused or aggravated by systemic or ocular diseases such as diabetes, cardiovascular disorder etc

**Prevalence**

The prevalence of presbyopia tends to be higher in countries with longer life expectancy and greater proportions of older populations. According to global estimates from 2005, over one billion people were affected by presbyopia, and this number continues to rise [24]. Presbyopia sufferers are expected to increase from 1.4 billion in 2020 to 1.8 billion in 2050 globally. [8]

**Pathophysiology** [25]

The amplitude of accommodation (AA) gradually diminishes throughout life, from approximately 12 D at age 10 years to 10D at 20 years, 8D at 30 years, 5D at 40 years, 2D at 40 years and 1D at 60 years.

Several key theories have been proposed to explain the mechanism of accommodation and its gradual decline with age.

1. **Helmholtz's Theory:** The classical explanation of accommodation, introduced by Helmholtz more than 150 years ago, describes how the lens maintains a relatively flat shape under resting tension when focusing on distant objects. During accommodation for near vision, the ciliary muscle contracts and moves forward and inward, reducing the tension on the zonular fibers. This relaxation allows the elastic lens to become more convex, thereby increasing its refractive power. With advancing age, however, the lens substance becomes denser and less elastic, reducing its ability to change curvature effectively- a primary cause of presbyopia.
2. **Coleman's (Catenary) Theory:** Coleman proposed that the zonular fibers act like the supporting cables of a suspension bridge, maintaining the natural curvature of the lens. This curvature is influenced by the balance of pressure between the anterior and posterior chambers of the eye. When the ciliary muscle contracts, the lens curvature increases centrally while relatively flattening at the periphery due to the pressure gradient created between these chambers.
3. **Schachar's Theory:** Schachar presented a contrasting explanation, emphasising the role of equatorial zonular fibers. According to this concept, contraction of the ciliary muscle actually increases tension on the zonules and the lens capsule, resulting in the lens shape change necessary for accommodation. Over time, as the lens continues to grow equatorially while the scleral size remains constant after early adulthood, zonular tension gradually decreases. Consequently, the ciliary muscle becomes less effective in generating sufficient tension to alter lens configuration, leading to the development of presbyopia.

**Clinical Presentation** [26]

The most common complaint in untreated presbyopia is difficulty in reading at near distances. In the early stage, patients often report that they need brighter light to read comfortably and may notice that they can read better in the morning compared to the evening or night. Other frequent symptoms include

difficulty reading fine print and a feeling that the eyes take longer to adjust and focus on near objects. Due to continuous effort and strain to maintain near focus throughout the day, these complaints are often associated with asthenopia (eye strain). Presbyopia typically becomes evident between 40 and 45 years of age, although the onset may vary significantly among individuals. It may appear earlier in under-corrected hyperopes, while it can occur later in under-corrected myopes.

**Mechanism of Production of Presbyopia**

Recent research suggests that presbyopia primarily develops due to age-related changes in the human crystalline lens. In younger individuals, contraction of the ciliary muscles causes the soft and flexible lens to change its shape, enabling clear focus on near objects. However, with increasing age, the central portion of the lens gradually becomes more rigid. By around 45–50 years [27], the lens often becomes too stiff to undergo adequate shape change, resulting in reduced accommodative ability. As people grow older, their eyes progressively lose their capacity to accommodate for near vision. This age-related decline in accommodation can be understood by comparing accommodative power across ages: newborns possess more than 20 dioptres of accommodation, whereas in an adult around 50 years of age, accommodation may reduce to less than 3 dioptres. Due to this reduction, near objects appear blurred in elderly individuals unless their focusing ability is corrected with spectacles, contact lenses, or laser/surgical procedures.

Prolonged near work produces sustained accommodative stress leading to ciliary fatigue and reduced accommodative reserve, thereby precipitating early symptomatic presbyopia.

**Management of Presbyopia**

**1. Optical Treatment:** The simplest treatment for presbyopia is to use a convex lens to provide additional positive power, often known as near addition. The quantity of near addition is determined by the patient's age, as well as the distance and demands of the job. However, this is just a partial answer because the near addition always blurs the far view.

**2.** Alternating vision, Monovision, and Simultaneous vision are the three therapy methods for presbyopia currently available. Each procedure has advantages and disadvantages, and can be accomplished using optical and/or surgical means.

**3. Medical Management:** The FDA has approved pilocarpine 1.25 per cent for topical use in the treatment of presbyopia. Clinical trials demonstrate that 15 minutes after instillation, near and intermediate vision improves for up to 6 hours. The most common adverse effects are headaches and redness.[28]

4. Intraocular lens implantation with either a multifocal or accommodating lens 31 is one of the intraocular methods for presbyopia correction. Corneal inlays and laser refractive surgery, which is further separated into monovision LASIK, presbyLASIK, INTRACOR, and photorefractive keratectomy, are examples of extraocular techniques (PRK).[29]

5. Procedures involving the sclera, such as Scleral implant and Scleral laser anterior ciliary excision (LaserACE). The presbyopic optical correction must be viewed in context, with factors such as the individual's age, refraction, body dimensions, specific near-vision environment, and frequent close-range situations all playing a role. Although the situation is universal, it is not always suitable for a generally applicable correction[30].

**DISCUSSION**

*Timira* is an ocular disorder in which the *Patala*- the subtle layers of the eye nourished by *Teja, Jala, Mamsa, Meda*, and *Asthi dhatus* are affected. These layers are likely correlated with various intraocular structures responsible for accommodation and convergence. *Dwitiya Patalgata Timira* in Ayurveda is closely correlated with presbyopia in modern ophthalmology. In Ayurvedic texts, *Dwitiya Patalgata Timira* is a condition affecting the second layer of the eye (*Patal*), leading to blurred near vision, which parallels the biomedical explanation of presbyopia caused by lens rigidity and weakened ciliary muscle function**.** With involvement of the second *Patala*, visual symptoms become more prominent, and the patient may experience increased blurring and greater difficulty in near work. This pattern also reflects the clinical picture of presbyopia, where near vision tasks become challenging due to reduced accommodative power. In modern terms, presbyopia represents a physiological decline in the eye's accommodative ability, primarily caused by lens hardening and weakening of the ciliary muscles. In Ayurveda, the vitiation of *Doshas* affecting the *Patala* leads to different varieties of visual disturbances, including those resembling refractive or accommodative errors.

*Acharya Sushruta* describes *Dwitiya Patalagata Timira* with clinical features that closely parallel the manifestations of *presbyopia*. *Dalhana* identifies the *Dwitiya Patala* as *Mansaashrita Patala*, suggesting involvement of structures associated with nourishment and elasticity-similar to the tissues governing lens flexibility and ciliary function in modern physiology.

| Aspect | *Dwitiya Patalgata Timira* (Ayurveda) | Presbyopia (Modern Medicine) |
|---|---|---|
| Location of pathology | Second layer of the eye (*Patal*) | Lens and ciliary muscles |
| Primary symptom (Classical Features) | *Suchipasham Na Pashyati* | Blurred near vision |
| Other symptoms | *Vihwala Darshana* | Hazy, confusing, or unstable vision with perception of false images like flies, webs, or rings. |
| | *Gochara Vibhrama* | Optical distortion where distant objects appear close and near objects appear far away. |
| Cause | Vitiation of *Doshas* | Lens rigidity, reduced muscle function. |
| Progression | Gradual decline in vision (near vision) | Gradual decline in accommodation/near vision. |

Hence, considering both the symptomatic resemblance and the involvement of visual accommodation mechanisms, *Dwitiya Patalagata Timira,* as described in Ayurveda, can be meaningfully correlated with the modern condition of presbyopia.

## CONCLUSION

Presbyopia is a universal, age-related physiological condition, characterised by progressive blurring of near vision and reduced ability to perceive fine details at normal working distances. This condition arises due to the gradual loss of accommodative capacity of the crystalline lens, leading to difficulties in near visual tasks such as reading and writing. A detailed comparative analysis of the clinical manifestations of *Dwitiya Patalagata Timira* as described in classical Ayurvedic texts by Acharya Sushruta and Acharya Vagbhata reveals striking similarities with the symptomatology of presbyopia in modern ophthalmology. Based on these parallels, *Dwitiya Patalagata Timira* can be reasonably correlated with presbyopia and categorised under *Drishtigata Roga* in the Ayurvedic system of medicine. Ayurvedic literature elaborates various ocular therapeutic procedures collectively known as *Kriyakalpas*, including *Tarpana, Seka, Putapaka, Anjana,* and *Aschyotana*. These procedures are primarily aimed at nourishing the ocular structures, maintaining adequate lubrication, and enhancing overall visual function, thereby providing therapeutic benefits in conditions like *Timira*.

Furthermore, Ayurveda advocates the practice of specific eye exercises along with appropriate dietary and lifestyle modifications to support accommodative function and potentially delay the progression of age-related visual impairment.

In light of this, there is a pressing need for an in-depth exploration of the anatomical and functional descriptions of the *Netra* (eye) as delineated in various Ayurvedic Samhitas, and their systematic correlation with contemporary ophthalmic anatomy and physiology. Such an integrative approach may contribute to a better understanding of traditional concepts and expand their clinical applicability in modern healthcare.

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