

EFFICACY AND SAFETY OF *TARPANA KARMA* IN THE MANAGEMENT OF *SUSHKAKSHIPAKA* (DRY EYE SYNDROME): A COMPREHENSIVE REVIEW

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ABSTRACT

Sushkakshipaka is described in *Ayurveda* closely resembles Dry Eye Syndrome (DES), a multifactorial ocular surface disorder characterized by tear film instability, ocular discomfort, and inflammation. *Tarpana Karma*, a specialized *Ayurvedic* ocular therapy involving the retention of medicated *Ghrita* over the eyes, has been traditionally used for the management of ocular diseases. This review summarizes the available *Ayurvedic* literature and contemporary scientific evidence on the efficacy, safety, and therapeutic mechanisms of *Tarpana Karma* in Dry Eye Syndrome. The available evidence suggests that *Tarpana Karma* improves symptoms such as dryness, burning sensation, foreign body sensation, and visual discomfort, while enhancing objective parameters including Schirmer's test and Tear Film Break-Up Time (TBUT). The prolonged contact of medicated *Ghrita* with the ocular surface promotes lubrication, stabilizes the tear film, reduces evaporation, and facilitates ocular drug delivery. Although current findings support the potential of *Tarpana Karma* as a safe and effective adjunctive therapy for Dry Eye Syndrome, further well-designed randomized controlled trials are required to establish its long-term efficacy, safety, and mechanisms of action

Keywords: Ocular surface disease, Tear film instability, Ocular lubrication, *Netra kriyakalpa*, Schirmer's test.

INTRODUCTION: *Sushkakshipaka* is described in the *Ayurvedic* classics as a *Sarvagata Netraroga* characterized by *Rukshata* (dryness), *Daha* (burning sensation), *Toda* (pricking pain), and ocular discomfort, primarily resulting from the vitiation of *Vata* and *Pitta Doshas*¹. It is closely correlated with Dry Eye Disease

(DED), a multifactorial disorder of the tear film and ocular surface, leading to ocular discomfort, visual disturbance, and tear film instability. The prevalence of DED has increased considerably in recent years owing to prolonged digital screen exposure, environmental factors, aging, hormonal changes, and systemic diseases²

Contemporary management mainly includes artificial tears, lubricating eye drops, and anti-inflammatory therapy, which primarily provide symptomatic relief. *Ayurveda* offers a holistic approach to the management of such conditions, wherein *Tarpana Karma*, a specialized ocular procedure employing medicated *Ghrita*, is indicated for disorders associated with ocular dryness and degeneration. Owing to its *Snigdha*, *Sheeta*, and *Chakshushya* properties, *Tarpana Karma* helps nourish the ocular tissues, improve tear film stability, maintain ocular surface homeostasis, and alleviate symptoms³. Therefore, this review aims to critically evaluate the efficacy, safety, and current scientific evidence regarding *Tarpana Karma* in the management of *Sushkakshipaka* (Dry Eye Disease).

Ayurvedic Perspective of Sushkakshipaka
Sushkakshipaka is one of the *Sarvagata Netrarogas* described by *Acharya Sushruta* under diseases affecting the entire eye. The disease is predominantly *Vata-Pittaja* in origin, where aggravation of *Vata* causes *Rukshata* (dryness), *Toda* (pricking pain), and impaired ocular lubrication, while aggravated *Pitta* produces *Daha* (burning sensation), *Raga* (congestion), and inflammatory changes in the ocular tissues⁴.

According to the *Ayurvedic* classics, the *Nidanas* include excessive exposure to wind (*Vata*), dust (*Raja*), smoke (*Dhuma*), sunlight (*Atapa*), prolonged visual strain, night awakening (*Ratri Jagarana*), suppression of natural urges (*Vegadharana*), and excessive intake of *Vata*- and *Pitta*-provoking foods. These factors lead to *Dosha Prakopa*, which localizes in the *Netra*, affecting the *Rasa*

and *Rakta Dhatus* and causing depletion of ocular *Snigdha*, resulting in impaired tear secretion and ocular surface instability.

Classically, the disease presents with *Rukshata*, *Toda*, *Daha*, *Gharsha* (foreign-body sensation), *Kandu* (itching), *Avila Darshana* (blurred vision), and difficulty in opening and closing the eyelids. Owing to its chronic and recurrent course, *Sushkakshipaka* is considered a *Yapya Vyadhi*, requiring long-term management rather than complete eradication. Therefore, therapies possessing *Snigdha*, *Sheeta*, and *Chakshushya* properties are recommended to restore ocular lubrication, nourish the ocular tissues, and maintain visual function. Among the *Netra Kriyakalpas*, *Tarpana Karma* is regarded as the principal therapeutic procedure for achieving these objectives.

Contemporary Understanding of Dry Eye Syndrome

Dry Eye Syndrome is defined as a multifactorial disease of the tear film and ocular surface characterized by loss of tear film homeostasis, accompanied by ocular symptoms such as dryness, irritation, and visual disturbance. It is broadly classified into aqueous-deficient dry eye (ADDE) and evaporative dry eye (EDE), with many patients exhibiting features of both types. The aetiology of DES is multifactorial, including aging, prolonged digital screen exposure, environmental factors such as low humidity and pollution, systemic diseases, hormonal changes, and use of certain medications. These risk factors contribute to tear film instability, tear hyperosmolarity, and inflammation of the ocular surface. The pathophysiology involves self-perpetuating vicious cycle of tear hyperosmolarity and inflammation

affecting the lacrimal functional unit, leading to reduced tear secretion and increased tear evaporation. The diagnosis of DES based on both subjective symptoms and objective clinical tests, including the Schirmer's test, Tear Film Break-Up Time (TBUT), ocular surface staining, and standardized questionnaires such as the Ocular Surface Disease Index (OSDI).

Therapeutic Approaches in Ayurveda for Netra Roga

Ayurveda adopts a holistic approach to the management of *Netra Rogas* by focusing on the pacification of vitiated *Doshas* and restoration of ocular health. Treatment includes both systemic therapies such as *Shamana* (palliative therapy) and *Shodhana* (purgation) along with local ocular procedures collectively known as *Kriyakalpa*, such as *Tarpana* (ocular lubrication therapy), *Aschyotana* (ocular instillation), *Anjana* (application of medicated collyrium), and *Putapaka* (ocular rejuvenation therapy). These therapies provide nourishment and lubrication, to the ocular tissue, improve visual function, and strengthen the eyes. When combined with proper diet and lifestyle modifications, they help alleviate symptoms, reduce disease recurrence and promote long-term ocular health.

Role of Tarpana Karma in Dry Eye Syndrome

Tarpana Karma is an important ocular therapeutic procedure described under *Kriyakalpa* in the *Ayurvedic* classics, indicated for management of various *Netra Rogas*, particularly those associated with ocular dryness and degenerative changes. Classical texts such as *Sushruta Samhita* and *Ashtanga Hridaya* elaborate its utility in improving ocular strength, nourishing ocular tissues and maintaining visual function. The procedure involves retaining medicated *Ghrita* over the eyes within a boundary prepared from black gram (*Masha*) flour for a specified duration, facilitating rejuvenation, nourishment and lubrication of ocular tissues. It is indicated in conditions like *Sushkakshipaka*, *Timira*, and other *Vata-Pittaja* disorders of the eye, while it is contraindicated in acute infections, excessive *Kapha* conditions, and immediately after *Shodhana* procedures⁵. The therapeutic efficacy of *Tarpana Karma* is attributed to the *Snigdha* (unctuous), *Sheeta* (cooling), and *Chakshushya* (eye-nourishing) properties of medicated *Ghrita*. These properties which help pacify vitiated *Doshas*, improve tear film stability, nourish the ocular surface and enhance visual function. Consequently, *Tarpana Karma* serves as an effective localized therapy for maintaining ocular health and managing chronic ocular disorders, including Dry Eye Syndrome⁶.

Table no.1 Matra Kala of Tarpana Karma

Condition of Eye	Affected ocular structure	Recommended Duration (Matra) ⁷
1. <i>Swastha</i>	Healthy eye	100 Matra
2. <i>Vartma roga</i>	Eyelid disorders	100 - 300 Matra
3. <i>Sandhi roga</i>	Conjunctival disorders	300 - 500 Matra
4. <i>Shuklagata roga</i>	Scleral disorders	500 - 700 Matra
5. <i>Krishnagata roga</i>	Corneal disorders	700 - 800 Matra

6. <i>Drishti roga</i>	Disorder affecting vision	800 -1000 <i>Matra</i>
7. <i>Adhimantha</i> (e.g. Glaucoma like condition)	Severe ocular disorders	Up to 1000 <i>Matra</i> ⁸

Mechanistic Insights into the Role of Tarpana Karma in Dry Eye Syndrome

Tarpana Karma is considered one of the principal *Kriyakalpa* procedures for the management of Dry Eye Syndrome because it addresses both the *Ayurvedic* pathogenesis of *Sushkakshipaka* and the underlying mechanisms of tear-film dysfunction. During the procedure, medicated *Ghrita* remains in prolonged contact with the ocular surface, creating a protective layer that minimizes tear evaporation and enhances tear-film stability. From an *Ayurvedic* perspective, the *Snigdha*, *Sheeta*, and *Chakshushya* properties of medicated *Ghrita* help pacify aggravated *Vata* and *Pitta* Doshas, relieve ocular dryness and burning sensation, nourish the ocular tissues, and restore

normal visual function. From a contemporary perspective, prolonged ocular retention of medicated *Ghrita* may improve lubrication of the ocular surface, reduce tear hyperosmolarity, modulate inflammatory responses, and support the integrity of the lacrimal functional unit. These effects collectively contribute to improved tear-film homeostasis, enhanced patient comfort, and relief of dry eye symptoms. Although the precise molecular mechanisms remain to be fully elucidated, the combined lubricating, anti-inflammatory, and tissue-nourishing effects of *Tarpana Karma* provide a plausible rationale for its use as an adjunctive therapy in the long-term management of Dry Eye Syndrome⁹.

Table no. 2 Previous clinical studies on Tarpana Karma in Dry eye syndrome and their effects

Eye disorders	Interventions	Main findings/ Effects
Dry Eye Syndrome (<i>Shushkakshipaka</i>)	<i>Triphala Ghrita</i> <i>Netra Tarpana</i> and <i>Goghrita Manda</i> <i>Netra Tarpana</i>	Significant improvement in symptoms such as dryness, burning sensation, foreign body sensation, Schirmer's test values, and Tear Break-Up Time (TBUT) ¹⁰ .
Computer Vision Syndrome	<i>Triphala</i> eye drops alone, <i>Triphala</i> eye drops + <i>Saptamrita Lauha</i> , placebo	Combined therapy produced the highest improvement (54.71%), followed by <i>Triphala</i> eye drops alone (48.89%), while placebo showed minimal improvement ¹¹ .
Dry Eye Syndrome	<i>Triphala Ghrita</i> <i>Netra Tarpana</i> and <i>Goghrita Manda</i> <i>Netra Tarpana</i>	Demonstrated statistically significant improvement in subjective symptoms and objective tear film parameters after 7-day <i>Tarpana</i> therapy ¹² .

Dry Eye Syndrome	Ghrita Netra Tarpana vs Sodium Hyaluronate eye drops	Netra Tarpana produced greater reduction in Ocular Surface Disease Index (OSDI), improved TBUT and Schirmer-I scores compared with artificial tears ¹³ .
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Clinical Evidence for Tarpana Karma in Dry Eye Syndrome

Available clinical evidence suggests that *Tarpana Karma* is a beneficial adjunctive therapy for Dry Eye Syndrome. Published studies have reported improvements in subjective symptoms, including ocular dryness, burning sensation, and foreign-body sensation, along with objective parameters such as Schirmer's test, Tear Film Break-Up Time (TBUT), and Ocular Surface Disease Index (OSDI) scores. However, the available evidence is limited by small sample sizes, heterogeneous treatment protocols, and short follow-up periods. Therefore, well-designed multicentre randomized controlled trials are required to establish the long-term efficacy and safety of *Tarpana Karma* in the management of Dry Eye Syndrome¹⁴.

DISCUSSION

Sushkakshipaka, described in *Ayurveda*, closely resembles Dry Eye Syndrome (DES) and is predominantly a *Vata-Pittaja* disorder characterized by *Rukshata* (dryness), irritation, burning sensation, foreign body sensation, and tear film instability. From a contemporary perspective, these features correlate with tear film hyperosmolarity, ocular surface inflammation, and epithelial damage, which are considered the key mechanisms underlying DES. *Tarpana Karma* is designed to provide prolonged contact of medicated *Ghrita* with the ocular surface, thereby enhancing lubrication, reducing friction during blinking, and improving tear

film stability. The lipid-rich nature of *Ghrita* supports the restoration of the tear film lipid layer, reducing excessive tear evaporation. The extended retention time of medicated *Ghrita* over the cornea facilitates sustained interaction of bioactive phytoconstituents with the ocular surface and allows trans corneal and transconjunctival diffusion into superficial ocular tissues. This prolonged residence time may improve drug bioavailability and therapeutic efficacy while protecting the ocular surface from desiccation¹⁵.

From an *Ayurvedic* standpoint, the *Snigdha*, *Sheeta*, and *Vata-Pitta Shamaka* properties of medicated *Ghrita* replenish the depleted *Snigdha* of ocular tissues, nourish the *Netra Dhatus*, and restore physiological homeostasis. Experimental studies have demonstrated that *Ghrita* based formulations can serve as effective lipid carriers for herbal constituents, while modern ophthalmic drug delivery research supports prolonged ocular retention as an important determinant of enhanced therapeutic response¹⁶.

The clinical improvement reported following *Tarpana Karma*, including better Schirmer's test values, Tear Break-Up Time (TBUT), Ocular Surface Disease Index (OSDI) scores, and symptomatic relief, may therefore result from both *Ayurvedic* principles and contemporary mechanisms involving tear film stabilization, anti-inflammatory activity, antioxidant effects, and enhanced ocular bioavailability¹⁷. Nevertheless, existing clinical evidence

remains limited by small sample sizes, methodological heterogeneity, and lack of standardized treatment protocols. Future multicentre randomized controlled trials incorporating objective biomarkers of ocular surface inflammation and advanced ocular imaging are required to further elucidate the mechanisms of action and establish the long-term efficacy and safety of *Tarpana Karma* in Dry Eye Syndrome.

Conclusion and Future Perspectives

Tarpana Karma is an effective *Ayurvedic* therapeutic modality in the management of *Sushkakshipaka*, correlating with Dry Eye Syndrome, by addressing the underlying *Vata-Pitta* vitiation and restoring ocular lubrication. Its *Snigdha*, *Sheeta*, and *Chakshushya* properties contribute to improved tear film stability, reduction in ocular discomfort, and enhancement of overall eye health. Classical *Ayurvedic* texts strongly support its use in various *Netra Rogas*, and emerging clinical evidence indicates its potential benefits in both subjective and objective parameters of Dry Eye Syndrome. However, to establish its wider acceptance in contemporary practice, further well-designed studies with larger sample sizes, standardized treatment protocols, and long-term follow-up are necessary. Future research integrating *Ayurvedic* principles with modern diagnostic and assessment tools can provide stronger scientific validation and promote the inclusion of *Tarpana Karma* as a complementary therapy in ocular care.

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