WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
Coden USA: WJPRAP Impact Factor 8.453
Volume 15, Issue 2, 1123-1139. Review Article ISSN 2277–7105

DRY EYE SYNDROME: A COMPREHENSIVE REVIEW OF SHUSHKAKSHIPAKA IN AYURVEDIC AND MODERN PERSPECTIVE

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Article Received on 15 Dec. 2025,
Article Revised on 05 Jan. 2026,
Article Published on 16 Jan. 2026,
https://doi.org/10.5281/zenodo.18267257

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How to cite this Article: 1*Dr. Shiwali Verma, 2Prof. Vijayant Bhardwaj, 3Dr. Kartik Goel, 4Dr Pankaj Verma (2026). Dry Eye Syndrome: A Comprehensive Review Of Shushkakshipaka In Ayurvedic And Modern Perspective. "World Journal of Pharmaceutical Research, 15(2), 1123–1239.

ABSTRACT

Shushkakshipaka has been elaborately described by ancient Ayurvedic scholars, reflecting its clinical significance through detailed explanations of etiology, symptomatology, prognosis, and management in classical Samhitas. Ayurveda considers Shushkakshipaka a curable condition when managed with appropriate therapeutic interventions. A critical analysis of classical descriptions reveals a close resemblance between Shushkakshipaka and Dry Eye Syndrome (DES), a contemporary ocular surface disorder with increasing global prevalence. Dry Eye Disease (DED) is a multifactorial condition characterized by tear film instability, ocular discomfort, visual disturbance, and fatigue, significantly affecting quality of life, occupational efficiency, and psychosocial well-being. Among its subtypes, evaporative dry eye is the most prevalent form. Current conventional management of DED largely focuses on symptomatic relief through artificial tear substitutes; however, these measures

often fail to address the underlying inflammatory pathology of the disease. In contrast, Ayurvedic management of Shushkakshipaka emphasizes therapeutic procedures such as Tarpana, Seka, Aschyotana, and Anjana, which aim to restore ocular lubrication, stabilize the tear film, and improve ocular surface health. Dry Eye Syndrome, also known as keratoconjunctivitis sicca, arises due to decreased tear secretion or excessive tear evaporation and presents with diverse clinical manifestations. Multiple physiological systems contribute to the integrity of the ocular surface, and disruption of these mechanisms may or may not produce overt symptoms, making accurate diagnosis essential. This comprehensive review critically compiles and correlates Ayurvedic and modern literature regarding the types, etiology, pathophysiology, diagnostic approaches, and management strategies of Shushkakshipaka and Dry Eye Disease, with special emphasis on evaporative dry eye. Additionally, recent advances in diagnostic techniques, drug delivery systems, and emerging therapeutic challenges are discussed to provide a holistic understanding for clinicians, researchers, and healthcare professionals.

KEYWORDS: Shushkakshipaka; Dry Eye Syndrome; Keratoconjunctivitis Sicca; Evaporative Dry Eye; Tear Film Instability; Ayurvedic Ophthalmology; Ocular Surface Disorder; Integrative Approach.

INTRODUCTION

Dry Eye Syndrome (DES) is a disorder of the pre-ocular tear film that leads to damage of the ocular surface and is commonly associated with symptoms such as ocular discomfort, irritation, visual disturbance, and fatigue. It is also referred to by various terminologies including keratoconjunctivitis sicca (KCS), keratitis sicca, sicca syndrome, xerophthalmia, dry eye disease (DED), ocular surface disease (OSD), dysfunctional tear syndrome (DTS), or simply dry eye. The term keratoconjunctivitis sicca is derived from Latin, meaning “dryness of the cornea and conjunctiva,” where the word “sicca” denotes dryness. Dry eye resulting from inadequate tear production is commonly associated with Sjogren’s syndrome.[1,2]

Dry Eye Disease is characterized by instability of the tear film, which may occur either due to reduced tear secretion or due to poor tear film quality leading to excessive evaporation. Based on these mechanisms, dry eye disease is broadly classified into two major types: aqueous-deficient dry eye disease and evaporative dry eye disease. Tear deficiency and instability result in damage to the interpalpebral ocular surface and are associated with persistent symptoms of ocular discomfort. Dry eye is a multifactorial disease of the tears and ocular

surface that causes symptoms of discomfort, visual disturbance, and tear film instability, with potential damage to the ocular surface. This condition is accompanied by increased tear film osmolarity and inflammation of the ocular surface.

Dry Eye Syndrome significantly interferes with daily activities requiring sustained visual attention such as reading, driving, and computer-related work. Patients often experience chronic and severe symptoms, which adversely affect their quality of life, social functioning, and workplace productivity.

Prevalence of Dry Eye Disease

The prevalence of dry eye syndrome increases with advancing age and is commonly observed in individuals above 50 years. It represents a significant ocular health burden worldwide, particularly among middle-aged and elderly populations. Factors such as prolonged contact lens use, systemic medications, autoimmune disorders, and refractive surgeries contribute to the increased incidence in these age groups. With rising life expectancy and growth of the aging population, the global burden of DES is expected to increase further. Epidemiological studies have reported prevalence rates ranging from 5% to over 30% across different age groups and geographic regions. It is estimated that nearly 25–30 million people are affected by dry eye disease globally. The condition affects all races and is more commonly observed in women than in men. Hormonal imbalance during menopause, particularly altered estrogen-androgen levels, is believed to contribute to inflammation of the lacrimal gland and ocular surface. Additionally, a significant proportion of patients with rheumatoid arthritis develop keratoconjunctivitis sicca. Other high-risk groups include individuals with Helicobacter pylori infection, prolonged digital screen exposure, and long-term contact lens users.[4,5,9]

Tear Film and Its Composition

Dry eye disease is recognized as a consequence of dysfunction of the lacrimal functional unit, which comprises the lacrimal glands, ocular surface including cornea and conjunctiva, eyelids, meibomian glands, goblet cells, and the associated neural network. The tear film consists of three primary layers. The innermost mucin layer, produced by conjunctival goblet cells, facilitates uniform spreading of the aqueous layer over the ocular surface. The middle aqueous layer, the thickest component, is secreted by the main and accessory lacrimal glands and provides hydration, nutrition, and removal of debris from the ocular surface. Deficiency of this layer accounts for most cases of dry eye disease. The outermost lipid layer, secreted by

the meibomian glands and glands of Zeis, reduces evaporation of the underlying aqueous layer and contributes to tear film stability.[1]

Tear fluid is a complex mixture containing proteins, immunoglobulins, mucins, electrolytes, cytokines, lysozymes, lactoferrin, and growth factors. Lysozyme acts synergistically with immunoglobulin A in bacterial lysis, while lactoferrin exhibits antibacterial properties. The average glucose concentration in tears is approximately 2.5 mg/dL, urea around 0.04 mg/dL, and osmolarity about 309 mOsm/L. Electrolytes such as sodium, potassium, and chloride are present in higher concentrations than in blood. The normal tear pH is approximately 7.25, and the refractive index of the tear film is 1.336.[15]

Ayurvedic Perspective and Shushkakshipaka

Ayurveda is one of the oldest holistic systems of medicine and emphasizes maintenance of health through a balanced state of body, mind, and spirit. Regarded as the fifth Veda, Ayurveda traces its origin to the Atharvaveda and is revered as the "Science of Life." Shalakya Tantra, one of the eight major branches of Ayurveda, specifically deals with diseases of the eye, ear, nose, throat, and head. Acharya Nimi is considered the pioneer of this branch, and his teachings are extensively described in the Uttaratantra of Sushruta Samhita. Acharya Sushruta elaborated seventy-six ocular diseases, highlighting the importance of ophthalmology in Ayurveda.[15]

Shushkakshipaka is described as a Sarvagata, Aushadha-sadhya Netra Roga in Sushruta Samhita and by Acharya Vagbhata under Sadhya Vyadhi. Different Acharyas have proposed varying views regarding Dosha involvement—Vataja, Vata-Pittaja, and Vata-Raktaja. Based on clinical features such as dryness, irritation, burning sensation, and ocular discomfort, Shushkakshipaka bears a close resemblance to Dry Eye Disease. Modern medicine defines dry eye as a multifactorial disorder of the tears and ocular surface resulting in symptoms of discomfort, visual disturbance, and tear film instability, associated with increased osmolarity and inflammation of the ocular surface. It occurs either due to inadequate tear production or excessive tear evaporation, thereby establishing a clear conceptual and clinical correlation with Shushkakshipaka.[15,16]

Etymology of Shushkakshipaka

The term *Shushkakshipaka* is derived from three components: *Shushka*, meaning dryness; *Akshi*, meaning eye; and *Paka*, denoting an inflammatory or pathological process.

Thus, Shushkakshipaka refers to a disease condition of the eye characterized by dryness and inflammatory changes, closely paralleling the modern concept of Dry Eye Syndrome.[20]

NIDANAS OF SHUSHKAKSHIPAKA AND CAUSES OF DRY EYE SYNDROME

Dry Eye Syndrome develops due to multiple factors affecting tear production, tear evaporation, or the quality of the tear film. The primary causes include decreased tear secretion, excessive evaporation of tears, and abnormalities in the mucin or lipid components of the tear film. Based on these mechanisms, dry eye disease has been broadly classified into aqueous-deficient dry eye and evaporative dry eye. Aqueous-deficient dry eye commonly occurs due to reduced tear secretion from the lacrimal glands and is frequently observed in elderly individuals, postmenopausal women, and patients suffering from autoimmune disorders such as Sjogren's syndrome and rheumatoid arthritis.[1,2]

Dysfunction of the lacrimal functional unit leads to alterations in tear composition and instability of the tear film, resulting in inflammation of the ocular surface. Inadequate tear production fails to provide sufficient anti-inflammatory protection, leading to persistent ocular irritation. This initiates activation of inflammatory cells, particularly T-lymphocytes, which release cytokines that further aggravate inflammation of the ocular surface and lacrimal glands. Consequently, tear quality deteriorates, and symptoms of dry eye disease manifest. Increased osmolarity of the aqueous tear layer is considered a hallmark feature of dry eye syndrome and acts as a trigger for ocular surface inflammation and tissue damage.

Sjogren's syndrome is characterized by a combination of aqueous tear deficiency and xerostomia. It is marked by progressive lymphocytic infiltration of the lacrimal and salivary glands, leading to disruption of glandular architecture and gradual loss of secretory function. Non-Sjogren's aqueous-deficient dry eye may be associated with conditions such as vitamin A deficiency, trachoma, sarcoidosis, and lymphoma.[9]

In evaporative dry eye disease, excessive tear evaporation occurs due to reduced blinking, eyelid abnormalities, or environmental influences. Factors such as dry climate, air pollution, wind exposure, central heating, chemical irritants, contact lens wear, prolonged driving, television viewing, and extended computer use significantly affect tear film stability. Persistent evaporation may predispose the eye to infection, corneal ulceration, and, in severe cases, vision loss. Inadequacy of the lipid layer is a major contributor to evaporative dry eye, as this layer normally stabilizes the tear film and retards evaporation. Meibomian gland

dysfunction, blepharitis, and ocular rosacea are leading causes of evaporative dry eye, wherein abnormal lipid secretion compromises tear film integrity.

NIDANAS OF SHUSHKAKSHIPAKA (AYURVEDIC PERSPECTIVE)

Classical Ayurvedic texts do not describe specific Nidanas exclusively for Shushkakshipaka; however, the Samanya Nidanas of Netra Rogas are applicable. According to Ayurvedic principles, three primary etiological factors contribute to disease manifestation, particularly in disorders of Chakshurendriya. These factors can be correlated with the modern understanding of evaporative dry eye.[15,16,17]

Asatmendriyartha Samyoga

Atiyoga

Excessive use of the eyes, such as prolonged exposure to bright digital screens without adequate blinking, leads to increased tear evaporation and ocular dryness.

Heenayoga

Inadequate use of the eyes, including prolonged stay in darkness or minimal visual activity, as well as reduced blinking during screen use, adversely affects tear dynamics.

Mithyayoga

Improper use of vision, such as continuous viewing of objects that are extremely near or far, excessive concentration on small digital text, poor visual hygiene, improper workplace ergonomics, viewing screens at inappropriate distances or angles, and exposure to excessively bright objects. Improper use of computer and television screens can be considered a form of Chakshurendriya Mithyayoga.

Pragyaparadha

Deviation from Sadvritta, or righteous conduct, results in disease manifestation. Pragyaparadha refers to actions performed without proper judgment involving Dhi, Dhriti, and Smriti. In the present context, excessive and unregulated use of computers and digital devices due to attachment or ignorance contributes to Dosha Vaishamya, leading to ocular disorders such as Shushkakshipaka.

Parinama (Kala)

Kala plays a crucial role in disease manifestation. Seasonal variations such as Sheeta, Ushna, and Varsha influence the body through excess, deficiency, or altered exposure. Seasonal imbalance contributes to the initiation and progression of ocular disorders.

SAMPRAPTI

The Samanya Samprapti of Netra Rogas forms the basis for understanding the pathogenesis of Shushkakshipaka. According to Acharya Sushruta, vitiated Doshas spread to the Jatru Urdhva Bhaga through the Siras, leading to manifestation of ocular pathology. Vitiated Vata, along with associated Pitta or Rakta, affects the lacrimal and ocular surface structures, resulting in dryness, inflammation, and impaired ocular function.

SAMPRAPTI GHATAKA

- **Dosha:** Vata (according to Sushruta), Vata-Pitta (according to Vagbhata), Vata-Rakta (according to Madhavakara and Karala)[15]
- **Dushya:** Rasa (Ashru), Rakta, Meda, Majja
- **Srotas:** Rasa and Raktavaha Siras
- **Srotodushti:** Sanga
- **Adhisthana:** Sarvagata Netra
- **Sadhyata:** Sadhya

POORVAROOPA OF NETRA ROGAS AND CORRELATION WITH EVAPORATIVE DRY EYE

Acharyas have described general Poorvaroopa for Netra Rogas, several of which are also observed in the prodromal stage of evaporative dry eye. These include avilata (ocular discharge or excessive tearing), congestion, watering, itching, stickiness, heaviness, burning sensation, pricking pain, redness, pain around eyelids, foreign body sensation, visual disturbances, impaired ocular function, and reduced blinking. Many of these features closely correlate with early manifestations of evaporative dry eye disease such as irritation-induced watering, itching due to eye strain, crusting of eyelids in meibomian gland dysfunction, burning sensation, pricking pain, foreign body sensation, blurred vision, and reduced ocular activity due to discomfort.[15,16]

ROOPA (CLINICAL FEATURES)

The cardinal symptom of dry eye disease is a persistent dry and gritty sensation in the eyes. Associated symptoms include burning, itching, foreign body sensation, excessive tearing, ocular pain, redness, photophobia, stringy discharge, and fluctuating or blurred vision. These symptoms tend to worsen in dry environments, low humidity, and high temperatures. Dry eye disease is clinically graded based on severity.[16]

Ayurvedic texts describe the Roopa of Shushkakshipaka as dryness of the eyelids, crusting, difficulty in opening and closing the eyes, foreign body sensation, pricking and tearing pain, mucoid discharge, burning sensation, roughness of eyelids, and inflammatory changes. These features show striking similarity with the clinical presentation of dry eye disease, further supporting the correlation between Shushkakshipaka and Dry Eye Syndrome.

UPADRAVA

Shushkakshipaka is included among the eighteen disorders described by Acharya Vagbhata that have the potential to become chronic and are categorized under Pilla Roga. This suggests that if left untreated, Shushkakshipaka may progress to chronic ocular pathology.[18]

Diagnosis of Dry Eye Syndrome

The diagnosis of Dry Eye Syndrome (DES) involves a combination of clinical evaluation and objective diagnostic tests, as no single test is sufficient to establish a definitive diagnosis. Diagnostic investigations are used for various purposes, including routine clinical practice, assessment of disease severity, monitoring therapeutic response, and characterization of dry eye as a component of systemic disorders such as Sjogren's syndrome. Due to poor correlation between clinical signs and patient-reported symptoms, the use of multiple diagnostic modalities is generally recommended. Symptom-based questionnaires are often employed to support diagnosis and to evaluate disease severity and treatment outcomes.

Tear Film Breakup Time (TBUT)

Tear Film Breakup Time is a quantitative test used to assess the stability of the tear film. It measures the interval between a complete blink and the appearance of the first dry spot on the corneal surface. Normally, TBUT ranges between 15 and 20 seconds. In this test, a fluorescein strip moistened with saline is applied to the inferior conjunctival sac, and the tear film is examined under a slit lamp using a cobalt blue filter. TBUT values less than 5–10 seconds indicate tear film instability and are commonly observed in mild to moderate dry eye

disease. A noninvasive variant, known as noninvasive breakup time (NIBUT), measures tear film disruption without fluorescein by observing distortion of reflected grid patterns on the tear film.

Epithelial Staining Tests

Epithelial staining techniques using dyes such as fluorescein, rose bengal, and lissamine green help detect abnormalities of the ocular surface, assess tear film integrity, and determine the severity of dryness. These tests provide a simple and effective method for grading ocular surface damage. Rose bengal is particularly sensitive for detecting early dry eye changes, especially on the conjunctiva, whereas fluorescein preferentially stains corneal epithelial defects and areas of epithelial erosion. Lissamine green stains devitalized and inadequately protected epithelial cells and is better tolerated than rose bengal, as it causes less discomfort and toxicity, although it is relatively less sensitive and transient.

Schirmer Test

The Schirmer test is a widely used quantitative method for evaluating tear production by the lacrimal glands. In this test, a standardized strip of filter paper is placed in the inferior conjunctival sac, and tear secretion is measured over a fixed period of five minutes. Schirmer I test measures both basal and reflex tearing and is performed without topical anesthesia. Schirmer II test evaluates reflex tearing and is performed after instillation of topical anesthetic. Wetting of less than 15 mm in five minutes is considered abnormal, while values below 6 mm are indicative of aqueous tear deficiency. Variability in results may occur due to eyelid manipulation and tear drainage.

Tear Function Index (TFI)

The Tear Function Index is a more sensitive indicator of tear dynamics, assessing both tear production and clearance. It is calculated by dividing the Schirmer II test value by the tear clearance rate. Higher values indicate better ocular surface health, whereas values below a specific threshold suggest dry eye disease. This test is also referred to as the Liverpool modification.

Tear Osmolarity

Measurement of tear osmolarity provides valuable qualitative information regarding tear film stability. Normal tear osmolarity ranges from approximately 309 to 312 mOsm/L, and increased values correlate with the severity of dry eye disease. Tear osmolarity is considered

a highly sensitive diagnostic parameter, although it lacks specificity. Elevated osmolarity is believed to trigger ocular surface inflammation and epithelial damage, making it a key marker in dry eye evaluation.

Impression Cytology

Impression cytology is a minimally invasive technique used to assess cellular changes of the ocular surface. It involves collection of superficial conjunctival epithelial layers, which are then examined microscopically. This method helps identify decreased goblet cell density, epithelial metaplasia, and keratinization, providing insight into disease etiology and progression. Although highly sensitive, the technique requires expertise in staining and microscopic interpretation.

Symptom Questionnaires

Standardized symptom questionnaires play an important role in screening and diagnosing dry eye disease, as well as in assessing its impact on quality of life. These questionnaires evaluate symptom frequency, functional limitations, and environmental triggers. Among them, the Ocular Surface Disease Index (OSDI) is widely used and consists of three domains: ocular symptoms, vision-related function, and environmental factors. Questionnaire selection depends on the intended application, such as diagnosis, clinical trials, or treatment evaluation.

Fluorophotometry

Fluorophotometry is an advanced and costly technique used to measure tear flow and tear volume by analyzing the decay of sodium fluorescein from the tear film. Reduced tear turnover rate is commonly observed in patients with symptomatic dry eye disease. Delayed tear clearance has been associated with increased concentrations of inflammatory cytokines, contributing to chronic ocular surface inflammation.

Tear Fluid Protein Analysis

Biochemical analysis of tear proteins provides additional diagnostic information. Levels of tear components such as lysozyme, lactoferrin, epidermal growth factor, aquaporin-5, lipocalin, and immunoglobulin A can be quantified using immunoassay techniques. Reduced concentrations of lysozyme and lactoferrin are commonly observed in dry eye disease, although lack of specificity limits their independent diagnostic value.

Tear Ferning Test

The Tear Ferning Test is used to assess tear quality, mucin content, and osmolarity. A small tear sample is collected from the lower eyelid, placed on a microscope slide, and allowed to dry. The resulting crystallization patterns are examined and classified, with abnormal ferning patterns indicating poor tear quality and dry eye disease.

Other Diagnostic Tests

Additional investigations include meibometry, meibography, and meiboscopy for assessment of meibomian gland dysfunction. Tear evaporation rate may be evaluated using evaporimetry, while meniscometry assists in diagnosing aqueous-deficient dry eye. Lacrimal or minor salivary gland biopsy may be performed in suspected cases of Sjogren's syndrome. Histopathological examination and microscopic analysis of tear debris further aid in disease characterization.

Despite advances in diagnostic modalities, no single qualitative or quantitative test can independently assess tear film integrity and disease severity. Therefore, an accurate diagnosis of Dry Eye Syndrome relies on a combination of clinical features, patient-reported symptoms, and multiple abnormal diagnostic test results.

Chikitsa of Shushkakshipaka (Ayurvedic Management)

The management of Shushkakshipaka in Ayurveda is aimed at lleviating *Rukshata* (dryness), pacifying aggravated *Vata*and *Pitta Dosha*, restoring *Ashru* (tear secretion), and maintaining the integrity of ocular tissues. Acharya Sushruta has described both *Samanya* and *Vishishta Chikitsa* for Netra Rogas, which are applicable in Shushkakshipaka.

1. Samanya Chikitsa

a) Nidana Parivarjana

Avoidance of etiological factors such as excessive exposure to wind, smoke, dust, heat, prolonged visual strain, night awakening, improper diet, and excessive use of digital devices is considered the first step in management.

b) Preventive and Supportive Measures

Regular intake of Triphala, maintenance of a calm mental state, regular application of Anjana, Nasya, Siravedhana when indicated, Ghritapana, Padabhyanga, foot bath, use of

umbrella, and protection of eyes from environmental irritants are advised for maintaining ocular health.

2. Vishishta Chikitsa

A. Local Therapeutic Procedures (Sthanika Chikitsa)

i. Anjana

Anjana is indicated to improve ocular lubrication and reduce dryness.

- Raskriya Anjana prepared using Saindhava, Devdaru, and Shunthi with Ghrita and Matulunga rasa
- Anjana prepared from Saindhava, Shunthi, Anoopa and Jalaja Vasa
- Mahaushadha Anjana
- Keshanjana prepared by Putapaka method with Ghrita

ii. Parisheka

Gentle irrigation of eyes using:

- Saindhava Lavana processed milk
- Saindhava Lavana mixed with cold water

iii. Aschyotana

- Tikta–Snigdha Aschyotana in Vataja Netra Roga
- Madhura–Sheetala Aschyotana in Pittaja Netra Roga
- Stanya Aschyotana is advised in conditions associated with Rakta, Pitta, and Vata vitiation

iv. Tarpana

Tarpana with Jeevaniya Ghrita is recommended to nourish ocular tissues and restore tear film stability.

v. Nasya

Nasya with Anu Taila is beneficial due to the close anatomical and functional relationship between the nose and eyes.

vi. Putapaka

Snehana Putapaka is advised to provide deeper nourishment to ocular structures.

vii. Pindi

Snigdha Pindi is indicated in Vata–Pittaja involvement to reduce dryness and burning sensation.

viii. Varti

Varti prepared using Brihati, Eranda Moola Tavaka, Shigru Moola, and Saindhava Lavana processed in Aja Ksheera is advised.

B. Systemic Management (Abhyantara Chikitsa)

i. Ghritapana

- Jeevaniya Ghrita
- Ghrita prepared with Dugdha and Kulira Rasa

These formulations pacify Vata–Pitta and nourish ocular tissues.

ii. Vasti

Vasti prepared with milk processed using Madhuka, Shatahva, and Ghrita supernatant is recommended to control Vata Dosha, which plays a major role in the pathogenesis of Shushkakshipaka.

Ayurvedic Therapeutic Rationale

Shushkakshipaka is predominantly a Vata–Pittaja disorder. Snigdha, Sheeta, Madhura, and Jeevaniya therapies counteract dryness, burning sensation, and ocular fatigue. Local ocular procedures restore tear stability, while systemic therapies correct underlying Dosha imbalance, thus offering a holistic and sustainable approach to management.

Ayurvedic–Modern Treatment Correlation Table (Shushkakshipaka / Dry Eye Syndrome)

Ayurvedic Chikitsa / Concept	Probable Action (Ayurvedic View)	Modern Correlate	Therapeutic Effect in Dry Eye
Nidana Parivarjana	Removal of causative factors causing Vata–Pitta vitiation	Lifestyle modification (screen break, avoiding AC, smoke)	Prevents tear film instability and symptom aggravation
Ghritapana (Jeevaniya Ghrita)	Snehana, Vata–Pitta shamana, nourishment of ocular tissues	Omega-3 fatty acid supplementation, systemic lubrication	Improves tear quality and reduces ocular surface inflammation
Anjana (Snigdha / Rasakriya Anjana)	Lubrication, scraping of vitiated dosha, local Rasayana	Lubricant eye drops / ocular ointments	Reduces dryness, burning, foreign body sensation

Tarpana (Jeevaniya Ghrita)	Prolonged ocular nourishment and hydration	Lubricating gel, ocular inserts (Lacrisert)	Improves tear film stability and corneal epithelial health
Aschyotana (Madhura–Snigdha / Sheetala dravyas)	Immediate soothing and hydration of ocular surface	Artificial tears, preservative-free lubricants	Symptomatic relief and surface protection
Parisheka (Sheeta / Dugdha yukta dravya)	Sheeta guna, Pitta shamana, anti-inflammatory	Cold saline wash / soothing eye irrigation	Reduces redness, burning and ocular discomfort
Nasya (Anu Taila)	Regulation of Urdhva Jatrugata Dosha, lacrimal nourishment	Neuro-secretory stimulation, autonomic regulation	Improves lacrimal gland function and tear secretion
Putapaka (Snehana Putapaka)	Deep ocular tissue nourishment	Intensive ocular surface therapy	Restores damaged ocular surface
Pindi (Snigdha Pindi)	Vata–Pitta shamana, anti-inflammatory	Warm compresses / eyelid therapy	Improves meibomian gland function
Varti (Snigdha formulations)	Sustained local drug delivery	Ocular inserts / ointments	Prolonged lubrication
Vasti (Milk & Ghrita based)	Systemic Vata regulation	Systemic anti-inflammatory & lipid modulation	Helps in chronic and recurrent cases
Rasayana therapy	Tissue rejuvenation	Antioxidant therapy, Vitamin A	Enhances goblet cell function, mucin layer integrity
Sheeta–Madhura Ahara	Pitta shamana, tissue nourishment	Anti-inflammatory diet, hydration	Supports tear film homeostasis

Ayurvedic therapeutic measures described for Shushkakshipaka show close correlation with modern treatment modalities of Dry Eye Syndrome, emphasizing lubrication, anti-inflammatory action, tear film stabilization, and ocular surface nourishment.

CONCLUSION

Dry eye disease is a multifactorial and complex disorder, which poses significant challenges in its diagnosis and long-term management. The evolving understanding of tear film dynamics, ocular surface inflammation, and tear hyperosmolarity has contributed to the development of more reliable diagnostic tools with minimal disturbance to physiological function. Improved insight into the etiopathogenesis, clinical features, and diagnostic parameters of keratoconjunctivitis sicca has opened new avenues for more rational and targeted management strategies. Furthermore, advances in pharmacotherapy and novel drug-delivery systems offer promising prospects for improving therapeutic outcomes in this highly prevalent and debilitating condition.

The eye, being a highly specialized sensory organ, plays a crucial role in an individual's interaction with the external world. Visual impairment significantly compromises quality of life, irrespective of socioeconomic status. In the modern digital era, excessive use of visual display terminals has resulted in a marked rise in evaporative dry eye disease, leading to ocular discomfort, reduced work efficiency, and limitation of daily activities. This functional impairment often contributes to psychosocial stress, reduced productivity, and emotional strain. Several intrinsic and extrinsic factors such as autoimmune disorders, environmental exposure, contact lens usage, hormonal imbalance, chronic inflammation, infections, and iatrogenic causes further influence disease severity. If left untreated, dry eye disease may progress to serious complications including corneal epithelial damage, ulceration, and even visual loss, emphasizing the importance of early diagnosis and timely intervention.

Modern management of dry eye syndrome primarily focuses on symptomatic relief through lid hygiene, warm compresses, artificial tears, anti-inflammatory agents, nutritional supplementation, and advanced procedures targeting meibomian gland dysfunction. However, these approaches often require long-term or lifelong therapy and may be associated with adverse effects or reduced patient compliance. In contrast, Ayurvedic texts describe Shushkakshipaka as a Vata-predominant disorder with Pitta involvement and advocate a holistic treatment approach. Therapeutic measures such as Ksheeraseka, Aschyotana, Tarpana, Putapaka, Anjana, along with systemic interventions like Nasya, Vasti, and Rasayana therapy, aim at correcting the underlying doshic imbalance while providing sustained nourishment and protection to ocular tissues.

Thus, an integrated Ayurvedic approach, when applied judiciously and at an early stage, offers a comprehensive and effective management strategy for Shushkakshipaka. The correlation between Ayurvedic principles and modern concepts of dry eye disease highlights the potential of Ayurveda not only in symptom management but also in improving overall ocular health and quality of life through a systemic and individualized therapeutic framework.

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