

REVIEW ARTICLE

Myopia and *Timira*: A Cross-sectional Review of Modern and Ayurvedic Perspectives

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ABSTRACT

Myopia is the most common refractive error and a leading cause of visual impairment worldwide, particularly affecting children and adolescents. With projections indicating that nearly half of the global population will be myopic by 2050, uncorrected refractive errors pose a significant public health concern. Modern ophthalmology primarily addresses myopia through optical correction and surgical interventions, focusing on symptom relief without altering disease progression. In contrast, Ayurveda, the ancient Indian system of medicine, describes a condition called *Timira* under *Netra Roga*, which shares remarkable similarities with myopia in terms of symptoms, etiology, and progression. This study offers a comparative analysis of Myopia and *Timira* based on classical Ayurvedic texts and contemporary medical literature. It explores the correlation between the two conditions in aspects such as pathophysiology, clinical presentation, and treatment modalities. Ayurvedic concepts of *Dosha* imbalance, especially involving *Vata* and *Pitta*, align with modern risk factors, such as genetic predisposition, excessive near work, and nutritional deficiencies. Management in Ayurveda focuses on systemic detoxification, ocular rejuvenation, and lifestyle modifications, offering a more holistic approach. The integration of Ayurvedic and modern perspectives can lead to a more comprehensive, preventive, and sustainable model for managing myopia, especially in the younger population. This interdisciplinary approach holds promise in addressing both the symptoms and root causes of refractive errors effectively.

1. INTRODUCTION

Refractive errors are the most common causes of visual impairment globally, with myopia (nearsightedness) leading the chart. The World Health Organization estimates that by 2050, nearly half of the world's population will be myopic. Myopia or short-sightedness usually affects children and adolescents progressing up to age 16 or more.^[1] Simple myopia refers to the refractive error of -6 dioptre or less.^[2] Optical correction for myopia only corrects the focus of light rays onto the retina that was focusing in front, thus clearing the vision but not does treat the disease and does not prevent the consequences of high myopia. Being the most important asset for the developing country and being 41.2% of the total country's population, it is important to address the young resident's problem in time. Uncorrected Refractive Errors (UREs) are the major cause of visual impairment contributing to 18% of blindness worldwide.^[3] Globally there are 12 million children

of school-going age (5–15 years) visually impaired from UREs. Population-based studies have suggested that more than 90% of visual impairment is due to myopia in this age group. Hence, it is obvious that UREs are a major public health problem in this age group.^[4] In Ayurveda, an ancient Indian system of medicine, eye disorders have been systematically documented under *Netra Roga*. *Timira* is one such disease, found in the *Sushruta Samhita* and other classical texts, which appears to describe symptoms consistent with refractive errors, such as myopia. This paper offers a comparative analysis of these two concepts to examine their overlap, clinical significance, and treatment implications.

2. METHODOLOGY

The details of myopia and *Timira* were examined through a review of ancient Ayurvedic texts. An extensive online search was conducted using Google and databases such as PubMed, Google Scholar, and the Ayurveda Research Database from IPGT and RA, Jamnagar, and GAU. The search strategy involved retrieving and extracting published

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literature on experimental, clinical studies, and review articles on *Timira* with special reference to Myopia. Relevant keywords included *Prathamapatalagata Timira*, *Dwitiyapatalagata Timira*, *Timira* and, refractive error, and simple myopia. All collected articles were meticulously assessed by reviewing their titles, abstracts, and full texts. Studies offering full-text access or detailed abstracts were prioritized in the screening process. Regardless of the publication date, studies with available full texts were included. The gathered information was then systematically compiled, organized, and reviewed in this manuscript.

3. RESULTS AND DISCUSSION

3.1. Myopia in Modern Ophthalmology

3.1.1. Definition and classification

Myopia is a condition where parallel rays of light focus in front of the retina when accommodation is relaxed, resulting in blurred distance vision. It can be simple myopia usually <-6.00 diopters, often stabilizes in early adulthood and high Myopia (Pathological), more than -6.00 diopters; may lead to degenerative changes like retinal detachment or macular degeneration.

3.1.2. Etiology and risk

Both genetic and environmental factors play vital roles in the development and progression of myopia. A large number of studies have shown that children with myopic parents are more likely to develop myopia than in those with non-myopic parents. Environmental factors include spending too much time on near work, spending less time outdoors, poor diet, inadequate light exposure, and various biochemical factors, such as a weak or degraded sclera and cornea also result in an increase in the axial length of the eyeball.

3.2. Clinical Picture

3.2.1. Symptoms

- Poor vision for distance (short-sightedness)
- Asthenopia symptoms: Eye strain and headache develop due to dissociation between convergence and accommodation
- Half shutting of eyes
- Psychological changes in untreated myopia, such as introvert, studious, little interest in outdoor activity.

3.2.2. Signs

- Prominent eyeballs
- Anterior chamber is slightly deeper than normal
- Fundus is normal (rarely myopic crescent may be seen)
- Somewhat large pupil with a bit of sluggish reaction.

3.2.3. Complications

- Retinal tears or retinal detachment
- Complicated cataract due to an aberration of lenticular metabolism
- Vitreous hemorrhage
- Choroidal hemorrhage and thrombosis are quite common and lead to severe visual loss when involved in the foveal region
- Strabismus fixus convergence.

3.2.4. Treatment

- Optical correction by concave lenses
- Therapeutic intervention- atropine eyedrop, pirenzepine
- Refractive surgeries, such as radial keratotomy, Photorefractive keratectomy, LASIK (Customized (C) LASIK, Femto-LASIK, C-F LASIK, Epi LASIK, Extraction of clear crystalline lens, Phakic intraocular lens, Inter corneal ring implantation, Orthokeratology

- General health improvement by protein and nutritional diet
- Visual hygiene- to avoid asthenopia symptoms include proper posture, adequate light
- Avoidance of excessive near work
- Low visual aids in progressive myopes with advanced degenerative changes
- Genetic counseling.

3.3. *Timira* in Ayurvedic Literature

3.3.1. Definition and pathophysiology

Timira is categorized under *Drishtigata Roga* (diseases of vision). It is defined as the gradual loss of visual clarity, progressing from blurry vision to blindness if untreated.

- Timira* is classified according to the involvement of the *Patalas* (layers of the eye), especially the first and second *Patala*, correlating with the ocular surface, and vascular coat of the eyeball.
- Imbalances all three *Doshas* are primarily involved.
- Vision distortion occurs due to vitiated *Doshas* obstructing light perception in the eye.

When the vitiated *Doshas* invade first *Patala*, the patient complains of difficulty in distance vision.^[5] According to Acharya Vagbhatta, when the *Dosha* moving through the *Siras* get lodged in the first *Patala* the person sees the objects hazy and sometimes sees the objects clearly without any obvious cause.^[6] This is the common complaint of Myopia. Hence, the *Timira* of first *Patala* can be correlated to the initial stage of mild degree myopia easily.

The following symptoms are complained by the patient when the vitiated *Dosha* is situated in the second *Patala*.^[7]

- Vihwahal Drishti* (Confused visual perception).
- Makshika Masahakan Keshan Jalakani cha Pashyati* (Appearance of bees, flies, hairs, etc., false objects).

These symptoms are present in high myopia, where degenerative changes occur. Therefore, considering these views, it can be concluded that *Timira* at the stage of first and second *Patala* involvement can be correlated to Myopia.

3.4. Causes of *Timira*

Ayurvedic texts cite causes such as:^[8]

- Excessive reading, night work
- Suppression of natural urges (like crying or sneezing)
- Poor diet, stress, and overexposure to sunlight or heat
- Aging and systemic diseases.

4. DISCUSSION

4.1. Association between Myopia and *Timira*

4.1.1. *Nidana* (Etiological factors)

Ayurveda approaches health from a whole-body perspective, integrating physical, mental, and environmental factors. Various modern etiological factors can be correlated with Ayurvedic concepts along with the associated *Doshas*. For example, genetic predisposition is understood in Ayurveda as *Adibala Hetu* or *Beeja Dosha*, primarily involving the Vata and Pitta *Doshas*. Excessive near work, such as prolonged reading or screen exposure, aligns with *Ati Adhyayana*, *Alpa Nidra* (lack of sleep), and *Dhee Chinta* (mental overexertion), and is associated with an imbalance in Pitta and Vata *Doshas*. A lack

of sunlight exposure is comparable to *Avyayama* (lack of exercise), *Divaswapna* (daytime sleeping), and *Asatmya Indriyārtha Yoga* (improper use of senses), predominantly disturbing the *Vata Dosha*. Nutritional deficiencies correlate with *Rasa Kshaya* (depletion of nutritive fluids), *Ahikara Ahara* (incompatible diet), and *Chakshushya Abhava* (lack of eye-nourishing foods), affecting all three *Doshas* but especially *Pitta*. Finally, chronic stress and the suppression of natural urges are captured in Ayurvedic terms as *Vegadharana*, *Chinta* (worry), and *Shoka* (grief), mainly aggravating *Vata* and *Pitta Doshas*.

4.1.2. *Rupa (clinical features)*

The signs and symptoms of *Timira*, as described in classical Ayurvedic texts, closely resemble those of myopia, particularly in its early stages. Both conditions are marked by a progressive decline in distant vision while near vision remains relatively unaffected. In myopia, clinical features include blurred vision for distant objects, eye strain, headaches, and sometimes watering of the eyes, especially after prolonged visual tasks. Similarly, *Timira* presents with *Avyaktata Darshana* (indistinct or blurred vision), *Durastha Avyakta Darshana* (inability to see distant objects clearly), eye fatigue, a sensation of darkness or shadow before the eyes (*Timira* literally means “darkness”), and strain during reading or seeing. As *Timira* progresses to deeper *Patala* (ocular layers), vision becomes more impaired, which can be correlated with worsening myopia or complications of high myopia in modern terms. In addition, symptoms such as photophobia (light sensitivity), dryness, and heaviness in the eyes noted in *Timira* also occur in myopic individuals due to eye strain and overuse. Hence, there is a strong symptomatic overlap, reinforcing that early-stage *Timira* aligns well with simple myopia, making Ayurvedic descriptions clinically relevant even in contemporary practice.

4.1.3. *Samprapti (pathophysiology)*

The pathophysiology of myopia in modern medicine centers around the abnormal focusing of light rays due to elongation of the eyeball (axial myopia) or excessive curvature of the cornea and lens, causing light to focus in front of the retina. This structural alteration leads to blurred distant vision and ocular strain. In contrast, Ayurveda explains *Timira* as a disease arising from the vitiation of *Vata* and *Pitta Doshas*, leading to impaired functioning of the *Sira* (nerves), *Rakta* (blood), and *Meda* (fat tissues) in the ocular layers (*Patalas*). The *Doshika* imbalance results in obstruction or improper flow of light, causing progressive dimness and distortion of vision. Both systems acknowledge that prolonged strain, improper nourishment, and systemic imbalances disrupt normal ocular function. While modern science focuses on anatomical changes and optical physics, Ayurveda emphasizes systemic metabolic disturbances and *Doshika* imbalances affecting ocular tissues, offering a holistic explanation for the onset and progression of vision impairment resembling myopia.

4.1.4. *Chikitsa (management)*

The treatment of myopia in modern medicine primarily focuses on optical correction through spectacles, contact lenses, or refractive surgeries to physically correct the focus of light on the retina. Pharmacological approaches, such as low-dose atropine, aim to slow progression, while lifestyle modifications such as increased outdoor activity are recommended for prevention.^[9] Conversely, Ayurveda approaches *Timira* treatment holistically by addressing the underlying *Doshika* imbalances (*Vata* and *Pitta*), improving ocular nourishment, and detoxifying the body through *Shodhana* (cleansing) and *Shamana* (palliative) therapies. Specific ocular therapies (*Netra Kriya Kalpa*) such as *Tarpana* (retention of medicated ghee over the eyes), *Nasya*

(medicated nasal drops), and herbal formulations aim to restore the function of ocular tissues and strengthen vision naturally. Both systems emphasize prevention through lifestyle and dietary changes, though Ayurveda integrates mind-body balance as a core component. Thus, modern and Ayurvedic treatments, while differing in methodology, complement each other by combining symptomatic correction with systemic healing.

The comparison between myopia in modern medicine and *Timira* in Ayurveda reveals significant conceptual and symptomatic overlap, particularly in the early stages of both conditions. While modern ophthalmology attributes myopia primarily to structural abnormalities, such as axial elongation and corneal curvature, Ayurveda views *Timira* as a systemic and doshic imbalance, especially involving *Vata* and *Pitta* [Table 1].

Despite differing frameworks, both systems acknowledge similar clinical presentations, namely, progressive blurring of distant vision and potential complications if left unmanaged. This convergence suggests that Ayurvedic interpretations of vision impairment were remarkably insightful, even in the absence of contemporary diagnostic tools.

Ayurvedic therapies such as *Tarpana*, *Nasya*, and *Rasayana* treatments not only address ocular symptoms but also aim to rejuvenate the entire visual system. These holistic interventions may offer supportive roles alongside conventional treatments, particularly in early or stable myopia cases. Furthermore, Ayurvedic preventive measures – like dietary modifications and daily eye care routines – align well with modern recommendations aimed at reducing myopia progression.

In summary, integrating Ayurvedic principles with modern ophthalmology could enhance patient care through personalized, preventive, and holistic strategies. Further interdisciplinary research is necessary to validate and standardize Ayurvedic interventions for refractive errors like myopia.

5. CONCLUSION

Myopia and *Timira*, though arising from different epistemological systems, share overlapping clinical features and disease trajectories. This review reveals that ancient Ayurvedic wisdom offers valuable therapeutic and preventive strategies that can complement modern ophthalmic care. Bridging both traditions not only enriches our understanding but also opens the door to holistic and sustainable solutions for managing refractive errors like myopia.

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7. AUTHORS' CONTRIBUTIONS

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9. ETHICAL APPROVALS

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10. CONFLICTS OF INTEREST

Nil.

11. DATA AVAILABILITY

This is an original manuscript and all data are available for only review purposes from principal investigators.

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Table 1: Comparative Analysis of Myopia and *Timira*

Aspect	Myopia (modern)	<i>Timira</i> (Ayurveda)	Remark
Primary cause	Axial elongation; genetic and environmental factors	Vitiated <i>Vata/Pitta Pradhana TriDoshas</i> ; improper lifestyle and diet ^[10]	
Symptom onset	Gradual blurring of distant vision	Gradual blurring of vision, initially distance vision <i>Avyaktani Rupani</i>	
Anatomical focus	Cornea, lens, retina	First and second <i>Patala</i> (eye layers)	
Progression	Can lead to high myopia and complications	Can lead to <i>Linganasha</i> (blindness)	
Diagnosis	Visual acuity tests, retinoscopy, fundus exam	Clinical symptoms, <i>Dosha</i> assessment	
Functional impairment	Light rays focus before the retina→blurred distant vision	Impaired flow of <i>Tejas</i> (vision energy) and obstruction of channels	
Treatment	Optical, surgical, pharmacologic	<i>Shodhana</i> (purification regimen), <i>Shamana</i> (palliative), <i>Netra Kriya Kalpa</i>	
Etiological factors			
	Genetic predisposition	<i>Adibala Hetu, Beeja Dosha</i>	
	Excessive near work	<i>Ati Adhyayana, Alpa Nidra, Dhee Chinta</i>	
	Lack of sunlight exposure	<i>Avyayama, Divaswapna, Asatmya Indriyarthas Yoga</i>	
	Nutritional deficiencies	<i>Rasa Kshaya, Ahitakara Ahara, Chakshushya Abhava</i>	
	Chronic stress, suppression of urges	<i>Vegadharana, Chinta, Shoka</i>	
Progression	Gradual worsening without correction	Progressive <i>Dosha</i> imbalance leading to worsening symptoms	
Systemic aspect	Primarily localized ocular changes	Systemic <i>Doshika</i> and metabolic disturbances affecting eyes	
Correction	Spectacles, contact lenses, refractive surgery (LASIK, PRK)	External ocular therapies, such as <i>Tarpana, Anjana</i> (collyrium)	Both aim to improve vision clarity, one mechanically, the other therapeutically
Pharmacological	Low-dose atropine to slow progression	Herbal medicines, such as <i>Timirahar Lauha, Triphala Ghritha</i>	Both use medication to manage disease progression
Detoxification	Not typically employed	<i>Shodhana</i> therapies (<i>Virechana, Nasya</i>) for <i>Dosha</i> balance	Ayurveda targets systemic cleansing, complementing symptom control
Nourishment and rejuvenation	Nutrition advice, antioxidants	<i>Rasayana</i> therapies (rejuvenation) for ocular tissues	Both stress ocular health through nourishment
Lifestyle and prevention	Increased outdoor time, reduced near work, screen breaks	Balanced lifestyle, proper diet, eye exercises, daily <i>Netra Seva</i>	Emphasize prevention through lifestyle modifications
Holistic approach	Primarily ocular/systemic risk factor control	Mind-body balance, <i>Doshic</i> harmony, mental well-being	Ayurveda offers a more integrated systemic approach