



## ROLE OF OCULAR REJUVENATION MODALITIES IN PREVENTIVE OPHTHALMOLOGY

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### ABSTRACT

Vision 2020 is a global initiative that aims to eliminate avoidable blindness by the year 2020. It is a collaborative effort of many programmes, which comes under Community ophthalmology or preventive ophthalmology, to improve eye care programs; gaining and sharing knowledge and think solutions together to achieve quality, comprehensive and equitable eye care. Our exacting and demanding lifestyle has resulted in many ailments including adverse effect on eyes. In present era, there are lots of causes which can disturb the natural health of eyes like continuous work on computer, watching television for long time, very frequent & prolong use of mobile phones, late night arousal, pollution, reading in poor source of light, unhealthy dietary habits physical and mental stress. Association between such defective lifestyle measures and subsequent eye diseases and their prevention procedures are searched and reviewed from different Ayurvedic literatures and online sources. Ayurveda which gives great significance to maintaining the health through its main "Swasthyaswasthya rakshanam" ideal, gives an elaborate account of protection of eyes and preservation of vision. In this consideration centuries ago our Acharyas has described many non pharmacological modalities while describing the dincharya (daily regime) and ritucharya (seasonal regime) and pathya- apathya (dietary regime), yogabhyasa, ocular exercises and many other discrete reference throughout the text are also available to rejuvenate ocular tissue. So an attempt has been made to explore the procedures for preservation of eye health in relation to certain factors like- relation of eye diseases with mind, diet and activities, sleep, daily and seasonal regimen related to eye health, occupational eye health and disorders, aging process and poor vision and rasayan (Rejuvenation) therapy for preserving good vision. Time tested procedures like Anjana (collyrium), Aschyotan (eye drop), Snana(bath), Padabhyanga (foot massage with oil), Nasya (nasal application of drugs), Abhyanga (oil massage) are considered as highly effective daily procedures for the maintenance of eye health. Various Yogasan and Satkriya and ocular exercises are also effective for ocular health and better eye sight.

**KEYWORDS:** Non Pharmacological, Eye rejuvenation modality, Ocular exercises, preventive ophthalmology,

### INTRODUCTION

Community Ophthalmology Or Preventive ophthalmology was described as a new discipline in medicine promoting eye health and blindness prevention through programs utilizing methodologies of public health, community medicine and ophthalmology in 1978. It emphasize the prevention of ocular diseases and visual impairment; reduction of ocular disability; and promotion of ocular health, quality of life and efficacy of a group of people at community level. This new discipline was first proposed by Bath in 1978 after observations of epidemics rates of preventable blindness among underserved populations in urban areas.

The concept of community ophthalmology has become mere relevant and essential to achieve the goal of Vision 2020: 'The Right to Sight' and to accomplish the theme

behind Vision for the Future (VFTF). There are 5 major causes recognised by Vision 2020 for preventable blindness.

Ayurveda being a science of life style plays an important role in preventive ophthalmology.

Ayurveda is ancient system of medicine which aims not only in cure of the disease but also prevent the humanity from all categories of physical, mental, intellectual and spiritual miseries. Among all the sense organs eyes are considered to be very important because vision is crucial for social and intellectual development of a person. It is rightly quoted by Vagbhatacharya, stating the importance of eyes "Once the vision is lost, the different kind of things of the world will all become one kind only, that of darkness". It is also emphasized that "an eye can

perceive forms, it adorns the face". It is a source of direct knowledge and it is a guide to avoid wrong deeds. It is proved that about 80% of the knowledge we gain is through the eye. So the existence and status of a person in this universe is directly influenced by the eye. So one has to take necessary efforts to take care of the methods for prevention of eye diseases. Prevention medicine deals with the measures to protect the individual from different affection and keep them in a state of positive health. For this we ensure prerequisites, supply of fresh air, supply of safe and unpolluted water, wholesome diet, environmental sanitation, congenial social and cultural atmosphere. Ayurveda teaches us how to lead a healthy life style. Ayurveda is mainly a science of health not the science of diseases and cure. It does not aim at creating only the health of individual but simultaneously provides prescription and prohibitions for the maintenance of healthy living. The knowledge of preventive ophthalmology was much organised during samhita and mediaval period. Unlikely the preventive aspects of ocular health and eye diseases not been given due importance in daily life in today's era. Vision is also affected as consequence of faulty lifestyle. Smoking cigarette, tobacco, alcohol consumption, high fat diet and junk food, chronic stress, prolonged exposure to bright light, working in computer for long time etc are few examples which exert damage to the ocular tissue. Clinical conditions which may occur due to faulty lifestyle are Age Related Macular Degeneration (ARMD), Diabetic/ Hypertensive retinopathy, computer vision syndrome and glaucoma, cataract, refractive errors and many more. For preventing these types of eye diseases and for maintaining ocular tissue health much has been described in texts of ayurveda, in the form of Dinacharya (daily regimen), Ritucharya (seasonal regimen) and specific therapies like kriya kalpa and pathya- apathya (specific diet regime) sadvritta and swasthabritta and taking chakshyusya rasayana drugs are useful to rejuvenate ocular tissue, thus maintaining ocular health and proper vision.

#### A. ROLE OF DINCHARYA

Acharyas have described vividly the aspect for daily lifestyle as Dinacharya and aspect of seasonal regime (ritucharya) to avoid the diseases. Acharya Charak has given the first definition of swasthritta as the specified regime of lifestyle to build immunity and to avoid all the diseases.<sup>[1]</sup> Acharya has described the concept of Dinacharya in *Matrashiti Adhyay* while Acharya Sushruta has described it in *Anagatbadhapratishedha Adhyay*, Acharya Vagbhata has described it in *Uttaranta*. Starting with the swasthritta acharya has described firstly the anjana.

**Anjana**- Acharyas have described anjana as the first swasthritta karma. *Sauviranjana* should be used daily while *rasanjanana* should be used once in 5-8 nights.<sup>[2]</sup> It has been described in many other ayurvedic texts that using anjana as a daily lifestyle destroys all the eye ailments.<sup>[3]</sup> According to acharya the *lekhananjana*

because of its *theekshna* property, eliminates the doshas from the srotas pertaining to varthma and eye and from the tissue and from related srotas and also from the *srungataka marma* and through mouth, nose and eye.<sup>[4]</sup> In today's context the probable mode of action of anjana can be described as-Once applied an Anjana it acts as a foreign body to the ocular surface. Hence eye gets reflex secretion in response to foreign particles on cornea and conjunctiva. Due to that considerable amount of drug washes out from the eye by weeping and another major portion may drain to the nasolacrimal duct (NLD). Apart from these another part may be eliminated from the ocular surface by evaporation (mainly *Rasakriya Anjana*), metabolism by tear enzymes and get in contact with tear proteins. Finally it remains in the *cul-de-sac* a very less amount of Anjana for the ocular absorption; meanwhile the portion drains to the NLD may absorb to the systemic circulation by nasal, laryngeal and oral mucosa. On the other hand *Gutika* and *Churna Anjana* have micro particles which may be deposited in the *cul-de-sac* and thereby increase the bioavailability to enhance ocular absorption. The ocular absorption of Anjana may initiate through the conjunctiva and cornea. Mainly lipophilic active ingredients may absorb through the cornea by transcellular pathway and hydrophilic from the conjunctiva by paracellular pathway. This ocular absorption may depend on the passive diffusion, carrier mediated transport (facilitated diffusion and active transport) and endocytosis. Also pH, viscosity, tonicity and most importantly molecular size and molecular weight of the active ingredients play a major role of the same. Once it crosses the conjunctiva (mainly hydrophilic); the sclera is more permeable and it allows drugs to penetrate the other interior structures of the eye i.e. ciliary body, iris, aqueous humour, lens, vitreous etc. But due to high vascularization of conjunctiva, ciliary body and iris considerable amount of drug may enter to the systemic circulation again. The drugs pass through the corneal epithelium (mainly lipophilic) directly go to the aqueous humour and distribute to the other ocular tissues. However some of the drugs coming to the aqueous humour either via cornea or conjunctiva undergo metabolism by the enzymes present in the aqueous. Considering all these factors it can be said that Anjana therapy may be highly activated in the anterior segment of the eye because of the presence of several anatomical, biological and physiological ocular barriers. But in the system of Ayurveda pharmacological actions of a drug may explain according to its pharmacological properties which are included *Rasa*, *Guna*, *Virya*, *Vipaka* and *Prabhava*. These qualitative qualities are still not explained and interpreted in accordance to the modern science. Hence as per the view of Ayurveda these qualitative measures may act on the posterior segment of the eye.<sup>[5]</sup>

**Shiroabhyanga (Head Massage)**<sup>[6]</sup>: *Shiroabhyanga* is a method of applying oil on the head as oil has *vata shamaka* properties. The *vata dosha* is present in eyes in form of *pranavayu* and the seat of *pranavayu* in body is

head (murdha). The brain stem is kept protected inside the scalp. When oil applied over the scalp, the medicinal effect reaches up to the brain. The optic nerve which ends in dristipatalam (Retina) is the direct extension of brain stem. So the oil applied over the head, especially at the region of moordha acts on the dristipatalam through the optic nerve. So daily application of oil, selected and medicated according to "prakriti" of person is a preventive measure of the eye diseases.<sup>[7]</sup> Abhyanga nourishes all sense organs and also acts as Dristiprasadana.<sup>[8]</sup> Through massage hydrostatic pressure is created over the area of scalp, helps the internal fluid to enter the viscera, tissue and diluted the accumulated toxins. After the completion of procedure the peripheral vessels are refilled and diluted toxins are brought into peripheral circulation and ultimately eliminated out of body.<sup>[9]</sup> Massage increases the release of neurotransmitter serotonin and due to pressure piezoelectricity is created which in turn increases the release of acetylcholine. This action with association of melatonin (a by-product of serotonin) and a neurochemical causes pleasant and calming effect by massage.<sup>[10]</sup>

**Padgi Dharan (covering head)/ Chatra Dharana(Using Umbrella)**<sup>[11]</sup> In all the three Brihitrayi Samhitas it has been described that covering head with some clothes (wearing pagdi) protects the eyes. Thus prevents eye ailments and maintains normal health of ocular tissue.<sup>[12]</sup> While Using umbrella protects the eyes from sunlight, dust, rain.

**Dhumrapaan**— Acharya Charak has said that dhumrapaan avoids all the disorders which occurs above the clavicle<sup>[13]</sup> and also when the dhumrapaan done in proper way opens channels of various sense organs (indriya shuddhi).<sup>[14]</sup>

**Snana(Bathing)**- It have been described in the ayurvedic text that head massage nourishes the sense organs and hence nourishing the ocular tissue. Generally, the sense organs get freshness with bath. The temperature mechanism is maintained and blood circulation is kept intact. Hot water is preferably for body bath and cold water for head bath. Hot water for head bath will adversely affect the hair and eyes.<sup>[15,16]</sup> Daily bath improves strength, and other impurities from the body.<sup>[17]</sup>

**Nasya karma**- Acharya Vagbhatt has explained that nasya is entry to the murdha. Drug administered through nostrils reaches Shringata marma (Sira marma) and spreads in murdha, netra etc. And remove the morbid doshas present above the supraclavicular region (eye also) and expel them from uttamanga.<sup>[18]</sup> While describing the nasya karma Acharya Charak has said that regular use of Nasya prevents all eye ailments. are also have described as Chakshushaya.<sup>[19]</sup> acharya have also described the drug administered through nasya enters into head and draws out the morbid matter, thus nourishes

indriyas.<sup>[20]</sup> Through nasya pooling of venous blood occurs in facial vein. Facial vein donot have valves. It communicates freely with intracranial circulation, not only at its commencement and by supraorbital vein which are connected with ophthalmic vein (a tributary of deep facial vein), which communicates through pterygoid plexus with the cavernous venous sinus. So nasya dravya reaches the brain and acts upon the eyes.<sup>[21]</sup>

**Padabhyanga** (Foot massage)/ **Padaprakshalana** (Washing Foots With Water) **Padtra dharan**- (paadukaa dharan)- Taking care of foot is also essential as foot is connected to the eye.<sup>[22]</sup> In brahitrayi the above mentioned three upkramas are said to be beneficial for eyes in many ways.<sup>[23]</sup> Acharya Sushruta has described in swasthvirita to take care of foot and has said that it nourishes the ocular tissue and hence prevents the eye ailments. Supporting the same fact Acharya Charak also said that Padabhyanga have Dristi Prasadana effect<sup>[24]</sup> and Acharya Chakradutta have kept the Padabhyanga in Chakshusya Varga.<sup>[25]</sup> Acharya Vagbhatt have stated that two siras or shrotas (channels) runs from pada to eyes hence any therapy done on the sole, have similar beneficial effects on eyes.<sup>[26]</sup> These two siras may be two nadis, Gandhari (which connects left toe to left eye) and Pusha (which connect the right toe to right eye).<sup>[27]</sup> Anatomically there exist no such vessels but can consider the siras as neurovascular bundles because sole of foot has very rich nerve anastomosis. Stimulation of this neurovascular bundle benefits the eyes by nourishing eye muscles and reduces eye strain. By pedal inunction ectodermal tissues of foot skin were nourished thereby nourishing its other derivatives in eye and improves the functions of eyes reduces eye strain and headache.<sup>[28]</sup> Also Ayurveda explains the same thing about the development of organs that pada and netra have its origin from Vaikarika and Rajas Ahamkar<sup>[29]</sup>, also both develop at same time in intrauterine life. Thus by therapy on pada we can have its effects on Netra because of their same origin.

Referring to the Textbook of Medical Physiology by C. Guyton, Joshi Nitesh et al stated that padabhyanga enables the somatic sensory area in the cortex which may get stimulation as both feet and eyes are in same area (number II) of the cortex.<sup>[30]</sup> Its stimulant effect may go to eyes and may act by improving the function of eyes and reducing eye strain.

Pressure created by foot massage generates a kind of piezoelectricity, which increases the conductivity of nerves. Also, the increased amino acids in blood, increase the neuron transmitter serotonin which helps to enhance pleasing effects on eyes.<sup>[31]</sup> Joshi nitesh et al in his study also support the fact that daily practice of Padabhyanga prior to onset of eye strain may prevent and also reduces the eye strain as a symptom.<sup>[32]</sup>

## B. ROLE OF SADVRITTA

A good, balanced mental status is essential for proper functioning of the eyes because sense organs can perceive the objects only in the presence of mind.<sup>[33]</sup> To maintain proper eye health and vision Vagbhata advised “manasonibrutti” i.e. withdrawing mind from all the sensual functions.<sup>[34]</sup> Stress hormones like cortisol are secreted and activation of hypothalamic pituitary adrenocorticoid leads to further arteriole dilation and venous constriction. So eye disease like Central Serous Chorioretinopathy (CSR) is believed to be exacerbated by stress and corticosteroid use. A clinical condition like Myokemia (twitching of eye lid) and dry eye are other effect of oxidative stress. Again stress induced hypertension may lead to retinal vein occlusion and other vascular disorders of retina.<sup>[35]</sup> Trayopasthambha Ahara, Swapna and Brahmacharya –these three are the tripods of life which sustain and maintain the life if followed properly. Ahara (Diet) plays major role in keeping eyes healthy. Virudha Ahara (incompatible foods) may leads to poor vision or cause blindness.<sup>[36]</sup> Swapna- (Nidra) Sleep rejuvenates the mind and body. Sound sleep is absolutely necessary for the eyes. During sleep, the eye is at complete rest and retains functional capacity. Normally 6-8 hours of sleep is necessary for a normal adult. Sleep deprivation leads to many eye disorders like floppy eye lid syndrome, dry eye, asthenopic symptoms, sudden vision loss after awakening becomes permanent (AION), swelling of optic nerve, blurred vision, change in colour perception. When natural urge of sleep is hold it leads to Akshigaurabam (heaviness and fatigue in eyes). In the context of etiological factors responsible for eye diseases Sushruta has mentioned “Swapnaviparyayat” (faulty sleep).<sup>[37]</sup>

## C.ROLE OF RITU CHARYA

According to ayurveda, year is divided into six seasons in which 3 seasons Shishira, Vasanta, Greeshma are known as Aadaan Kala (Uttarayan), when dsun takes north. Other 3 seasons Varsha, Sharad, Hemanta are considering as Visarga Kala wit sun following its southern course.<sup>[38,39]</sup> We see various changes in bio-life around us, with change in the seasons. As human being is also part of the same ecology, the body is greatly influenced by external environment. If body is unable to adopt itself to stressors due to changes in specific traits of seasons, it may lead to *Dosha Vaishamya*, which in turn may render the body highly susceptible to one or other kinds of disorders.<sup>[40]</sup> As adaptations according to the changes, is the key for survival, the knowledge of *Ritucharya* (regimen for various seasons) is thus important. People do not know or ignore the suitable types of food stuffs, dressing, and others regimen to be followed in particular season, this leads to derangement of homeostasis and causes various eye diseases, such as diabetic retinopathy, hypertensive retinopathy, refractive errors, dry eye disease.. Onset of lifestyle diseases is insidious, delayed development, and difficult to cure.<sup>[41]</sup> The strength and complexion of the person knowing the suitable diet and regimen for every season and practicing

accordingly are enhanced.<sup>[42]</sup> *Hemanta* is the *Ritu* of *Pravara Bala*, *Vasanta* is the *Ritu* of *Madhyama Bala* and *grisma* is the *Ritu* of *Avara Bala*.<sup>[43,44,45]</sup> In *Ayurveda*, the knowledge of *Ritucharya* is a first hand guide to the concept of *Kriya-Kala*, which describes the modes and stages of the development of diseases, with regard to the state of different *Doshas*—*Vatu*, *Pitta*, and *Kapha* in accordance with the changes of time. With changes in diet and lifestyle, there are changes in the state of *Tridosha*, which is bound to affect us, resulting disharmony, causing lifestyle diseases. There is also a reference of Seasonal Affective Disorder in modern science.<sup>[46]</sup> Blood plays important role in homeostasis of body. During sharad ritu blood becomes naturally impure.<sup>[47]</sup> The average metabolic responses during cold exposure were significantly higher in winter as compared to summer.<sup>[48]</sup> Rapid drop in temperature affect blood ph, blood pressure and tissue permeability, thus causing many eye disorders such as glaucoma, herpes infection.<sup>[49]</sup> As inwinter season the humidity has considerable influence so there are increased chances of viral and microbial infections.<sup>[50]</sup> Ayurveda not only mentioned the preventive aspect and regimen that should be followed in every season but also mentioned treatment that should be given considering seasonal effect. Regimens according to ritus are mentioned below.

## D.ROLE OF OCULAR EXERCISES

Many ocular exercises have rescribed by various authors, which have beneficial effect on eye . Some are described here-

**SUNNING-** Simple bathing of eyes in light is called Sunning. Natural or artificial, it is based on their interrelated facts that the eyes flourish on light and they see by the contrast between light and darkness rods and cones designed to provide acute vision in bright light, the rods provide sight at night. Sunning is relaxant of mind and body, looses the tightened muscles by increasing blood circulation, acts as antioxidant for the retina, increases ability of eyes for light and dark adaptation as sun rays replenishes the visual purple (rhodopsin pigment) in the retina. In *chakshushya upnishad*, *chakshushya mantra* was described and it has been written that this mantra should be recited daily 12 times. While reciting the mantra, a copper or silver vessel with little amount of water inside should be held in front to purify the water inside.

At the end water should be applied to eyes by fingers and then should drink this water. It has been described that this type of prayers gives strength to eyes.

## PALMING (covering eyes with moist hands)

Everyone must have noticed that when the eyes are tired, closing the eyes for a moment clears the vision and a kind of relief is felt in the eyes, but as some light still comes through the closed eyelids, a greater relief can be achieved by excluding this light as well. This is done by covering the closed eyes with palm of our hand( without any pressure on eyes). This practice is called palming.<sup>[51]</sup>



When the eyes with normal sight are closed and covered so as to shut all the light, the retina does not receive any light and the result is that one sees perfect black.<sup>[52]</sup> Palming soothes the optic nerve and cut off all sensory and motor signals going through the optic nerve to the brain, destroys the Timira Vyadhi.<sup>[53,54]</sup> helps in stabilising brain<sup>[55]</sup>, restores the normalcy of eyeball in relation to shape and size thus improves vision.<sup>[56]</sup>

#### **BALL EXERCISE and CLOCK EXERCISE (netra chestha)**

Benefits of ball and clock exercises- Brings the coordination between both the eyes,<sup>[57]</sup> Improves and coordinates the movement of extra ocular muscles.<sup>[58]</sup>

#### **EYE WASH**

Eye wash stabilises the vision<sup>[59]</sup>, destroys the eye ailments and demolishes the Timira Vyadhi.<sup>[60]</sup> Drishti Prasadana,<sup>[61]</sup> Chakshusya,<sup>[62]</sup> improves the functions of eyes reduces eye strain and headache, pleasing effects on eyes.<sup>[63]</sup>

#### **E. ROLE OF YOGABHAYASA**

Yoga especially Shat Kriya's like Trataka and Neti Kriya may help to improve vision and maintain the eye health. Hathayoga Pradipika and Gheranda Samhita clearly mention that accepting procedures like Trataka and Neti Kriya helps to improve vision and prevent the diseases of eye.

**TRATAKA:** Trataka destroys the eye diseases and removes sloth<sup>[64]</sup> helps to attain Divyadrishti,<sup>[65]</sup> promotes the perception of subtle manifestations<sup>[66]</sup>, arouse inner vision i.e. Ekagrata,<sup>[67]</sup> improves concentration, memory, will power. Trataka reduces the micro movements of eyes, improves cognitive function and visualization skills.<sup>[68]</sup> Trataka is known to relieve conditions like eye strain, headache, myopia.<sup>[69]</sup>

#### **F. ROLE OF AAHAR THERAPY**

As per Sarangadhra due to normal ageing process vision becomes poor in 6th decade of life. According to modern medicine age related macular degeneration (ARMD), Age related Cataract are diseases which occur due to ageing and oxidative stress in day to day life process. To avoid these problems or slow down the process of ocular degeneration Ayurved advocates aahara which are Chakshushya by action. Acharya Yogratnakar have described pathya especially for netra roga. These aahar has antioxidant properties thus nourishes the ocular tissue. So in this context hita (wholesome) and ahita (unwholesome) ahara (diet) vihara (activities) which affect eye can be summarized as follows in the Table.

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