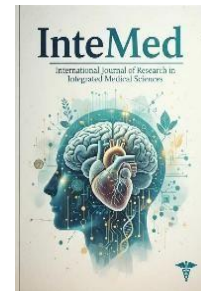




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Review Article

Eye Anatomy in Ayurveda and Modern Science: A Review of Dinacharya, Padabhyanga and Its Probable Mechanism of Action in Maintaining Ocular Health

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Abstract: The eye is one of the most important sense organs responsible for perception of the visual environment. Ayurveda describes the eye under the concepts of Netra Sharira and Netra Kriya Sharira, considering Tejo Mahabhuta as predominant and Alochaka Pitta as an important functional principle associated with visual perception. Modern anatomy describes the eye as a specialized optical and neural organ consisting of three coats—fibrous, vascular and nervous—and refractive media that focus light on the retina.

Increasing use of computers, smartphones and other digital devices has resulted in frequent complaints of ocular fatigue, dryness, burning, redness, watering, headache and visual discomfort. Digital eye strain is recognized as a group of ocular, visual and extraocular symptoms associated with prolonged digital-device use. Reduced blink rate during screen viewing may contribute to ocular surface dryness and discomfort.

Ayurveda emphasizes prevention through Dinacharya, a structured daily regimen intended to maintain physiological equilibrium. Abhyanga and Padabhyanga are described as important components of daily health maintenance. Classical Ayurvedic texts attribute Drishti-prasadana and Chakshushya effects to Padabhyanga. The

present review attempts to integrate the Ayurvedic description of ocular anatomy with modern anatomical concepts and critically discusses the probable mechanism through which Padabhyanga may influence ocular comfort.

The proposed mechanisms include the Ayurvedic actions of Sneha, Vata-Pitta shamana, sensory stimulation of the foot, relaxation, modulation of autonomic activity, reduction of perceived fatigue and improvement in sleep. However, the exact neurophysiological pathway connecting foot massage with ocular function remains to be established. Therefore, Padabhyanga may be considered a promising supportive preventive practice for lifestyle-associated ocular discomfort, while further well-designed clinical and physiological studies are required.

Keywords: Netra Sharira, Eye anatomy, Ayurveda, Dinacharya, Padabhyanga, Abhyanga, Chakshushya, Drishti-prasadana, Digital eye strain, Ocular health.

1. Introduction

Vision plays a fundamental role in human life and interaction with the environment. The eye receives light, forms an optical image and converts visual information into neural signals that are transmitted to the brain. Modern anatomy recognizes the eye as a complex optical and neural

organ. The eyeball is approximately spherical and is organized into three major coats: an outer fibrous coat consisting of sclera and cornea, a middle vascular coat consisting of choroid, ciliary body and iris, and an inner nervous coat represented by the retina.

Ayurveda approaches ocular health from a broader functional and preventive perspective. Netra is described as a sense organ predominantly associated with Tejo Mahabhuta. The Ayurvedic description includes Mandala, Sandhi, Patala, Drishti, Alochaka Pitta, Tarpaka Kapha and the role of Prana Vayu in visual perception. The literature reviewed in the present thesis describes the eye as a Tejomaya organ and identifies Alochaka Pitta with visual function.

The contemporary lifestyle has introduced prolonged visual demands. Digital devices are now routinely used for professional, educational and social activities. Digital eye strain is characterized by symptoms including eye strain, ocular discomfort, dryness, redness, tearing, blurred vision and headache. Current ophthalmic literature indicates that prolonged screen use is associated with reduced blinking and increased ocular surface exposure, which may contribute to dryness and discomfort.

Ayurveda emphasizes prevention of disease through Swasthasya Swasthya Rakshanam. Daily practices under Dinacharya include personal hygiene, exercise, organ care and Abhyanga. Padabhyanga is specifically described as a daily practice having beneficial effects on the eyes.

Thus, understanding the relationship between Ayurvedic ocular concepts, modern anatomy and preventive practices such as Padabhyanga is relevant in the context of increasing lifestyle-related visual stress.

2. Aim of the Review

To review the Ayurvedic and modern concepts of eye anatomy and critically discuss the role of Dinacharya, particularly Padabhyanga, in maintaining ocular health, with emphasis on its probable mechanism of action.

3. Objectives

To review the Ayurvedic concept of Netra Sharira.

To review the modern anatomical structure and physiology of the eye.

To explore the concept of Dinacharya in preventive ocular health.

To review the classical description of Padabhyanga and its Chakshushya/Drishtiprasadana effect.

To discuss the probable Ayurvedic and modern mechanisms of action of Padabhyanga.

To identify research gaps and future possibilities for scientific validation.

4. Ayurvedic Concept of Netra

4.1 Panchabhautika constitution

According to Ayurvedic literature, Netra is Panchabhautika in constitution, with predominance of Tejo Mahabhuta. The thesis describes different structural components of the eye in relation to the five Mahabhutas.

The following conceptual relationship is described:

• Ocular component	• Predominant Mahabhuta
• Mamsa component	• Prithvi
• Rakta component	• Teja
• Krishna portion	• Vayu
• Shukla portion	• Aap
• Ashrumarga	• Akasha

This description represents an Ayurvedic functional-philosophical interpretation and should not be regarded as a direct anatomical equivalence to modern histology.

4.2 Alochaka Pitta

Alochaka Pitta is described in relation to the visual function of Netra. Ayurvedic physiology explains visual perception through coordinated interaction between Indriya, Manas, Atma and the sensory object. Prana Vayu and Tarpaka Kapha are also described as important functional factors in the visual system.

4.3 Ayurvedic structural description

Classical Ayurvedic literature describes the eye using Mandala, Sandhi and Patala concepts. Five Mandalas are described:

Pakshma Mandala

Vartma Mandala

Shukla Mandala

Krishna Mandala

Drishti Mandala

Six Sandhis are also described, including the junctions involving the eyelid, sclera, cornea and pupil.

The Patala concept represents deeper anatomical levels of the eye in Ayurvedic literature and is particularly important in the description of ocular diseases.

5. Modern Anatomy of the Eye

Modern anatomy describes the eyeball as a specialized organ of vision with three concentric coats.

5.1 Fibrous coat

The outer fibrous coat consists of:

Sclera

Cornea

The sclera provides structural integrity and maintains the shape of the eyeball. The cornea is transparent and constitutes the anterior refractive surface of the eye.

5.2 Vascular coat

The middle vascular coat, or uveal tract, consists of:

Choroid

Ciliary body

Iris

The ciliary body participates in accommodation, while the iris regulates the quantity of light entering through the pupil.

5.3 Nervous coat

The retina constitutes the inner nervous coat. It contains photoreceptor cells—rods and cones—which convert light into neural signals. The macula and fovea are specialized retinal areas associated with high visual acuity.

5.4 Refractive media

The major refractive media are:

Cornea → Aqueous humour → Lens → Vitreous body → Retina

These structures work together to focus light on the retinal photoreceptors.

6. Ayurvedic and Modern Perspective: Conceptual Correlation

Ayurveda and modern medicine describe the eye through different theoretical frameworks. Modern science focuses primarily on anatomical structures, tissue organization, optics, physiology and neural pathways. Ayurveda emphasizes Dosha, Dhatu, Mahabhuta, Srotas, Indriya and functional principles.

Therefore, correlation between the two systems should be regarded as conceptual rather than one-to-one anatomical equivalence.

• Ayurvedic concept	• Broad modern functional perspective
• Netra	• Organ of vision
• Drishti	• Visual function
• Alochaka Pitta	• Functional concept associated with visual perception
• Ashru	• Tear-related ocular protection
• Tarpaka Kapha	• Nourishment/lubrication-related functional concept
• Prana Vayu	• Functional coordination/neural activity concept
• Netra Mandala	• Descriptive structural divisions

Such correlations can facilitate interdisciplinary discussion but require further scientific validation.

7. Digital Eye Strain and Ocular Surface Stress

Digital eye strain is a group of ocular, visual and extraocular symptoms associated with prolonged digital-device use. Symptoms include eye strain, tired eyes, ocular ache, dryness, burning, redness, tearing, blurred vision and headache.

One important mechanism is reduction in blinking during prolonged screen viewing. Reduced blinking can increase ocular surface exposure and contribute to tear-film instability and dryness.

The thesis similarly discusses prolonged visual concentration and reduced blinking as factors contributing to ocular dryness. In Ayurvedic interpretation, dryness may be understood in relation to Vata-Pitta aggravation and reduction of the protective/lubricating aspect represented by Kapha.

It is important to distinguish temporary digital discomfort from established ocular disease. Persistent visual loss, significant pain, photophobia, recurrent redness or other concerning symptoms require appropriate ophthalmological evaluation.

8. Dinacharya and Ocular Health

Dinacharya is the Ayurvedic concept of an organized daily routine intended to maintain physiological balance and promote health.

Ayurveda gives importance to preventive care rather than waiting until disease becomes established. Abhyanga is one of the important external oleation practices, and specific attention is traditionally given to the head, ears and feet.

The daily application of Sneha to the feet is described as Padabhyanga. Classical literature attributes multiple benefits to this procedure, including reduction of dryness, fatigue and stiffness and promotion of ocular well-being.

9. Padabhyanga

Padabhyanga is the application of an appropriate Sneha Dravya to the feet followed by systematic massage. It is considered a form of Bahya Snehana.

The thesis describes Padabhyanga as a Dinacharya procedure and cites its classical Drishtiprasadana effect.

The classical benefits described include:

Reduction of dryness

Reduction of roughness

Reduction of fatigue

Reduction of numbness

Improvement of strength of the feet

Prevention of fissures

Vata-pacifying action

Drishtiprasadana

Chakshushya effect

The concept is therefore relevant not only therapeutically but also as a preventive daily practice.

10. Classical Rationale for the Ocular Effect of Padabhyanga

10.1 Drishtiprasadana

Several classical references cited in the thesis associate Padabhyanga with Drishtiprasadana. This is interpreted as maintenance or promotion of visual clarity and ocular well-being.

10.2 Samanya-Vishesha Siddhanta

The thesis discusses similarities between Pada and Netra in Ayurvedic developmental concepts and applies Samanya-Vishesha Siddhanta to explain a possible relationship between the two sites.

10.3 Nadi concept

The thesis also refers to the traditional description of Pusha and Gandhari Nadis in relation to the foot and eye. This represents a classical explanatory model rather than a demonstrated anatomical nerve pathway.

10.4 Marma concept

The foot contains important Marma regions, including:

Kshipra

Talahridaya

Kurccha

Kurcchashira

Gulpha

The thesis proposes that massage of these regions may provide sensory stimulation and contribute to systemic relaxation.

11. Probable Mode of Action of Padabhyanga

The probable mechanism can be discussed under Ayurvedic and contemporary physiological perspectives.

11.1 Ayurvedic mechanism

The general mechanism of external Sneha described in the thesis can be represented as:

Application of Taila

↓

Release of active principles

↓

Entry into Romakupa

↓

Absorption through Swedavahi Srotas/Siramukha

↓

Distribution through circulation

↓

Dosha pacification

↓

Samprapti-vighatana

This represents the Ayurvedic explanatory model for the action of external oleation.

11.2 Vata-Pitta shamana

When a suitable medicated oil is selected, its Guna, Rasa, Vipaka and Virya may be considered in relation to the predominant Dosha.

In the thesis, Tungadrumadi Taila is described as containing Karchura, Ushira, Yashtimadhu, Utpala and Chandana and is discussed as having properties useful in Vata-Pitta pacification.

The proposed sequence is:

Snigdha/Madhura/Shita properties

↓

Vata-Pitta Shamana

↓

Reduction of Rukshata and Daha

↓

Reduction in ocular discomfort

↓

Chakshushya/Drishtiprasadana

This should be regarded as an Ayurvedic explanatory hypothesis rather than a directly demonstrated biochemical mechanism.

12. Contemporary Physiological Interpretation

From a modern perspective, Padabhyanga involves repeated tactile, pressure and mechanical stimulation of the skin and soft tissues of the foot.

A plausible conceptual pathway is:

Foot massage

↓

Activation of peripheral sensory receptors

↓

Afferent sensory input to the central nervous system

↓

Relaxation and modulation of stress/autonomic responses

↓

Reduction in perceived fatigue

↓

Improved relaxation and sleep

↓

Possible indirect improvement in ocular comfort

The thesis proposes sensory cortical involvement and relaxation as possible explanations for the observed reduction in symptoms. However, direct evidence demonstrating a specific foot-to-eye neural pathway in humans is currently insufficient. Therefore, this mechanism should be presented as a probable hypothesis requiring experimental validation, rather than as an established anatomical fact.

13. Padabhyanga, Stress and Sleep

Visual fatigue is often accompanied by headache, mental fatigue and disturbed sleep, particularly among individuals with prolonged screen exposure.

The thesis proposes that Padabhyanga may contribute to relaxation and improved sleep through neuropsychological mechanisms and discusses serotonin and norepinephrine as possible mediators.

This is clinically relevant because adequate sleep and reduction of general fatigue may indirectly support ocular comfort.

The relationship between evening screen exposure and sleep is also recognized in modern literature; evening light exposure can influence circadian physiology.

14. Padabhyanga and Dryness of Eye

Dryness is one of the major complaints associated with prolonged digital-device use.

The modern mechanism primarily involves:

Prolonged near work → reduced blinking → increased ocular surface exposure → increased tear evaporation/tear-film instability → dryness and irritation.

From the Ayurvedic perspective, the thesis interprets dryness in relation to Vata-Pitta aggravation and Kapha Kshaya. Snigdha properties of Sneha are therefore conceptually relevant to countering Rukshata.

It should, however, be emphasized that Padabhyanga should not be presented as a proven treatment for all forms of dry-eye disease.

15. Evidence from Previous Ayurvedic Research

The thesis literature review identifies previous clinical and conceptual work on Padabhyanga.

Studies have investigated:

Tila Taila Padabhyanga in eye strain

Goghrita Padabhyanga in computer vision syndrome

Padabhyanga in Timira/myopia

Ksheerbala Taila Padabhyanga in insomnia

Tungadrumadi Taila in relation to Padabhyanga and sleep

Conceptual studies on Drishtiprasadana.

The thesis reports that previous work with Tila Taila and Goghrita Padabhyanga showed improvement in subjective ocular symptoms, including eye strain and dryness.

Recent literature also demonstrates continuing research interest in integrating Ayurvedic approaches with ophthalmology. For example, a 2025 published protocol specifically incorporates Padabhyanga into an Ayurvedic intervention framework for non-pathological myopia, demonstrating that the procedure continues to be investigated in contemporary research.

Ayurvedic ophthalmic interventions have also been investigated in clinical studies of conditions such as dry eye and glaucoma, although these studies involve interventions different from Padabhyanga and therefore should not be used as direct evidence for the efficacy of Padabhyanga itself.

16. Integrative Conceptual Model

The overall conceptual model can be summarized as follows:

Ayurvedic pathway

Padabhyanga + Sneha

↓

Snigdha / Madhura / Shita properties

↓

Vata-Pitta Shamana

↓

Reduction of Rukshata, Shrama and Daha

↓

Drishtiprasadana / Chakshushya effect

↓

Improvement in ocular comfort

Contemporary pathway

Foot massage

↓

Peripheral sensory stimulation

↓

Central sensory processing

↓

Relaxation / possible autonomic modulation

↓

Reduction in stress and fatigue

↓

Improved sleep and subjective well-being

↓

Possible indirect improvement in ocular comfort

These two pathways provide complementary conceptual explanations, but they should not be regarded as scientifically equivalent mechanisms.

17. Safety and Clinical Considerations

Padabhyanga is a non-invasive external procedure when appropriately performed. However, it should be used judiciously.

It should not replace standard ophthalmological examination or treatment in patients with:

Sudden loss of vision

Severe eye pain

Acute red eye

Significant photophobia

Ocular trauma

Acute infection

Glaucoma or retinal disease requiring medical treatment

Similarly, the use of medicated oils around the eye itself is different from application to the feet and should not be confused with ocular drug administration.

18. Research Gaps

Despite the classical description of Padabhyanga as Chakshushya, several scientific questions remain unanswered.

Future studies should investigate:

Tear-film break-up time before and after Padabhyanga.

Schirmer test changes.

Ocular Surface Disease Index (OSDI).

Blink-rate changes.

Non-invasive tear-film stability.

Autonomic nervous system parameters.

Heart-rate variability.

Cortisol and other stress biomarkers.

Sleep-quality indices.

Objective visual-function parameters.

Comparative efficacy of different Sneha Dravyas.

Dose-response relationship of massage duration.

Long-term preventive effects.

Randomized controlled trials with adequate sample size.

Neurophysiological studies investigating sensory pathways associated with foot massage.

19. Limitations of Current Evidence

The classical Ayurvedic rationale for Padabhyanga is well established in textual literature; however, the modern biomedical mechanism remains incompletely characterized.

Most available evidence is limited by factors such as small sample sizes, heterogeneous interventions, subjective outcome measures and limited mechanistic investigations. Therefore, claims that Padabhyanga directly improves anatomical or physiological eye function should be made cautiously.

The distinction between symptomatic improvement, ocular comfort and actual improvement in visual acuity or ocular disease is particularly important.

20. Conclusion

The eye is described in Ayurveda as a predominantly Tejo Mahabhuta-based sensory organ with important functional

roles attributed to Alochaka Pitta, Prana Vayu and Tarpaka Kapha. Modern science describes it as a highly specialized optical and neural organ composed of three major coats and multiple refractive and neural structures.

The increasing use of digital devices has created a significant burden of ocular discomfort characterized by eye fatigue, dryness, redness, watering and headache. Modern evidence indicates that reduced blinking and prolonged near work contribute substantially to digital eye discomfort.

Ayurveda provides a preventive framework through Dinacharya. Among these practices, Padabhyanga is traditionally described as Drishtiprasadana and Chakshushya. Its probable Ayurvedic mechanism may involve Sneha, Vata-Pitta Shamana and reduction of Rukshata, whereas a contemporary physiological interpretation may involve peripheral sensory stimulation, relaxation, autonomic modulation and reduction of fatigue.

The available evidence supports Padabhyanga as a promising area for research in preventive and supportive ocular care; however, definitive claims regarding direct ocular physiological effects require further high-quality randomized controlled and mechanistic studies.

Padabhyanga should therefore be viewed as a potentially useful complementary Dinacharya practice for ocular comfort rather than as a replacement for evidence-based ophthalmic diagnosis and treatment.

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