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## KRIYAKALPA – A GLIMPSE OF NETRAROGAS

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### ABSTRACT

Kriyakalpas, the specialized ocular treatment modalities, affirms the absolute necessity of unique approach towards netrarogas, thus highlighting the gravitas of eye and eye diseases. Many procedures and formulations have been described to cure the ophthalmic disorders. Present conventional system of medicine has topical and systemic administration of drugs to the eye which are highly inefficient and there is a need for controlled, sustained release, particularly for conditions that affect all parts of the eye. Sushruta, the father of ancient Indian surgery, advocated 'Kriyakalpa' is the main therapeutic procedure for Netra Rogas, along with other forms of treatment. He has described this in a separate chapter in Uttartantra of Sushruta Samhita. These procedures improve the vision by strengthening of the ciliary muscles, maintaining unctuousness of the eye ball, proper accommodation of the lens, delays the senile opacity of the lens etc. On the other hand these procedures also helpful in dealing with inflammatory conditions like conjunctivitis, hordeolum, corneal ulcer, staphyloma, panophthalmitis etc. Thus Kriyakalpa can be done in healthy as well as diseased eye conditions to improve the ophthalmic health. The probable mode of action and possible drug route of Kriyakalpas are yet to be explored

**KEYWORDS,** *Netra rogas, Kriyakalpa, Eye diseases.*

## INTRODUCTION

Shalakya Tantra, the branch of Ayurveda which deals with the Urdhwa-jatrugata rogas, gives prime importance to eye disorders as eye is the most important sense organ. Kriyakalpas are the specialized ocular treatment modalities explained in Ayurveda. No other single-organ is ascribed with such specific and exclusive modality of treatments. Thus the importance of eye and eye disorders are highlighted in this science. The probable mode of action and route of drug delivery of Kriyakalpas are yet to be explored. Such an attempt is made in this article which helps in establishing the scientific credibility of Kriyakalpa.

*Kriyakalpa* is the basis of the ophthalmic disorders, as *Panchakarma* is the basis of *Kayachikitsa*. When we refer to our classics for the therapeutic measures adopted in the management of eye diseases, we find that the management includes many of the topical treatments along with systemic ones. The reason might be that the drugs administered systematically may not cross the blood aqueous, blood-vitreous and blood-retinal barriers. Now the topical measures came into play and these are called as '*Kriya Kalpas*'

### **Etymology**

The word *Kriyakalpa* built from two words: *Kriya* and *Kalpa*. *Kriya* means therapeutic procedures for *Chikitsa* used to cure the disease and *Kalpa* means practicable, possible, manner of acting, a prescribed rule. So *Kriyakalpa* means

specific formulation used for therapy in Ayurvedic Ophthalmology. It includes selection of specific procedure, preparation of special drug form and finally its proper application to the eyes.

**Table** – Kriyakalpa as per various Acharya [1,2,3, 4]

Kriyakalpa	Charak	Sushruta	Sharangadhara	Bhavamishra	Chakradatta
<i>Seka</i>	-	+	+	+	+
<i>Aaschyotana</i>	+	+	+	+	+
<i>Anjana</i>	+	+	+	+	+
<i>Tarpana</i>	-	+	+	+	+
<i>Putpaka</i>	-	+	+	+	+
<i>Pindi</i>	-	-	+	+	+
<i>Bidalaka</i>	+	-	+	+	+



## MATERIAL AND METHOD

### Classification and Indication of *Kriyakalpa* [5,6,7, 8]

Kriyakalpa	Indication	Types	Duration	Mode of action
<i>Tarpana</i>	When a patient sees darkness / blackouts in front of eyes In severe dryness of the eyes Roughness of the eyes Stiffness of the eyelids Falling of eye lashes / Madrosis Injured eyes due to Abhighata, <i>Siraharsha</i> , <i>Arjuna</i> ,		i. <i>Vata</i> -1000 <i>Matra</i> ii. <i>Pitta</i> -800 <i>Matra</i> iii. <i>Kapha</i> -600 <i>Matra</i> b) According to <i>Adhithana</i> -i. <i>Vartma</i> -100 <i>Matra</i> ii. <i>Sandhi</i> -300 <i>Matra</i> iii. <i>Shukla</i> -500 <i>Matra</i> iv. <i>Krisna</i> -700 <i>Matra</i> v. <i>Drishti</i> -	By virtue of its <i>Sanskaranuvartana</i> property, <i>Ghrita</i> attains the properties of ingredients without losing its own. <i>Ghrita</i> is supreme in <i>Jangama Sneha</i> and is <i>Balavardhaka</i> , <i>Ojovardhaka</i> , <i>Vayasthapana</i> , <i>Agni Deepana</i> and <i>Dhatuposhaka</i> . According to <i>Charaka</i> , <i>Ghrita</i> is effective in subsiding <i>Pittaja</i>

	<i>Timira , Abhishyanda</i>		800 <i>Matra</i> <i>vi.</i> Sarvagata- 1000 <i>Matra.</i>	and <i>Vataja</i> disorders; it improves <i>Dhatus</i> and is overall booster for improving <i>Ojas</i>
<i>Putpaka</i>	<b>Snehana</b> <b>Putapaka –</b> <i>Rukshata</i> or <i>Ruksha netra</i> <i>Vata</i> disorders of the eye. <b>Lekhaneeya</b> <b>Putapaka –</b> <i>Snigdhatata</i> or <i>Snigdha netra</i> <b>Ropaneeya</b> <b>Putapaka -</b> <i>Pitta, Rakta</i> or <i>Vata</i> or eyes afflicted with <i>Vrana</i>	<b>Snehana</b> <b>Putapaka</b> <b>Lekhaneeya</b> <b>Putapaka</b> <b>Ropaneeya</b> <b>Putapaka</b>	200 <i>Matra</i> <i>kala.</i>  100 <i>Matra</i> <i>kala</i>  300 <i>Matra</i> <i>kala.</i>	<i>Due to suspension</i> <i>through ghee</i> <i>particles do not</i> <i>leave the eye and</i> <i>contact time is</i> <i>more and more</i> <i>drugs are</i> <i>absorbed. It will</i> <i>cross corneal</i> <i>epithelium barrier</i> <i>easily due to its</i> <i>lipophilic property</i>

<p><i>Seka</i></p>	<p>Itching in the eyes Watery eyes Conjunctivitis Burning eyes Dry Photophobia</p>	<p><i>Lekhna</i>  <i>Ropana</i>  <i>Snehana</i></p>	<p><i>200 Matra</i>  <i>600 Matra</i>  <i>400 Matra-</i></p>	<p>medicine is poured on closed eye (on eye lids) continuously from four inches height fir a specific time according to <i>Dosha</i>" so the medicine is absorbed through skin of lids.</p>
<p><i>Aaschyotana</i></p>	<p><i>Pitta Dosha,</i> eye condition like mild pain, redness, watering, foreign body sensation, itching, burning sensation, congestion of vessels, It is contraindicated in night.</p>	<p><i>Lekhana</i>  <i>Ropana</i>  <i>Snehana</i></p>	<p><i>8 drops</i>  <i>12 drops</i>  <i>10 drops</i></p>	
<p><i>Anjana</i></p>	<p>When the patient has undergone the</p>	<p><i>Lekhana</i>  <i>Ropana</i></p>	<p><i>In Morning it should be kapha</i></p>	

	<p><i>Shodhana</i> therapies of <i>Vamana</i> and <i>Virechana</i> and the <i>Niraama Dosh</i> are causing eye diseases, then <i>Anjana</i> should be done.</p>	<i>Prasadana</i>	<p><i>shaman Anjan</i> <i>In Evening pitta shaman Anjan</i></p>	
<i>Pindi</i>	<p>Acute stages of all eye diseases in general and <i>Abhishyanda</i> in particular</p>	<i>Abhishyandha, Adhimanth</i>		<p>It reduces inflammation produced due to trauma or wound. Mechanical effect of pressure helps in reducing IOP by dilatation of vessels &amp; drainage of aqueous (PINDI).</p>
<i>Bidalaka</i>	<p>Acute stages of eye disorder, burning sensation, swelling, discharge, redness, pain,</p>			<p>Dermal absorption of medicines.</p> <ul style="list-style-type: none"> <li>• By vasodilatation - helps in relieving the inflammatory conditions, congestion, irritation etc.</li> </ul>

	foreign body sensation etc.			<ul style="list-style-type: none"><li>• Increases local temp and facilitates drainage from the site of lesion.</li></ul>
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## DISCUSSION

### THE OCULAR PHARMACOKINETICS [9, 10, 11]

The drug pharmacokinetics from the eye follows the following paths

- Trans-corneal permeation from the lacrimal fluid into the anterior chamber.
- Non-corneal drug permeation across the conjunctiva and sclera into the anterior uvea.
- Drug distribution from the blood stream via blood-aqueous barrier into the anterior chamber.
- Elimination of drug from the anterior chamber by the aqueous humor turnover to the trabecular meshwork and Schlemm's canal.
- Drug elimination from the aqueous humor into the systemic circulation across the blood-aqueous barrier.
- Drug distribution from the blood into the posterior eye across the blood-retina barrier.
- Intra-vitreous drug administration.
- Drug elimination from the vitreous via posterior route across the blood-retina barrier.
- Drug elimination from the vitreous via anterior route to the posterior chamber.

### PROBABLE ROUTE OF ACTION

The probable mode of action of drug and its routes can be better explained in terms of the following anatomical structures:

### CORNEA:

- The main route of drug entrance to the aqueous humor is trans-corneal permeation
- The drug absorption limits from the lacrimal fluid by corneal epithelium

- The hydrophilic drugs have lower permeability in the cornea than Lipophilic drugs.
- Among our medicinal preparations Ghritas, Vasa, Majja oil etc are lipophilic.

### CONJUNCTIVA:

- Leaky epithelium

- Greater surface area.

- Permeable to the hydrophilic and large molecules (Swarasa, Kwatha, Arka).
- Dilution and excretion of the drug by tears also reduce the bio availability of topical ocular drugs (Aschyotana).

- Sustained release is more considerable (Anjana).

### SCLERA:

- More permeable than the cornea.

- it is Independent of drug lipophilicity.

- it is permeable to the large molecules of even protein size.
- Drug route: bulbar conjunctiva – sclera – choroid.

### VITREOUS:

- Lipophilic and Small molecules may diffuse rapidly into the vitreous (Ghrita, Vasa, Majja Oil).

- Free diffusion is present between the vitreous and the posterior chamber in the anterior region of the vitreous.

- In conditions if Blood Retinal Barrier is disrupted, drug delivery with sustained release from the vitreous to the choroid maybe possible.

#### **INTRA-VITREAL DRUG ELIMINATION:**

- Anterior route: vitreous- posterior chamber- aqueous turn overuveal blood flow.
- Posterior route: (lipophilic) active and passive transport – across posterior BRB.

#### **CHOROID AND RETINA:**

- Choroid has leaky walls and extensive blood flow.
- Small lipophilic drugs maybe more permeable
- The drug reaches the choroid and then across into the retina if BRB is disrupted through corneal and non-corneal route

#### **CONCLUSION**

Kriyakalpas are specialized treatment modalities which facilitates the ocular drugs to reach and act on the desired sites.

- Seka, Aschyotana, Pindi, Bidalaka are for the anterior segment of eye.
- Tarpana, Putapaka, Anjana are for both the anterior & posterior segments of eye.
- The medicaments, duration and dosage of kriyakalpas facilitate the bio availability of drugs e.g. Anjana is for sustained release.
- Putapaka is combination of lipo – hydrophilic drugs.

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