

Review Article

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“KRIYAKALPA (TARPANA) IN DRY EYE DISEASE: CLASSICAL BASIS, PROCEDURE AND CLINICAL EVIDENCE”**Dr. Abhay Gandhi¹****AFFILIATIONS:**

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ABSTRACT

Background: Dry eye disease is a common, multifactorial disorder of the ocular surface characterised by loss of tear film homeostasis, causing discomfort, visual disturbance and reduced quality of life. Its prevalence is rising with ageing, screen use and environmental factors. Ayurveda describes a similar condition, Shushkakshipaka, and treats it with Kriyakalpa, a group of local ocular procedures, of which Tarpana (retention of medicated ghee over the eyes) is the most characteristic. **Objective:** To review the modern understanding of dry eye disease, the classical description of Shushkakshipaka and Tarpana, and the clinical evidence for Tarpana in dry eye. **Methods:** Narrative review of Sushruta Samhita, international consensus reports on dry eye disease, and Ayurvedic clinical studies. **Results:** Shushkakshipaka is described as dryness, roughness, burning and difficulty in opening the eyes due to Vata and Pitta, closely matching dry eye symptoms. Tarpana involves building a dough wall around the eye and retaining lukewarm medicated ghee for a specified time. An open-label randomised comparative trial of Triphala Ghrita and Goghrita Manda Tarpana and several uncontrolled studies and case reports report improvements in symptoms, Schirmer test and tear film break-up time. No sham-controlled or masked trials have been published. **Conclusion:** Tarpana is a plausible lipid-based ocular surface therapy for dry eye, consistent with the importance of the tear film lipid layer. Masked, controlled trials using standard dry eye outcome measures are needed before firm conclusions can be drawn. **KEYWORDS:** Tarpana; Kriyakalpa; Shushkakshipaka; dry eye disease; tear film; Triphala Ghrita; Shalakya Tantra; ocular surface

INTRODUCTION

Dry eye disease (DED) is defined as a multifactorial disease of the ocular surface characterised by a loss of homeostasis of the tear film, accompanied by ocular symptoms, in which tear film instability and hyperosmolarity, ocular surface inflammation and damage, and neurosensory abnormalities play aetiological roles^[1]. Global prevalence estimates vary widely, from about 5% to 50% depending on definitions and populations^[2]. Hospital-based studies in India have reported high prevalence, with risk factors including age, female sex, screen use, environmental conditions and systemic diseases^[3].

DED is broadly classified into aqueous-deficient and evaporative types, with meibomian gland dysfunction being a major cause of evaporative dry eye^[4]. Management is stepwise, ranging from education, environmental modification and lubricants to anti-inflammatory therapy, punctal plugs and advanced treatments^[5].

Ayurveda describes a range of eye diseases in the Shalakya Tantra branch. Shushkakshipaka, literally “dry eye inflammation”, resembles DED. Ayurvedic treatment emphasises Kriyakalpa, local procedures for the eye, including Tarpana, Putapaka, Seka, Ashchyotana, Anjana, Pindi and Bidalaka^[6].

Tarpana, in which medicated ghee is retained over the eye, is widely used for dry eye in Ayurvedic practice. This review summarises the classical basis, procedure and evidence for Tarpana in dry eye.

METHODS

Classical sources were Sushruta Samhita, Uttara Tantra 6 (Shushkakshipaka) and 18 (Kriyakalpa)^[6]. Modern literature included the Tear Film and Ocular Surface Society Dry Eye Workshop II (TFOS DEWS II) reports and Ayurvedic clinical studies identified through PubMed, Google Scholar and Ayurveda journals using Tarpana, Kriyakalpa, Shushkakshipaka, dry eye and Netra Tarpana. This is a narrative review.

CLASSICAL DESCRIPTION OF SHUSHKAKSHIPAKA

Sushruta classifies Shushkakshipaka among the Sarvagata (diseases affecting the whole eye)^[6]. Its features include:

- Dryness and roughness of the eyes.
- Difficulty in opening and closing the eyelids (Kunita Varma).
- Burning sensation and a feeling of grittiness.
- Pain and redness.
- Desire for cool applications.
- Blurring of vision.

Table 1: Features of Shushkakshipaka and modern dry eye disease

Shushkakshipaka feature	Modern dry eye feature
Dryness, roughness, grittiness	Dryness, foreign body sensation
Burning sensation	Burning
Difficulty in opening and closing lids	Discomfort on blinking; lid margin disease
Redness	Conjunctival hyperaemia
Blurring of vision	Fluctuating vision due to tear film instability
Desire for cool applications	Symptom relief with cool compresses or lubricants
Aggravated by wind, dust, heat, staring	Aggravated by environment, screen use

Vata and Pitta are considered the main Dosha involved, with depletion of the unctuous and cooling

qualities that normally nourish the eye. Causes include exposure to wind, dust, heat and smoke, excessive weeping, staring at bright or minute objects, night waking and dry diet.

KRIYAKALPA AND TARPANA

Kriyakalpa

Kriyakalpa refers to local therapeutic procedures for the eye^[6].

Tarpana procedure

Classical texts describe Tarpana as follows^[6]:

1. Preparation: the patient's body is purified if needed; the procedure is performed in a calm room, in the morning or evening, on an empty stomach.
2. Position: the patient lies supine.
3. Barrier: a wall of dough made from black gram flour is built around each eye, sealing the orbit.
4. Ghee: lukewarm medicated ghee, liquefied in a warm water bath, is poured into the well until the eyelashes are covered.

5. Retention: the patient opens and closes the eyes gently while the ghee is retained for a duration that depends on the disease and the part of the eye affected, measured in Matra (a unit of time based on the duration of a blink or the time to say a syllable).
 6. Removal: the ghee is drained through an opening in the barrier, and the eyes are cleaned and fomented with warm water.
- Post-procedure care: the patient avoids bright light, wind and dust, and may receive Dhumapana (medicated smoke) to clear Kapha. Courses commonly last three, five or seven days, sometimes repeated.

Signs of correct, excessive and inadequate

Table 2: Kriyakalpa procedures

Procedure	Description
Seka	Pouring a thin stream of medicated liquid over the closed eyes
Ashchyotana	Instilling medicated drops into the eye
Pindi	Applying a medicated bolus wrapped in cloth over the closed eyes
Bidalaka	Applying medicated paste on the eyelids, sparing the lashes
Anjana	Applying collyrium to the lid margin
Tarpana	Retaining medicated ghee over the open eyes
Putapaka	Retaining a medicated juice extract prepared by a special process over the eyes

Tarpana

Sushruta describes the signs of proper Tarpana as comfortable sleep and awakening, clarity of vision, ability to tolerate light and lightness of the eyes; excessive Tarpana causes heaviness, stickiness and itching; inadequate Tarpana causes dryness and irritation^[6].

Commonly used ghees

Triphala Ghrita, Jivantyadi Ghrita, Mahatriphaladya Ghrita, Shatavari Ghrita and plain cow's ghee (Goghrita Manda, the clear upper part of ghee) are commonly used.

PROPOSED MECHANISMS

The tear film consists of a mucin layer adjacent to the epithelium, an aqueous layer and an outer lipid layer secreted by the meibomian glands, which slows evaporation^[4]. Meibomian gland dysfunction and lipid layer deficiency are major causes of evaporative dry eye^[4]. Tarpana exposes the ocular surface and lid margins to warm lipids for an extended period. Possible mechanisms include:

- **Warmth:** warming the lids may soften meibum and improve meibomian gland secretion, similar to warm compresses used in modern management of meibomian gland dysfunction^[5].
- **Lipid supplementation:** ghee lipids may temporarily supplement or stabilise the tear film lipid layer, analogous to lipid-containing artificial tears^[5].

- **Lubrication and protection:** a lipid layer may reduce friction between lids and the ocular surface.
- **Pharmacological effects:** herbs in medicated ghees, such as Triphala, may have antioxidant and anti-inflammatory effects.

These mechanisms are plausible but have not been studied directly with tear lipid analysis, meibography or interferometry.

CLINICAL EVIDENCE

Randomised comparative trial

An open-label randomised comparative clinical trial published in an Ayurveda research journal compared Tarpana with Triphala Ghrita and with Goghrita Manda in patients with Shushkakshipaka (dry eye syndrome)^[7]. Both groups showed improvements in symptoms and objective measures such as Schirmer test and tear film break-up time. The trial was open-label and compared two active Tarpana preparations, without a sham or standard-care control.

Other clinical studies

Several uncontrolled clinical studies have reported symptom relief with Tarpana or related ghees. An uncontrolled study of 50 patients treated with Mahatriphaladya Ghrita reported symptomatic relief in most participants^[8]. A study of Netra Tarpana with Triphala Ghrita evaluated clinical and pathological parameters in dry eye^[9]. Recent case reports describe multi-component Ayurvedic treatment including Tarpana, Seka, Nasya and Ashchyotana in dry eye,

with improvements in Schirmer test, tear film break-up time and Ocular Surface Disease Index scores^[10,11]. In one case of severe aqueous-deficient dry eye before cataract surgery, Schirmer test rose from under 1 mm to 5 to 7 mm and the Ocular

Surface Disease Index score fell from 50 to 10 over two months of combined treatment, although the authors noted that the contribution of individual procedures could not be determined^[10].

DESIGNING BETTER TRIALS

Table 3: Summary of evidence for Tarpana in dry eye disease

Study type	Example	Main finding	Certainty (authors' judgement)
Open-label RCT comparing two Tarpana ghees	Triphala Ghrita vs Goghrita Manda ^[7]	Both improved symptoms and tear tests	Low
Uncontrolled clinical study	Mahatriphaladya Ghrita, 50 patients ^[8]	Relief in most patients	Very low
Clinical study	Triphala Ghrita Tarpana ^[9]	Clinical and pathological improvement reported	Very low
Case reports	Multi-component treatment ^[10,11]	Improved tear tests and OSDI	Very low

Future trials of Tarpana should:

1. Diagnose DED using TFOS DEWS II criteria, including symptom questionnaires and at least one sign such as reduced tear film break-up time, increased osmolarity or ocular surface staining^[12].
2. Classify DED as aqueous-deficient or evaporative and assess meibomian gland function.
3. Compare Tarpana with standard care such as lubricant drops and warm compresses, and with sham procedures such as plain warm ghee or warm saline in a dough well.
4. Use masked outcome assessors.
5. Use validated outcomes such as the Ocular Surface Disease Index^[13], tear film break-up time, Schirmer test, corneal and conjunctival staining, tear osmolarity and meibography.

6. Follow patients for at least one to three months to assess durability.

7. Monitor safety, including infection, allergy and intraocular pressure.

INTEGRATING TARPANA WITH CONVENTIONAL DRY EYE CARE

Tarpana does not need to be positioned as an alternative to conventional dry eye management. The TFOS DEWS II management report recommends a staged approach, beginning with education, environmental modification, eyelid hygiene, warm compresses and lubricants, and progressing to anti-inflammatory agents and procedural therapies when needed^[5]. Tarpana shares features with several first-step measures, namely warmth, lipid delivery and rest of the eyes, and could reasonably be studied as an adjunct within this framework.

A practical integrated pathway could be:

Table 4: Integrating Tarpana with conventional dry eye care

Step	Conventional measure	Ayurvedic measure that could be evaluated alongside
Assessment	Symptom score, TBUT, staining, Schirmer, lid margin examination ^[12]	Assessment of Dosha, Prakriti and aggravating factors (Nidana)
Education	Screen breaks, blinking exercises, humidity, avoiding fans and air conditioning blowing on the face	Avoidance of Nidana such as staring, night waking and dry diet
Lid care	Warm compresses, lid hygiene	Seka or Pindi with warm decoctions
Tear supplementation	Preservative-free lubricants	Tarpana course, Ashchyotana

Step	Conventional measure	Ayurvedic measure that could be evaluated alongside
Systemic and general	Treating associated conditions, reviewing medications	Nasya, Padabhyanga (foot massage), dietary advice
Referral	Severe or autoimmune dry eye, corneal involvement	Specialist ophthalmic review before any local procedure

Practical considerations

Several practical issues affect how Tarpana is delivered and evaluated:

- **Standardisation of the medicated ghee:** batches differ in herbal content, moisture and microbial load. Studies should report the source, method of preparation (Sneha Paka), and quality tests, and ideally use ghee manufactured under Good Manufacturing Practice.
- **Temperature:** the ghee should be lukewarm; overheating risks lid burns, and cooling causes it to solidify. Checking temperature on the back of the operator's hand, as for other warm applications, is a minimum.
- **Hygiene:** fresh dough, clean instruments and single-patient portions of ghee reduce the risk of cross-contamination.
- **Patient tolerance:** some patients find keeping the eyes open in ghee uncomfortable at first; gentle instruction and gradual opening improve tolerance.
- **Visual blurring after the procedure:** patients should not drive immediately afterwards.
- **Contact lenses:** lenses must be removed before the procedure and not reinserted the same day.
- **Cost and time:** a full course requires several visits, which affects adherence; this should be measured in trials and compared with home-based treatments.

SAFETY

Tarpana is generally safe when performed hygienically. Possible adverse effects include temporary blurring, heaviness, itching, allergic reaction to ingredients and, theoretically, infection if ghee or equipment is contaminated. Medicated ghees should be prepared and stored under sterile or clean conditions. Tarpana should be avoided in active ocular infections, corneal ulcers and after recent eye surgery unless specifically indicated. Patients with severe DED, such as in Sjögren's

syndrome or graft-versus-host disease, need specialist ophthalmic care.

DISCUSSION

Shushkakshipaka corresponds closely to DED in its symptoms and aggravating factors, and Tarpana is a distinctive Ayurvedic treatment that delivers warm lipids to the ocular surface. Its plausibility is supported by modern understanding of the role of the tear film lipid layer and meibomian glands in dry eye. However, the clinical evidence remains weak, consisting mainly of open-label studies and case reports. Tarpana's procedure is distinctive and difficult to mask, which makes sham-controlled designs challenging but not impossible. Given the high prevalence of DED and the need for affordable treatments, well-designed trials of Tarpana are warranted.

CONCLUSION

Tarpana is a classical Kriyakalpa procedure that delivers warm medicated ghee to the eye and is widely used for Shushkakshipaka, which corresponds to dry eye disease. Its mechanisms are plausible in light of modern tear film physiology, and early clinical studies report improvements. Masked, controlled trials using TFOS DEWS II criteria and validated outcome measures are needed to establish its efficacy.

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