

## ASCHYOTANA, AADYA UPAKRAMA IN SARVA-AKSHI ROGA.

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### ABSTRACT

*Kriyakalpa*, (group of local ocular therapeutic procedures) specific formulations used for different therapeutic procedures, preparation of special medicaments and its proper application in appropriate disease has gained much importance in treating many of the eye diseases. The penetration of drugs in the ocular media after topical administration is one of the most interesting challenging part in pharmaceutical aspects of ophthalmology. The drugs administered through the various *kriyakalpas* has the ability to cross the blood aqueous, blood vitreous and retinal barriers. *Aschyotana* is one among the *kriyakalpa* which is having a vivid utility in many *netra rogas*, where in our *acharyas* have mentioned various *yogas* depending on the disease condition. As *panchakarma* is the bases of *kayachikitsa*, *kriyakalpa* are the main therapeutic procedures for *netra roga vignana* in *Shalaky tantra*. Special attention should be taken to maintain healthy vision as *Dalhana* states *drushti: pradhanatvat*.

**KEYWORDS:** *kriyakalpa, aschyotana, netrarogas. yogas.*

### INTRODUCTION

*Netra roga vignana* in *ayurvedic* literature comprises a major part of *shalaky tantra*, branch of *ashtanga ayurveda*. This fact is evidenced by vivid and systemic presentation of the subject matter. *Vagbhatacharya* says, all efforts should be made by a person to protect the eyes, throughout the period of life; for the person who is blind this world is useless, the day and night are the same even though he may have wealth.<sup>[1]</sup> Many local ocular therapeutics are explained in *ayurvedic* literature for the

cure of many dreadful diseases in the form of *kriyakalpas*.

The word *kriyakalpa* is derived from two words - *kriya* and *kalpa*.

*Kriya-kri dhatu +sa pratyaya*(to do/to perform/to practice)

*Kalpa-krip dhatu+ghan pratyaya*(specific formulation).

*Kriyakalpas* are the modified procedures which suits various physiological as well as pathological conditions of eye.

### Types of *kriyakalpa* according to different *acharyas*:

KRIYAKALPA	C.S	S.S	A.S	A.H	SHA.S	B.P	Y.R
TARPANA	+	+	+	+	+	+	+
PUTAPAKA	-	+	+	+	+	+	+
SEKA	-	+	+	+	+	+	+
ASCHYOTANA	+	+	+	+	+	+	+
ANJANA	+	+	+	+	+	+	+
PINDI	-	-	-	-	+	+	+
VIDALAKA	+	-	+	+	+	+	+

*C.S-Charaka samhita, S.S-Sushruta samhita, A.S-Ashtanga sangraha, A.H-Ashtanga hrudaya, SHA.S-Sharangadhara samhita, B.P-Bhavaprakasha, Y.R-Yogaratanakara.*

*Aschyotana*- Instillation of medicines in the form of drops from a height of two *angulas*.

*Seka*-Is the procedure of pouring the liquid medicines over the eyes from a height of four *angula*. It is indicated in diseases manifested in severe form.

*Anjana*-Is a procedure of applying medicinal pastes or powders to the inner side of lower lid, either by finger tip or with an applicator(*anjana shalaka*). It is indicated

when *doshas* are fully manifested and are localised in the eye.

*Pindi*-Is the modification of *vidalaka*. Instead of directly applying the pastes to eyelid, they are packed in thick cotton cloth and are kept tightly over the eyelids.

*Vidalaka*-Is the application of medicated paste to the outer surface of the eye lids.

*Tarpana*- It is the local procedure where the eyes are made to blink in medicated *sneha dravya* for a specified time, there by they are made to get *tripti*(satisfaction).

*Putapaka*-The procedure of *putapaka* is similar to *tarpana*, but the ingredients, preparation of medicine and durations are different.

### **Kriyakalpa Theatre**

*Vataataparajoheene veshmanyuttanashaayina*<sup>[2]</sup>  
*Krutaneela peetaayatarajavanike veshmaani*<sup>[3]</sup>

*Kriyakalpa* theatre should have proper ventilation, but devoid of excessively blowing wind, sun rays, or dust. There should be curtains(*javanika*) of dark colours like blue or yellow.

It should be equipped with materials and medicaments for the treatment and to manage complications(cause due to *mithyayoga*, *atiyoga* or *hinayoga*).

### **Purvakarma in kriyakalpa**

*Kriyakalpa* should be done after systemic cleansing of the body and head.

*Samshuddadehashiraso jeerna aanasya shubhadine*<sup>[4]</sup>  
*Deha shodana* is done depending upon *dosha dushiti*.

A course of *snehana*, *swedana*, *sira mokshana*, *vamana*, *virechana* and *basti* are necessary in the event of chronic eye diseases.

*Shiroshodhana* is achieved by *virechana nasya*, as it eliminates *doshas* from the head.

*Tarpanadi karma* should be performed only after *samsarjana karma*, the efficacy of the drugs or procedure are best achieved if done only after *samsarjana karma*, as *agni* is enhanced at cellular level with in the cell, increases the cellular absorbtion and assimilation thereby. *Ashchyotana* can be done during *shodhana karma*. But *ashchyotana* and *anjana* should not be done to the patients undergoing *tarpana*.

### **Aschyotana**

*Netrasechane chakshu: poorane samyakksharanasheeel cha*<sup>[5]</sup>

*Aschyotanam sarvaakshirogeshvaadya upakrama*<sup>[6]</sup>  
In all the diseases of the eyes, *aschyotana* is beneficial. It is the first line of treatment. (can be performed before the actual manifestation of the diseases).

### **Paribhasha**

*Kwathaksheeradrava snehabindunaam yattu paatanam/ Dwayangulonmeelite netre prokthamaaschyotanam hi tat*<sup>[7]</sup>

Instillation of *kwatha*, *ksheera*, *dravadravya*, or any *sneha dravyas* from two *angulas* of height into the opened eyes is known as *aschyotana*.

### **Bheda**<sup>[8]</sup>

*Snehana aschyotana-atiruksha netra.*

*Lekhana aschyotana-snigdha netra.*

*Ropana aschyotana-drushti balaprada, pittaraktha vrana nashaka* and *vata shamaka*.

### **Matra**<sup>[9]</sup>

*Snehana aschyotana*-10 drops.

*Lekhana aschyotana*-7-8 drops.

*Ropana aschyotana*-12 drops.

*Prakuncha: sheishmike vyadhou paanishukthishcha vaatike//*

*Aschyotana pramanam syaad dwe shukthi chasrapaithike/*

*Athava aschyotana yaavadeeyamanan sahennara: //*<sup>[10]</sup>

DOSHA	PRAMANA
Sleshma	Prakuncha
Vata	Pani shukti
Pitta and Rakta	Dwe shukti

### **Aschyotana nirdesha**<sup>[11]</sup>

Based on *doshic* predominance in the disease *aschyotana* is done as the first line of treatment. If the condition is not in *prabala avastha aschyotana* should be done. Because of the combination of different *dravyas* as *kalpana* it readily relieves *netra ragata*(redness), *ashru*(lacrimation), *sangharsha*(foreign body sensation), *ruk*(pain), *daha*(burning sensation), *toda*(pricking sensation), *paka*(suppuration), *sopha*(inflammation), *kandu*(itching sensation).

### **Karana Kala**<sup>[12]</sup>

Dosha	Type of ashchyotana	Time
Kapha	Lekhana	Purvahna
Vata	Snehana	Aparahna
Pitta and Rakta	Ropana	Madhyahna

- ❖ *Tayorakaalo raathri:kaalastu sarvamaharvedanotpattirva*<sup>[13]</sup>
- ❖ *Tasya kaalo diva sarvo yaamashcha pratham nishi*<sup>[14]</sup>
  - It should not be done during night time.
  - In case of severe pain, *aschyotana* should be done immediately.
  - According to *Shodala*, it can be done at any times in day and in first *yaama* of night.

**Dharana kala**

As per *Yoga ratnakara*, *Bhavaprakasha* and *Sharangadhara – vaakshatam*.

**Mode of action of Ashchyotana<sup>[15]</sup>**

The medicine dropped into the eye, entering into the channels of the head, nose, face eliminates the *malas* which have localised in the upper part of the body.

*Aschyotana* is indicated in acute phase of inflammation as there will be the increase in the corneal and conjunctival epithelium permeability due to which absorption will be more.

*Aschyotana kriyakalpa* is contraindicated at night, owing to pupil being dilated and the angles of the anterior chamber are partially closed thus impeding the drainage of aqueous humour so that, *aschyotana sechanarupa*, proper cleansing effect is not achieved.

**Ayogya aushadha<sup>[16]</sup>**

<b>Dravya/kalpna</b>	<b>Parinama</b>
<i>Atyanta ushna or atyanta teekshna aschyotana.</i>	<i>Daha, raga, paka, drushti dourbalya.</i>
<i>Atyanta sheeta aschyotana.</i>	<i>Stambha, ashru, sangharsha, nistoda, vedana.</i>
<i>Atimatra aschyotana.</i>	<i>Vartma sankoca, sphurana, kashayavartma, Sangharsha, pravata asahatva.</i>
<i>Atyanta nyuna matra aschyotana.</i>	<i>na roga shanti, shotha.</i>
<i>Aparisruta dravya.</i>	<i>Ashrusrava, gharsha, vedana.</i>

**Aschyotana dravya**

The temperature of the liquid medicines is decided on the basis of *dosha dushti*.

It should not be more *teekshna* or *ushna* or *sheeta*. It should not be instilled in more quantity. The formulation should be well filtered.

*niranna*. On fourth day, depending on the condition of the disease *aschyotana* should be done.

**The medicines should be.**

<b>Quality of the medicine</b>	<b>Doshadushti</b>
<i>Ushna</i>	<i>Vataja rogas</i>
<i>Koshna</i>	<i>Kaphaja rogas</i>
<i>Sheeta</i>	<i>Pitta and raktaja rogas.</i>

**Pradhana karma**

- The patient should be comfortably lying down in supine position, in *kriyakalpa* theatre.
- The eye is opened by stretching and pressing *apanga pradasha* by left hand.
- The medicine can be held either in a conch shell with a piece of cotton.
- Holding the medicine in right hand, instilled to the *kaninika sandhi/vartma-shukla sandhi* of opened eye based on the type of the disease.
- In case of *kaphaja netra roga*, the *sukhoshna dravya* should be taken. In case of *pittaja* and *raktaja netra roga*, *sheeta dravyas* should be taken.
- The medicine should fall on the eye from a height of two *angulas*.
- *Dharana kaala* of the *aushada* is *vaak shatam*.
- The medicines remaining in the eye should be wiped out with a piece of cotton or soft cloth immediately.

Similarly the qualities like *rasa, guna* etc. are modified to counteract *dosha dushti*.

<b>Dosha dushti</b>	<b>Aschyotana guna</b>
<i>Vata</i>	<i>Tikta rasa, snigdha guna.</i>
<i>Pitta</i>	<i>Madhura rasa, sheeta guna.</i>
<i>Kapha</i>	<i>Tikta rasa, ushna-ruksha guna.</i>

**Vidhi<sup>[17]</sup>****Purva karma**

According to *Videha*, first three days one should take *laghu ahara* or he should do *upavasa* or he should be in

**Pashchat karma**

A mild fomentation with warm water is beneficial in *kapha-vata* diseases and not in *pittaja* and *raktaja* diseases.

**Samyak yoga, atiyoga, hina yoga lakshanas<sup>[18]</sup>**

The *lakshanas* are similar to *tarpana samyak yoga, atiyoga* and *hina yoga*. Those are as follows.

<b>Samyak yoga</b>	<b>Atiyoga</b>	<b>Hinayoga</b>
<i>Sukhaswapna-avabodhana</i>	<i>Guru</i>	<i>Ruksha</i>
<i>Vaishadyam</i>	<i>Avila</i>	<i>Avila darshana</i>
<i>Varna patavan</i>	<i>Ati snigdha</i>	<i>Ashru adhyam</i>
<i>Nivrutti vyadividwamsa</i>	<i>Ashru</i>	<i>Asaha rupa darshana</i>
<i>Kriyalaghava</i>	<i>Kandu</i>	<i>Vyadhi vridhhi.</i>
<i>Prakasha kshamata.</i>	<i>Upadeha.</i>	

**Pratikara in atiyoga**

In kapholbana	In vatolbana
Ruksha dhuma	Snigdha dhuma
Ruksha nasya	Snigdha nasya
Ruksha anjana	Snigdha anjana
Ruksha seka	Snigdha seka

**Pratikara in hinayoga**

In kapholbana	In vatolbana
<u>Ruksha dhuma</u>	Snigdha dhuma
<u>Ruksha nasya(pradhamana nasya)</u>	Snigdha nasya
<u>Ruksha anjana</u>	Snigdha anjana
<u>Ruksha seka</u>	Snigdha seka

**Vividha Aschyotana Yogas****Samanya Aschyotana Yogas**

Yoga	Dravyas	Reference
AMALAKA SWARASA PRAYOGA	The swarasa extracted by crushing fresh fruit of amalaki.	Chakradatta 59/6.
SHIGRU PALLAVA SWARASA	Shigru pallava swarasa with madhu.	Yoga ratnakara, Netrarogadhikara.
YASHTIMADHU KWATHA	Thick swarasa of daruharidra with madhu.	Yoga ratnakara, Netrarogadhikara.
STREE DUGHDA PRAYOGA	After birth, for upto 4/5/6 <sup>th</sup> months stree dugdha can be used for any netra roga.	Kashyapa samhita-kalpa-4.
SWARNA PRAYOGA	Ksheera, madhu, shankhanabhi with swarna is trichurated in copper vessel and that is used for aschyotana.	Kashyapa samhita-kalpa-4.

**Roganusara Aschyotana Yogas.**

Roga nama	Yogas	Reference
VATIKA NETRA ROGA	Kashaya prepared out of Eranda mula, jayanti, bruhati, madhu shigru, bilvadi panchamula.	Cha-chi-26, 237.
PAITTIKA NETRA ROGA	Sheeta kashaya prepared from Prithvika, darvi, manjishta, laksha, dwi madhuka, utpala, sharkara.	Cha-chi-26,238.
KAPHAJA NETRA ROGA	Kashaya prepared from nagara, triphala, musta, nimba and vasa.	Cha-chi-26,239.
	Rasanjana, dwe haridra, swadamshtra, vishwa bhesaja,, madhu samyukta.	Gadanigraha-125.
RAKTA PITTA ANILA NETRA ROGA	Stree stanya.	Sha sam, Uttarakhanda -13/20.
VATA RAKTAJA NETRA ROGA	Ksheera sarpi ghrita. Eranda mula saphala praroha milk.	Sha sam, Uttarakhanda -13/20. Gadanigraha, Netrarogadhikara -126.
PITTA VATAJA NETRA ROGA	Prapoundarika, madhuka haridra, aja paya.	Gadanigraha, Netrarogadhikara-126.
NAVINA ABHISHYANDA	Netra purana with amalaki swarasa.	Chakradatta59/6.
VATAJA ABHISHYANDA	Saindhava, udichya, yashtavha, pippali, paya.	Su sam.Ut -9/12.
	Hribera, tagara, manjishta,udumbara twak, chaga paya.	Su sam.Ut – 9/13.
	Daru haridra kashaya with madhu.	Ash san.Ut-21/6.
	Eranda pallava mula with ajakshera.	Ash san.Ut-21/6.
	Salaparni, prishnaparni, bruhati, madhuka, urubaka, ajaksheera.	Ash san.Ut-21/6.

	<i>Tagara, hribera, shangoshta, udumbara, madhuk, pippali, bruhati dwaya, erandamula.</i>	<i>Ash san.Ut-21/6.</i>
	<i>Amshumati dwaya, bruhati, kantakari kept in sura, Madhya, dhanyamla or kept in anupa mamsa, amla kwatha.</i>	<i>Yoga ratnakara Netraroghadhikara .</i>
	<i>Koshna kashaya prepared out of bilvadi panchamula, bruhati, eranda, shigru.</i>	<i>Bhava prakasha, Madhyama khanda, 63/153.</i>
	A piece of <i>lodhra</i> bark is covered with a paste of leaves of <i>nimba</i> . After it dries up slightly, the bark is warmed on fire and juice extracted by pressing it.	<i>Sha.sam, Uttara khanda,13/17.</i>
	<i>Bilvadi panchamula bruhati randa shigru kwatha.</i>	<i>Sha sam, Uttara khanda, 13/17.</i>
	Stree dugdha prayoga.	<i>Yoga ratnakara Netraroghadhikara.</i>
<b>PITTAJA ABHISHYANDA</b>	<i>(a)Sagaraphena macerated with woman's milk and added with honey.</i>	<i>Su Sam,ut 10/11-12.</i>
	<i>(b) yashti, rodhra, draksha, sharkara and utpala or yashti and rodhra macerated with ghee.</i>	<i>Su Sam,ut 10/11-12.</i>
	<i>(c) kashmari, dhatri and pathya macerated in water.</i>	<i>Su Sam,ut 10/11-12.</i>
	<i>(d) katphala macerated in water; any of these(a-d) made as kalka should be held inside linen cloth and juice is taken.</i>	<i>Su Sam,ut 10/11-12.</i>
	<i>Prapoundarika, amalaka, dwi bruhati, darbha, dashamula, shatavari, talisapatra, manjishta, neeloypala kwatha,sita sthanya.</i>	<i>Ash san,Ut, 19/19.</i>
	<i>Madhuka, kantakari niruha.</i>	<i>Ash san, Ut, 19/19.</i>
	<i>Kshoudra, chandana, madhuka, lodhra, manjishta, swarnagairika kwatha(teevra shula, daha hara). Stree dugdha prayoga.</i>	<i>Yoga ratnakara Netraroghadhikara. Yoga ratnakara Netraroghadhikara.</i>
<b>RAKTAJA ABHISHYANDA</b>	<i>Aschyotana done with rain water in which powder of kasheru and madhuka kept in a cloth bag has been soaked is beneficial.</i>	<i>Su, Sam,ut 12/10</i>
	<i>Antariksha jala is specifically mentioned to soak drug. Stree dugdha prayoga.</i>	<i>Gadanigraha, Netrarogadhikara Yoga ratnakara, Netraroghadhikara.</i>
<b>SARVA ABHISHYANDA</b>	<i>Triphala kashaya.</i>	<i>Bhava prakasha, Madhyama khanda, 63/152.</i>

		<i>Sha sam, Uttara khanda ,13/19.</i>
PAITTIKA TIMIRA	<i>Tikta rasa pradhana sheetala dravya aschyotana is indicated.</i>	<i>Yoga ratnakara, Netraroghadhikara.</i>
KAPHAJA TIMIRA	<i>Yuthi, pathya, kana, shunti, kusuma pushpa swarasa, water taken from the falls of forests, shunti boiled in gomutra.</i>	<i>Yoga ratnakara, Netraroghadhikara.</i>
SANNIPATIKA TIMIRA	<i>Shigru pallava swarasa.</i>	<i>Yoga ratnakara, Netraroghadhikara.</i>
LINGANASHA	<i>Rodhra, saindhava, draksha, madhuka and chagala paya ksheera paka.</i>	<i>A.H-ut-14</i>
ARJUNA	<i>Aschyotana done with sour liquids or sita, madhuka, katvanga, mastu, ksaudra, amla and saindhava; or sour juice of bijapuraka, kolamla and dadimamla may be used either once, twice or thrice in day.</i>	<i>Su-sam-ut-12/19-20</i>
	<i>Sarkara, mastu, kshaudra.</i>	<i>A.H-ut-11.</i>
NETRA PAKA	<i>Nagara together with saindhava is soaked in ghee for one month, this ghee mixed with woman's milk (especially in sasopha).</i>	<i>Su-sam-ut-12/43.</i>
	<i>Eravaru, pundarika should be taken in equal quantity to this 16 parts of milk and 64 parts of water is added and it should be reduced to ksheeravashehsa (16 parts).</i>	<i>Yoga ratnakara, Netraroghadhikara.</i>
KUKUNAKA	<i>Ghee boiled with guduchi or triphala.</i>	<i>Su-sam-ut-19/13.</i>
SHUKRA ROGA	<i>Cold infusion of amalaki, nimbapatra, kapittapatra, yashtimadhu, lodhra, khadira and tila.</i>	<i>Chakradatta, 59.</i>
	<i>Tutta dissolved in water cures shukra.</i>	<i>Chakradatta, 59.</i>
	<i>Yashtimadhu, daruharidra, utpala, padma, laksha, prapoundarika, nalambu boiled along with stree paya.</i>	<i>Yoga ratnakara, Netra roghadhikara.</i>
	<i>Equal quantity of jati, pravala and madhuka is fried with ghrita and boiled with water. After cooling it should be used for aschyotana. If it is done by using stree paya it will be more beneficial.</i>	<i>Yoga ratnakara, Netra roghadhikara.</i>
POTHAKI	<i>Aamra, jambu, pravala kwata.</i>	<i>Ash san, Ut-12/7</i>
	<i>Madhuyukthana triphala kwatha.</i>	<i>Ash san, Ut-12/7</i>
	<i>Kashaya prepared out of patola and amalaka.</i>	<i>Chakradatta, 59.</i>
	<i>Phanijjaka swarasa mixed with lashuna swarasa.</i>	<i>Chakradatta, 59.</i>
AJAKAJATA	<i>Shweta karkataka should be kept inside vata patra for one month. After that the swarasa should be extracted</i>	<i>Yoga ratnakara Netraroghadhikara.</i>

	by the method of <i>putapaka</i> . From the method of <i>nirdhuma agni</i> , <i>shambuka mamsa</i> should be cooked, after cooling <i>karpoora churna</i> is added and used as <i>aschyotana</i> .	<i>Yoga ratnakara</i> <i>Netrarogadhikara</i> .
PARVANI	<i>Saindhava</i> is mixed with <i>madhu</i> and used as <i>aschyotana</i> .	<i>Yoga ratnakara</i> <i>Netrarogadhikara</i>
UPANAHA	<i>Kashaya</i> prepared out of <i>patola patra</i> and <i>amalaki</i> .	<i>A.H-ut-14</i>
NETRA SHULA	Milk boiled with seeds of <i>karanja</i> , <i>amalaka</i> fruits and <i>madhuka</i> added with honey is ideal for <i>aschyotana</i> to be done twice a day ( <i>avastika shula</i> ).	<i>Su-sam-ut-15</i>
	<i>Saindhava</i> and <i>lodhra</i> should be fried along with <i>ghrta</i> then it should be done <i>mardana</i> with <i>kanji</i> . This is squeezed using <i>shweta vastra</i> and used as <i>aschyotana</i> .	<i>Yoga ratnakara</i> <i>Netrarogadhikara</i> .
	<i>Aschyotana</i> with the <i>stanya</i> processed with <i>haridra</i> , <i>mustaka</i> , <i>triphala</i> , <i>daruharidra</i> , <i>sarkara</i> and <i>madhuka</i> mixed with <i>nari ksheera</i> .	<i>Chakradatta, 59.</i>
	<i>Lodhra churna</i> is fried with <i>ghrta</i> or equal quantity of <i>sharkara</i> and <i>triphala churna</i> with water can be used for <i>aschyotana</i> .	<i>Yoga ratnakara</i> <i>Netrarogadhikara</i> .
KLINNA VARTMA	<i>Musta</i> , <i>haridra</i> , <i>madhuka</i> , <i>priyangu</i> , <i>Siddhartha</i> , <i>rodhra</i> , <i>utpala</i> , <i>sariva</i> .	<i>Su Sam, ut- 13/48</i>
SHOPHA, SHULA	<i>Draksha</i> , <i>madhuka</i> , <i>manjishta</i> , <i>jeevniya shruta paya</i>	<i>Gadanigraha, Netrarogadhikara</i>
	<i>Sindhutha</i> , <i>rodhra</i> , <i>sita</i> , <i>jeeraka</i> , <i>tintidaka</i>	<i>Gadanigraha, Netrarogadhikara</i>
SHUDDHA SHUKLA	<i>Haridra</i> , <i>madhuka</i> , <i>sariva</i> , <i>lodhra kashaya</i> .	<i>Ash san, 14/23</i>
SHUSHKAKSHIPAKA	<i>Darvi prapoundarika kwatha</i>	<i>Ash san, ut 20 – 2</i>
	<i>Manjishta, madhuka, kalanusari lodhra, laksha, prapondarika, - raktha raji</i>	<i>Ash san, ut 20 – 2</i>
	<i>Mridvika, chandana kalka</i>	<i>Ash san, ut 20 – 2</i>
NETRA ABHIHATA	<i>Sheeta ashchyotana</i> .	<i>Yoga ratnakara,</i> <i>Netrarogadhikara</i> .
	<i>Haridra, triphala, darvi, sita, madhu</i> .	<i>Yoga ratnakara,</i> <i>Netrarogadhikara</i> .
	<i>Nishabdha, triphala, darvi, sita, madhuka stree paya</i> .	<i>Gadanigraha,</i> <i>Netrarogadhikara 171.</i>
AGANTUJA NETRA ROGA	<i>Stree paya</i> .	<i>Gadanigraha,</i> <i>Netrarogadhikara-169.</i>
RUK -SWAYATHU	<i>Saindhava, rodhra, sita, jeeraka, tintidaka patra, Churna kept in cloth</i> .	<i>Gadanigraha, Netrarogadhikara-123.</i>
KANDU -DAHA –RUJA	<i>Saindhava rodhra aja brushtam souvira mardana kept in cloth and</i>	<i>Gadanigraha, Netrarogadhikara-</i>

	immersed in water.	124.
ARMA SHASTRA KARMOTTARA	Lodhra, madhuka, kimshuka, patola, dwi haridra, eranda, mukula kwatha.	Ash San, Ut-14/12.

### Eye Drops<sup>[19]</sup>

Eye drops are sterile, aqueous or oily solutions or suspensions, meant for instillation into the eye. Eye drops should be sterile, free from foreign particles and irritating effect. They should also contain a suitable preservative and be adequately buffered. Wherever possible, aqueous eye drops are made isotonic with lacrimal secretions. One important property of the eye drops is the partitioning of the drug from the vehicle to the ophthalmic tissue.

Eye drops may contain antimicrobial substances such as antibiotics, anti-inflammatory agents such as physostigmine sulphate, or mydriatics drugs such as atropine sulphate. Oily eye drops are not generally used. Some sustained action eye drops have also been marketed recently.

### METHODS OF PREPARATION

Eye drops can be prepared by any of the following methods

- (a) sterilization by filtration followed by aseptic transfer to a sterile container which is then closed aseptically to exclude microbial contamination.  
(b) sterilization by heating in an autoclave after filtration and sealing in the final container.
- Heating at 98 to 100 C for half an hour after filtration and sealing in the final container. The eye drops must be freshly prepared.
- It is the process of 'heating with a bactericide', similar to method (2) but incorporating a suitable powerful bactericide in addition. The eye drops must be freshly prepared.
- Preparation by asepsis when the vehicle is oily. Eye drops need not be prepared freshly.

Whatever method is used in the preparation, the eye drops should be subjected to 'test for sterility'.

### Mode of action of eye drops

In *eye drops*, the drug employed in the conjunctival sac in the form of aqueous solution or lipophilic solution, the period of tissue contact is very less; hence the bio-availability is very short. 80% of each drop is instantaneously drained through the naso-lacrimal duct. The aqueous solution of (decoction/aqueous extracts) different plant materials containing the active principles in the assimilable form facilitates absorption. The dose of drug applied at one time vary from 8-12 drops; mass drug action phenomenon also play a role in absorption.

### Factors to be observed are

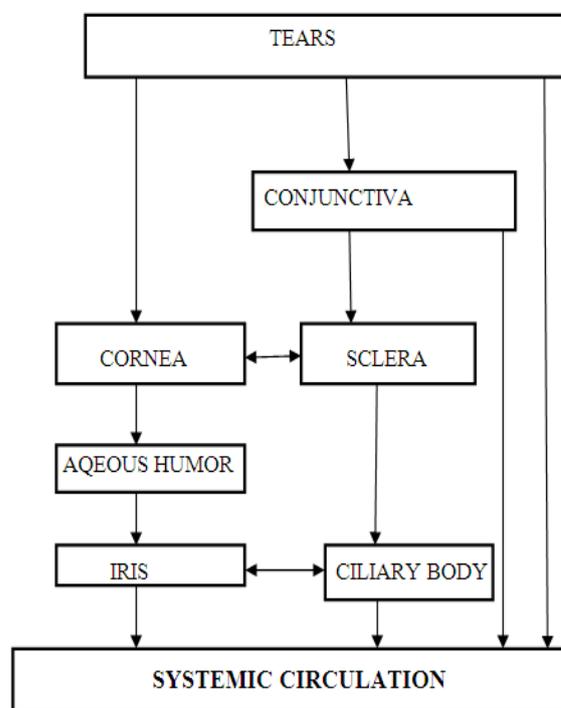
- Physical state of drug
- Route of drug administration.
- Solubility and bio-availability.
- Absorbing surface.
- Absorption (time and rate of absorption).
- Vascularity of the surface.

- Compliance.
- Excretion of the drug.

### Ocular Pharmacology<sup>[20]</sup>

**Absorption:** After topical instillation of a drug, the rate and extent of absorption are determined by the time the drug remains in the cul-de-sac and precorneal tear film, elimination by nasolacrimal drainage, drug binding to tear proteins, drug metabolism by tears and tissue proteins and diffusion across the cornea and conjunctiva.

### Possible absorption pathways of an ophthalmic drugs following topical application to the eye.



### Systemic Circulation

Naso lacrimal drainage contributes to systemic absorption of topically administered ophthalmic medication. Transcorneal and trans conjunctival / sclera absorption are the derived routes for localised ocular drug effects. The drug concentration gradient between the tear film and the cornea and conjunctival epithelium provides the driving force for passive diffusion across these tissues.

**Distribution:** Topically administered drugs may undergo systemic distribution primarily nasal mucosal absorption and possibly by local ocular distribution by transcorneal or transconjunctival absorption. Following transcorneal absorption, the aqueous humour accumulates the drug, which then is distributed to intraocular structures as well

as potentially to the systemic circulation via the trabecular meshwork pathway.

**Metabolism:** Enzymatic biotransformation of ocular drugs may be significant because a variety of enzymes, including esterases, oxidoreductases, lysosomal enzymes, peptidases, glucuronide and sulphate transferase, mono amine oxidase and 11 beta hydroxysteroid dehydrogenase are found in the eye. The esterases have been of particular interest because of the development of prodrugs for enhanced corneal permeability. Topically applied ocular drugs are eliminated by the liver and kidney after systemic absorption.

## CONCLUSION

The drugs given orally will undergo digestion under the influence of *pachaka pitta*. The drugs administered through *kriyakalpa* are not digested by its influence but helps to rectify the locally accumulated *doshas*. The oral drugs find difficult to cross blood-aqueous, blood-vitreous and blood-retinal barriers to reach target tissues of the eye. The topical drugs can reach there and achieve higher bio-availability. The tissue contact time of the drugs can be controlled in *kriyakalpa* and they are selected depending upon the stage and severity of the disease. The medications can be judiciously selected i.e., to increase *ushna* or *sheeta*, *snigdha* or *ruksha* as required by the ocular tissue. Intra ocular penetration of topically instilled drugs is determined by corneal epithelium. Stroma allows rapid passage of the drug through endothelium into the anterior chamber. Thus by topical application of the proper drugs in the form of *aschyotana* based on the condition of the *doshic* involvement good results can be achieved for the betterment of the patients.

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