Kottakkal
ayurveda

VAIDYARATNAM P.S. VARIER'S
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Vaidyabandhu

Adding science to practice

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Aryavaidyan P. Madhava Varier
First Managing Trustee, Arya Vaidya Sala, Kottakkal
(1909 – 1953)

Eye diseases

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Send your suggestions to: **vaidyabandhu@aryavaidyasala.com, vaidyabandhuavs@gmail.com**
Exclusively for Registered Ayurvedic Medical Practitioners

To Update *Netrachikitsa*



Dr. P.K. Santhakumari MD(Ay)
Founder & Chief Physician
Matha Ayurveda Eye Hospital
Trivandrum

I am writing these words on the basis of my experience in the field of Netrachikitsa for the last 43 years (1982 - still continuing)

I am really happy and confident to say that *Netrachikitsa* is a growing branch of ayurveda in our country. Even though the number is few, there are young doctors who are taking *Netrachikitsa* as a profession and a career. There are efficient and dedicated academicians also in India. To update and improve the field of *Netrachikitsa*, we have to reach every nook and corner of the subject. I am mentioning here some important areas only.

1. Academy

We know colleges are the main sources of knowledge for the study. BAMS doctors are converted to eye specialists only through the colleges; an eye specialist coming out of the college after completing his formal studies think and work according to the training they obtained from the college. They can move forward with confidence only if they get a strong basis during their study period. To teach the *theory part* of a disease and its management on ayurvedic basis is very easy. But, to teach the *practical part* of a disease and its management on Ayurvedic basis is not at all. If we understand an ophthalmic condition on the basis of non-ayurvedic terms / principles, be careful that can be absolutely wrong. Let me explain. Take a case as an example - Macular Edema. First of all, study and analyze all aspects of Macular edema and analyze it on the basis of *Tridosha* theory. What is the predominant *Dosha*, *Dhatu*, *Sthanasamsrayam*, etc? Understand the *Samprapthi* and prognosis carefully. Then try to answer the following:

- What is the difference between Cystoid Macular Edema and Macular Edema associated with Diabetic Retinopathy on Ayurvedic basis? Is there any difference in the *Dosha* predominance?
- What is the *Samprapthi* of Macular Edema developed by BRVO (Branch retinal vein occlusion) or any other occlusions?
- What happens after anti-VEGF (Vascular Endothelial Growth Factor) injections? Is there any change in the *Samprapthi* later?
- What is the impact of laser treatment in Macular Edema? What happens to *dosha* predominance Later?
- What are the reasons for the flare ups?

Without confident answers for questions like these, don't start the management. In short, bring Macular Edema to our place, our own place. Then only, we can handle it with confidence.

2. Books

For any study, books / literature / references are necessary. Now, there is a huge void in this area. We have a very few authentic books – *Ashtangahridayam*, *Sushrutha Samhitha*, *Nimithantra*, etc. But the contents are highly condensed. The matter is very deep and usually not reachable to a common doctor. Sometimes, the meaning we understand may not be correct. In short, simple translation of these books is not enough for study purpose. We need analytical descriptions. For that, the same condition should be studied and explained from different angles on the basis of ayurvedic theory. Books on specific or single topics are necessary. Examples are:

- Diagnosis of eye diseases in Ayurveda
- Dosha predominance in *Abhishyanda*
- Ayurvedic approach in the management of Retinitis pigmentosa
- *Samprapthi* of *Abhishyanda*
- Concept of *Timira*, and so on…

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Web: www.aryavaidyasala.com

In an approach like this, we can touch all aspects of the matter. I am sure there are Shalakya specialists who are capable of doing this in our own state. They have to dedicate their time and energy for that. Academy can make initiative projects on this matter.

3. Research works

Research works can be done in the institutions, academies, hospital and also on personal level. In fact, there are quality maintained research works already conducted and also going on in this field. Usually, the researchers are focusing on a particular drug or a therapy in a particular disease; or comparison of two different methods in a particular condition. To my knowledge, the result is not implemented practically later. It is safe in the shelves without any use. It should reach in the needy hands. It is to be published widely and steps to the take make it reach it in the hands of all eye specialists.

Research topics should be highly selective. One topic and its outcome have to lead to the next level research on the same topic. E.g. a study on the role of Pitta in the development of *Abhishyanda* -> Role of Pittasamana procedures in the management of *Abhishyanda* -> role of *Seka* in the treatment of *Pittabhishyanda* -> management of *Abhishyanda* in Ayurveda.

Aim of the research can be focused on the basic theory of Ayurveda. For e.g.:

- Role of *Brimhananasya* (role of a particular drug or medicine can be selected here) in controlling the *Vata* predominance in ARMD (Age-Related Macular Degeneration.)
- Management and assessment of Kapha dominance in *Kaphavidagdha*.
- A study on the action of Vidalaka in the Pitta Vitiation of *Abhishyanda*.
- A Study on the Dosha predominance in the different stage of RP (Retinitis Pigmentosa) etc.

These studies will give an insight on the basis of ayurvedic theory.

4. Evidence Based

We can use all available methods, technologies and devices to make evidence. It is not a difficult task nowadays. Evidence on the basis of objective parameters are the best evidence. Investigation reports of OCT (Optical Coherence Tomography), Fundus photograph, cornea thickness, ONH (Optic Nerve Hypoplasia), Tonometry, Visual field Test, etc. are enough for evidence. Facilities for these are available nowadays. Everything should be documented clearly before and after treatment. The colleges and hospitals having *Netra* specialist posts have to use these technologies.

Always new diagnostic devices and instruments are being developed. We have to be aware of all new methods and update ourself accordingly and make assessment parameters on its basis. In certain cases where symptoms are purely subjective, we can take subjective parameters for assessment and evidence. E.g. Flashes, floaters etc. Here, we can take personal level declarations, voice records, testimonies, etc. which can be considered as evidence. Everything should be clearly documented and certified.

5. Private Hospitals

The scope of private hospitals for eye disease is very high in our country. The number of private hospitals are actually very less compared to the demand. The world is looking towards Ayurveda hopefully to get a solution for unsolved problems. Everybody knows and agrees that in spite of all ultramodern technologies and research for years a group of degenerative disorders of the eye are still remain unsolved –

atrophy, Retinitis Pigmentosa etc. are examples. Science is silent here and patients are falling to blindness. Ayurveda can contribute a lot in this aspect. Appropriate medicines and treatment procedures based upon the theory of *rasayana chikitsa* seem to be result oriented and give a spark of hope for the patients. The group of diseases labeled as *leading to blindness* can be changed to *Avoidable Blindness*. Private hospitals can take a major role here because

- Extra care and time can be spent.
- Personal level monitoring and supervision are possible.
- Extra facilities can be given.
- Special preparation of medicine, if necessary is possible.

A private hospital can take over these tasks. When we talk about private hospitals, understand that:

1. There are many schemes and startup projects supported by Government. Be aware of these are learn about these carefully.
2. Arrange facilities necessary for *standard* eye treatment.
3. Obey rules and regulation of the land while running the hospital
4. Don't entertain Guest, Client and customer in a eye hospital. Only *Patient*. Then only a *Doctor* can handle the case with due seriousness.
5. In an eye hospital, hygiene is very important.
6. Never do eye medications in the room where *Abhyangam*, *Udwarthanam*, Kizhi etc. are done. It should be separate.

6. Private Practice

It is a truth that all students coming out after completing PG do not get Government job. They have to depend on private practice. Please understand and believe that ours is a Professional course. We have the right to practice what we have learnt. There are many advantages for private practice when compared to a Government Job:

- A private practitioner has the freedom to do according to their decision and will.
- No time concern for consultations. We can arrange consultations according to the patients and doctors convenience.
- They can make necessary medicine for the patient and directly supply to the patient
- Doctor can change the schedule according to the seriousness of the case and necessity of the treatment.

Conclusion

Everything is possible if there is confidence with dedication. Above all, we have to update ourselves continuously. Be conscious and aware of newly developing ophthalmic symptoms and signs. Learn about the newly developing diagnostic devices and equipments. Interpret all the outcomes into the theory of Ayurveda. For that, make use of all available sources. Seminars, webinars, journals, books, discussions, research papers – everything are resources. Take advantage of them. Try to implement everything practically. If these are followed, success is ours.



Feed Back/ Letter to editor

Simple and very useful thoughts and experiences of senior doctors and also the concepts of each disease in each doctor's experience makes this journal unique among Ayurvedic journals. It should be distributed in each month rather than four months once. Dr. Devikrishnan sir's article in every journal is helping a lot in brushing up all the Yogas used in each diseases. Thank you very much for this.

Dr. Sruthy Viswanath, B.A.M.S
Kottakkal Arya Vaidya Sala
Attibelle dealership,
Bangalore

An open label clinical trial to prove the efficacy of *jalukavacharana* (leech therapy) in reducing the increased intra-ocular pressure in glaucoma



Dr. Jeena N.J. MD(Ay), PhD
Professor & HOD
Department of Shalakyathantra
(Ophthalmology & ENT)
Vaidyaratnam P.S. Varier Ayurveda College
Kottakkal

Background and Purpose:
Glaucoma is one of the leading causes of blindness worldwide. It is a group of diseases resulting in an optic neuropathy which has got the characteristic changes in the optic nerve head and progressive visual loss. Raised intra-ocular pressure (IOP), optic nerve damage and field defect are the triad of signs seen in glaucoma. A sustained increase in IOP may be due to increased formation of the aqueous humor, blockage in its outflow or a raised pressure in the episcleral veins. The pathogenesis of glaucomatous damage can be attributed to a combination of factors affecting axonal health. The two main influences are (i) mechanical changes due to the rise of intra-ocular pressure and (ii) vascular perfusion of the optic nerve head. Primary open angle glaucoma is a slowly progressing one which causes gradual visual loss whereas angle closure glaucoma is well known to cause sudden loss of vision. The management of glaucoma ranges from topical medications to surgical interventions as well as laser treatments. Even though many such medical and surgical methods are available, treating glaucoma with protecting vision is still a biggest challenge faced by the ophthalmologists. Various randomized controlled clinical trials have shown that lowering intraocular pressure does reduce progression of primary open-angle glaucoma. However, there are lots of interest in non pharmacological options that includes lifestyle adjustment and alternative and complementary therapy (ACT). *Jalukavacharana* (Leech Therapy), the application of medicinal leeches (Hirudinae medicinalis) for therapeutic use, is used by ayurveda for the treatment of such eye diseases since many centuries. It is considered as the safest mode of blood-letting as per ayurveda and is advised in all age groups without any absolute contraindication. It is seen to give a very quick response in many acute conditions of the eye. The present study was conducted to assess the efficacy of leech therapy in reducing the increased intra-ocular pressure in patients diagnosed with glaucoma.

Materials and Methods:
Thirty diagnosed patients of chronic open angle glaucoma (chronicity >5 years) in the age group of 40-60 years were included in the present study. Those who had an intraocular pressure of more than 25 mm of hg with antiglaucoma medications were selected for clinical trial. Live healthy leeches of the family *Hirudinae medicinalis* were used for the treatment. *Jalukavacharana* was conducted for 10 sessions over a month in three-day intervals. The site for therapy was around the limbus (ciliary vessels) or inside the palpebrae (palpebral vessels). Indentation tonometer was used to check the intra-ocular pressure. IOP was measured before and after each therapy session. The values of IOP measured on Day 1, Day 12, Day 21 and Day 30 of *Jalukavacharana* were taken for analysis. Patients were given ayurvedic eye drops (drops made from Moringa oleifera) after 30 days and a follow-up IOP was taken at 3 months (Day 90). Difference of IOP of each sitting analysed using paired t test. Difference of IOP between the first sitting and last sitting as well as 3 months follow-up was also analysed using paired t test.

Results:
Patients had a mean age of 49.33+3.62 years. There were 21 female and 9 male patients with mean chronicity of 7.33+1.58 years. Mean IOP at Day one was 33.8+8.4 and after treatment

IOP was 30.1+7.7 which was statistically significant ($p<0.05$) using paired t-test. The results were statistically significant on Day 12 and Day 21 too ($p<0.05$). The mean variation from Baseline to Day 30 and follow-up on Day 90 were 32.2 + 9.3, 22.5+4.6, 20.7+4.9 respectively. There was a mean change of 12 mm of Hg in IOP which was highly statistically significant using paired t-test ($p<0.01$).

	IOP BT	IOP AT	% CHANGE
DAY 1	33.8±8.4	30.1±7.7*	10.1%
DAY 12	29.9±6.9	26.7±5.9*	10.7%
DAY 21	26.2±5.8	23.9±5.5*	8.8%
DAY 30	23.7±5.8	22.5±4.6	51%

Probable mode of action of *Jalukavacharana*

Leech saliva has certain chemical constituents namely hirudin, hyaluronidase and hementine. Hirudin is a thrombin inhibitor and so functions as an anticoagulant. Hyaluronidase is an enzyme that breaks down hyaluronic acid which is a bonding material of connective tissue and this increases blood flow. The active sucking of blood by the leeches lets out the blood and causes a decrease in the pressure of the episcleral vessels. This in turn increases the aqueous outflow into the episcleral veins which reduces the IOP of the eyes.

Conclusions:

Several well designed randomized controlled trials have demonstrated that lowering the IOP reduces the rate of glaucomatous damage of optic nerve. The present study looked at the effectiveness of *Jalukavacharana* in Chronic Open Angle Glaucoma in uncontrolled IOP with anti-glaucoma drops. The study showed clinically significant and statistically significant ($P<0.01$) changes in immediate reduction and long-term reduction of IOP. Out of all Thirty patients, no drop outs were there. The patients had no other complications due to the treatment. Application of leeches (*Jalukavacharana*) removes not only blood from the body but also injects biologically active substances which help to manage various ailments. The present study indicates the use of Leech therapy as an alternative method for treating Primary Open Angle Glaucoma. Follow up studies will look into continuing efficacy of the therapy in sustaining the IOP, improvement in Visual field and Neuroprotection.



DEMOGRAPHICS

DEMOGRAPHICS		
AGE		49.33±3.62
GENDER	MALE	09
	FEMALE	21
MEAN DURATION OF DISEASE		7.33±1.58
ANTIGLAUCOMA MEDICATION*	TIMOLOL	29
	LATANOPROST	13
	BRIMONIDINE	04
	DORZOLAMIDE	11

*All medications were stopped during therapy

Overall change in condition after 1 month

Baseline IOP	End of Therapy IOP	% Change
32.2 + 9.3	22.5±4.6*	30.1%

*<0.01

Ayurvedic management of Panuveitis – A Clinical Experience



Dr. Itoozhi Unnikrishnan Namboothiri
BAMS, PG Dip. in Clinical Research
Medical Director & Addl. Chief Physician
Itoozhi Nambothiris Ayurveda
Nursing Home, Mayyil, Kannur, Kerala.
Visiting Consultant (Eye Clinic),
Arya Vaidya Sala, Kottakkal

INTRODUCTION

Uveitis is a broad term used to describe the inflammatory pathology of vascular layer of eyeball. It is composed of a diverse group of disease entities, which in total has been estimated to cause approximately 10% of blindness. Based on the anatomical involvement of eye, uveitis is broadly classified into anterior, intermediate, posterior and Panuveitis.

Anterior uveitis

This is the most common type and affects the front of the eye, specifically the iris and ciliary body. It can be acute and painful, causing redness and light sensitivity.

Intermediate uveitis

This type affects the middle part of the eye, including the vitreous humor (the gel-like fluid) and the ciliary body. It is often characterized by symptoms like blurred vision and floaters, but typically without significant pain.

Posterior uveitis

This type affects the back of the eye, including the retina and choroid. Symptoms can include blurred vision, floaters and loss of peripheral vision.

Panuveitis

This is the most severe form, as it affects the entire uveal tract, from the front to the back of the eye. It can cause a combination of symptoms and may lead to significant vision loss if not treated properly.

CASE REPORT

12yr old overweighed boy (BMI 25.5) from Kannur district came to the OP with his mother seeking ayurvedic treatment for his diminished vision associated with net like appearance in both eyes for about 6 months. He also c/o excessive blinking, Photophobia and redness in BE (lateral side) more on the right eye. He also suffers from recurrent upper respiratory tract infections, reduced sleep, excessive sweating, heaviness of body and fatigue. He had a history of pneumonia also. Initially the child had difficulty in reading black board along with head ache and ocular pain on straining. So, consulted an ophthalmologist, on examination, his visual acuity was 6/9 (BE)6/18 (RE),6/9(LE) with near vision N6. On investigation his blood levels of ACE(89.30 U/L) and LDH(287.3 U/L) were high and on Fundus examination it is found bilateral macular oedema and papilledema and clinically diagnosed with Panuveitis (BE) .He was prescribed with steroids which gave him symptomatic pain relief, but there was no change in diminished vision. Parents noticed more weight gain after the course of medication. So they were anxious about using steroid medications for long term.

CLINICAL FINDINGS

On examination *Prakrithi* of the patient is *kaphapaithika*; agni was *manda* which leads to *aama* in *jatharagni* and *dhatwagni* level resulted in *abhishyanda*.

The child was accustomed to the long term intake of *atisnigdha*, *madhura*, *katu*, *amla ahara*, with *avyayama* leading to *kapha pitta medo dushti* along with vitiation of *rasa, rakta dhathu* which is manifested as features like *gaurava, aalasya, arochaka and sthoulya*. Vitiation of *medovaha srotas* inturn causes *svedovaha* and *mutravaha sroto dushti* Chronic impact of *kapha medodushti* contributes to the *jatharagni mandya* and subsequent *aama* formation in the body.

Underlying *rasavaha sroto dushti* vitiates its *sroto moola(hridaya)*, which is also the seat of *prana vaha srotus*. This agantuja nidana along with *aama* causes *prana vaha sroto dushti*.

On *achakshushya nidana sevana* (stress, regular

intake of curd), *prakupita vata* along with vitiated *kapha pitta rakta* invades *netramandala* and becomes *sarvakshigata* to cause *khavaigunya* which ultimately leads to *abhishyanda* with clinical features like *netraraga, sirassula, akshisula, prakaasa - akshamata, netra sankocha and aavila darsana.*

THERAPEUTIC INTERVENTION

Protocol: *Kaphamedohara, Deepanam, Amapachanam, Vatanulomanam, Raktaprasadana, Ahishyandaharam, Netraprasadana, Rasayanam*

Table 1: Medication in first phase

Duration	Medication
10/03/25 to 10/04/25	*Kashyapa Thraiphala Kashayam (kapha pitta samanam chakshushyam)*
	Dhanada nayanadi kashayam (Vatha Kapha Samanam)
	Shadanga Paneeyam (Deepana Pachanam)
	Thriphala Guggulu (Tridosha samanam, Medoharam
	Ranjaka Choornam for Nethradhara (Pitha Raktha Haram)
	Vimala bindu Aschyothanam (Nethra Prasadanam,Pitta Rakta samanam)

Table 2 : In house Therapy Duration 16/04/25 to 29/04/25

Internal Medication	External Therapy
Yashtee Guuchyadi Kashayam (Kapha Pitta Samanam)	*Udwarttanam(Kapha Medo haram)*
Dhanada Nayanadi Kashayam	*Nethra Dhara(Lodhra+ Yashtimadhu+ Ajaaksheera) (Pitta samana, Nethra Prasadana)*
Thriphala Guggulu	*Mukkadi Bidalakam (Pitta Raktha Prasamanam, Amapachanam)*
Mahamanjishtadi Kashayam Tab(Pitta Samanam, Raktha Prasadanam)	*Abhyanga+ Dasamoola Kashaya Dhara (Vatanuloma)*
	Mridurechanam (Pitta Samanam)
Shadanga Paneeyam	*Thalapothichil (Vatha Pitta Prasamanam, Indriya Prasadanam)*
Nethra Poshana Aharas	*Shirodhara with Thriphaladi thailam (Indriya Prasadanam, Vatha prasamanam, Manobalapradam)*
	Tharpana & Putapakam (Akshi Balapradam)

Follow Up Medication

Thriphala Guggulu, Yashti Guluchyadi Kashayam, Manjishthadi Rasayanam (*Raktha sodhanam & Rasayanam*), *Vimala Bindu Aschyothanam*, *Lasuna ksheerapakam*.

OBSERVATION & RESULT

First Month	*Redness of eyes, blinking of eyes, photophobia got relieved. Stopped steroid medication.* *VA showed good improvement with DV :6/6(BE) 6/12p-1(RE) 6/6p-1(LE) and N V N6*
Third Month	*VA improved to 6/6P-1(BE) 6/9(RE) 6/6P-3(LE) .* *The episodes of cough and cold got reduced considerably*
Fourth Month	*VA was full with 6/6 (BE) 6/6 (RE) 6/6 (LE) and near vision N6* *Body weight reduced by 4 kg and BMI became normal (BMI-24)* *Rasayana prayoga improved the general immunity of the child*

CONCLUSION

The concept of *Abhishyandahara chikitsa* in Uveitis spectrum of disease is found to be highly promising. *Visesha samprapti vighattana* in each case and *nidana parivarjana* are the essential parts of *chikitsa*. Proper counselling to the patient and family about *Anabhishyandi ahara viharas* are also to be promoted by Vaidya for the better result.

Notable Quotes

Triphala rudhirasrutirvishudhirmanaso nivritirajnam sa nasyam Shakunashata sa padapooja ghritapanam cha sadaiva netraraksha

त्रिफला रुधिरस्रुतिर्विशुद्धिः
मनसो निर्वृतिरञ्जनं सनस्यम्।
शकुनाशनता सपादपूजा
घृतपानं च सदैव नेत्ररक्षा।।

Usage of triphala, bloodletting, panchakarma treatments, withdrawing the mind from unwanted things, use of collyrium ,nasal medication, taking meat of birds protecting the feet and consuming ghee, daily practices of these help to improve the health of eyes.

(Ashtangahridayam uttarasthana)

Ayurvedic management of Proliferative Diabetic Retinopathy with Vitreous hemorrhage



Dr. Nethradas P.K.
BAMS, MS (Ay.)
Medical Officer (Nethra)
Kerala Rama Varma District Ayurveda Hospital (RVDAH) Thrissur



Dr. Jisha P.L.
BAMS, MS (Ay.)
Specialist Medical Officer (Nethra)
Drishti Project (NAM)
Kerala Rama Varma District Ayurveda Hospital (RVDAH)Thrissur

Malini (Name changed), a 48-year-old female homemaker with a 26-year history of Type 2 Diabetes Mellitus, presented to the Nethra Department of RVDAH, Thrissur with a sudden onset of dimness of vision in her left eye noticed three months earlier. After Examinations the condition was diagnosed as proliferative diabetic retinopathy in both eyes and vitreous hemorrhage in the left eye. Initially, she consulted an allopathic ophthalmologist. Although she underwent laser photocoagulation, her visual improvement remained unsatisfactory, leading her to explore ayurvedic management.

The patient had a positive family history of diabetes through her father. She reported severe stress related to her family issues and progressive visual reduction, along with disturbed sleep. Her lifestyle was predominantly sedentary, with minimal physical activity, irregular meal patterns and a diet rich in carbohydrates.

- Before treatment, her visual findings were as follows: Visual acuity: Right Eye (RE) 6/9; Left Eye (LE) CF 2M
- Detailed refraction: Right eye 6/9 + 0.50/130 improving to 6/6; Left eye CF 2 m NFIG Fundoscopy P(1): Neovascularization in both eyes and Vitreous hemorrhage in the left eye



P(1)

Internal medicines administered included Guduchyadi kashaya, Pancharavinda Churna, Pramehoushadhi gudika, Chandraprabha tab and Manasamitra Vataka. Counselling was provided for stress and sleep disturbances. The condition was assessed as predominantly involving *Pitta* and *Rakta* vitiation, along with *srotorodha* and *dhatukshaya*.

The inpatient treatment started with *rooksha* and *sheeta* procedures extended for 21 days and comprised the following procedures:

- *Thalapothichil* with Manjishthadi yoga, Amalaka, and Musta in *takra* for 7 days
- *Takradhara* with Manjishthadi takra for 14 days
- *Anjana* (collyrium) with Chandanadi Anjana
- *Mukhalepa* with Lakshadi and Jadamayadi churna
- *Netra Seka* with Manjishthadi Kashaya
- *Netra Purambada* with Mukkadi

Following this treatment, the patient demonstrated marked improvement. Left eye vision improved from CF 2 M to 6/24p in left eye. She also reported reduced floaters and visual disturbances, along with relief from mental stress. Fundoscopic evaluation P(2) showed a significant decrease in vitreous hemorrhage. She was advised to continue internal medications, *anjana, mukhalepa, netra seka, purambada*, and

psychological consultation for sleep disturbance and stress.



P(2)

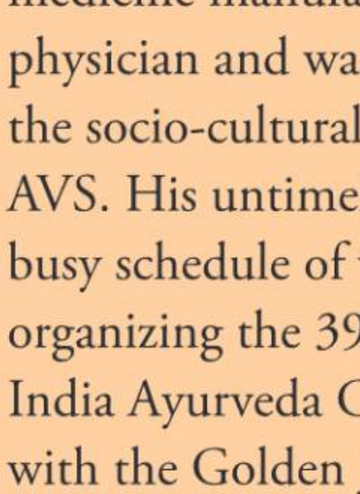
The protocol was then shifted to *snigdha* therapy to stabilize the vision. This included:

- *Shirodhara* with Asanamanjishtadi for 7 days
- *Chandanadi Anjana*
- *Mukhalepa* with Lakshadi and Jadamayadi churna
- *Netra Seka* with Manjishtadi Ksheera Kashaya
- *Netra Purambada* with Mukkadi
- *Tarpana* with Patoladi Ghritha 5 days

After 12 days of *snigdha* procedure, and 10 days of *pathya upachara* the patient experienced further improvement, P (3) with visual acuity progressing from 6/24p to 6/12 in left eye. The patient now follows strict *ahara* and *vihara* guidelines to maintain glycemic control. Her follow-up regimen includes external therapies such as *netra seka*, *anjana*, and *vidalaka*, and internal medications including Guduchyadi Kashaya, Pancharavinda Churna, and Pramehoushadhi tab.

Aryavaidyan P. Madhava Varier

(1909 – 1953)



He was the first Managing Trustee of Arya Vaidya Sala, Kottakkal. He assumed charge in 1944 following the demise of the Founder of the institution, Vaidyaratnam P.S. Varier. He served in the post till he departed for his heavenly abode in 1953. During his short tenure of less than a decade in office, he contributed vehemently to the rapid growth of AVS, including the mechanization of medicine manufacturing. He was an eminent physician and was also deeply committed to the socio-cultural and charitable activities of AVS. His untimely death occurred during a busy schedule of work, while he was organizing the 39th conference of the All India Ayurveda Congress at Kottakkal, along with the Golden Jubilee celebrations of AVS. To commemorate Aryavaidyan Madhava Varier, a thesis presentation competition for Ayurveda PG students is being conducted annually at Kottakkal.

This issue of Vaidyabandhu is being brought out as a tribute to the legendary soul.





Ophthalmic care in Ayurveda



Dr. K. Devikrishnan
Chief Sub Editor
Centre for Textual Studies and Publications
Arya Vaidya Sala, Kottakkal

The eyes are regarded as the body's most important sense organs (*Sarvendriyanam nayanam pradhanam*). Nowadays, a lot of people use electronic devices, and screen time is uncontrollable and unavoidable. Digital eye strain has been increased after COVID19. The primary issue is continuous use, which has a major negative impact on vision. According to the information from WHO, globally above 2.2 billion people have a near or distance vision impairment. The leading causes of vision impairment and blindness at international level are refractive errors and cataracts. Vision diminishing poses a huge global financial burden. The eye disorders can affect people of all ages; however, most people with vision impairment and blindness are over the age of 50 years.

The refractive errors include nearsightedness (myopia), farsightedness (hyperopia), astigmatism and presbyopia, which occur between 40 and 50 years (unable to read words in a book). The above refractive errors can be corrected by glasses. For every 20 minutes spent looking at digital medium you should always try to a 20 seconds break and look at a faraway object. This may help to reduce the eye strain.

Dry eyes can happen when the eye can't make tears. This condition occurs due to long looking at computers, certain diseases like rheumatoid arthritis, blepharitis, allergy and antihistamine medications, sleeplessness and antidepressant medicines, using contact lenses, modern medicines for cardiac problems, hypertension, etc.

Macular degeneration usually occurs in elderly persons. It affects the central part of the retina, the macula, which helps in fine vision. Straight lines look wavy, gradual loss of ability to see objects and, if not treated properly, vision loss will be the result.

Cataract is the most common eye problem affected by people, irrespective of age. In this clouding of the lens is occurred. We can delay the progress of the disease by using ayurvedic medicaments.

Types of cataracts

1. Senile-according old age condition
2. Due to diabetes
3. Hyper parathyroidism
4. Due to deficiency of Vitamin B_2, Vitamin C
5. Traumatic
6. After cataract surgery
7. Due to intraocular tumors
8. Due to myopia
9. Detachment of retina
10. Due to glaucoma
11. Due to overuse of corticosteroids.

In terms of both function and dignity, the eyes are the most significant organs. The eyes reflect a wide range of illnesses, age related macular degeneration, vitreous detachment, uveitis, refractive errors, retinal detachment, retinitis pigmentosa, central retinal vein occlusion, lazy eye etc.It is challenging to open the eyes with muscular problems. Conjunctival disorders are caused by vitamin B_1 deficiency. Eye conditions like keratitis are brought on by a vitamin B_2 deficiency. Vitamin C insufficiency causes bleeding and exophthalmia in the eyes. Night blindness may result from a vitamin A deficiency. Eye edema is observed in kidney disorders.

Diabetic retinopathy

People with diabetes can have a disease called diabetic retinopathy. In this the blood vessels in the retina are damaged by high blood sugar level. Initially no symptoms occur, if the blood sugar is not controlled blood vessels in retina bleed and the vision is affected seriously.

Glaucoma
This eye disease damages the optic nerve. When fluid increases in front part of eye, the extra fluid increases the eye pressure and it damages the optic nerve.

Ayurvedic Concept
According to ayurvedic classical text *Ashtangahridaya*, *pitta dosha* gets increased from consuming food items that are very pungent, sour and salty, penetrating, very hot, and cause severe burning sensations during digestion. The above unhealthy food habits for a prolonged time are the main causes for eye diseases. Aggravated *pitta dosha* localized in eyelids, joints, white portion, black portion, pupil and whole eye. Taking cold water bath immediately after exposure to heat, abnormal sleeping habits, excessive exposure to dust and heat, suppressing natural urges, seasonal variation, controlling tears smoking and alcohol usage are the other causes of eye disorders. *Ashtangahridaya* listed 94 eye disorders and their remedies, while *Sushrutasamhita* lists 76 diseases of the eye.

Some peculiar symptoms are described in certain disease conditions in Ayurveda.

In *Raktapitta*, eyes are red, yellow, or green in color.

In *Kshatakasa* eyes are glittering and have a radiant look.

In the features of *Pittaja Kasa* yellow coloration of eyes is seen.

Black color of eyes in *Vataja arsas*. Edema of eyes seen in *Arsas*

In *Prameha*, thickening of the eyes is a symptom.

In aggravated *Ardhavabhedaka*, the eyesight is lost.

In *Ardita* disease, loss of movement of the eyes and one eye is closed.

In *Thimira* the person sees the objects as though covered, unsteady, slightly red, dirt, sees webs, hairs and rays of light in front of his eyes.

Ayurvedic medications for eye care
Let us find some ayurvedic medicaments that are useful in the diseases of the eye and to protect the health of the eyes. These medicines are prescribed by ayurvedic doctors according to the disease condition.

1. Jivantyadi ghrita
(Ref.Text: Ashtangahridayam)
This ghrita is useful in eye disorders and helps to prevent cataract. Useful in refractive error, optic nerve damage, dry eyes, ptosis, neurological eye diseases and optic neuritis

2. Mahatiktaka ghrita
(Ref.Text: Ashtangahridayam)
Usually prescribed in skin diseases, ulcers, burning sensation and *paittika vikaras*. Useful in ophthalmic complaints. It is *rasarakta prasadana*, rasayana and ojaskra.

3. Tiktaka ghrita
(Ref.Text: Ashtangahridayam)
Usually prescribed in skin diseases, ulcers, burning sensation and *paittika vikaras*. Useful in ophthalmic complaints. It is *rasarakta prasadana*

4. Mahatraiphala ghrita
(Ref.Text: Ashtangahridayam)
Useful in *netravikaras, thimira* etc. Prescribed in night blindness, retinal hemorrhage and retinitis pigmentosa.

5. Patoladi ghrita
(Ref.Text: Ashtangahridayam)
Useful in *akshiroga, netravarana* and *akshishopha*. This ghrita can be prescribed in uveitis, inflammatory eye disorders, eye discoloration after observing the stages of the disease.

6. Traiphala ghrita
(Ref.Text: Ashtangahridayam)
Useful in vision problems, myopia, computer vision syndrome, early stages of cataract, night blindness, eye tumor and diabetic retinopathy. Helps to improve vision. It is anti-inflammatory, anti-oxidant and eye rejuvenator.

7. Guggulutiktaka ghrita/Guggulutiktaka kwathamTablet/ Nimbamritasavam (Ref.Text:Ashtangahridayam)
This medicine is anti-infective, anti-ulcer, anti-inflammatory, anti-diabetic, blood purifier, effective in rheumatoid arthritis, osteoarthritis and eye disorders.

8. Pathyakshadhatryadi kashayam (Ref.Text:Sarngadharasamhita)
Useful in headache, migraine, eye strain, diabetic retinopathy, early stages of cataract and in painful conditions of eye.

9. Dhanadanayanadi kashayam (Ref.Text: Sahasrayogam)
Effective medicine in facial paralysis, ptosis and other neurological conditions of eyes. Prescribed in *ardita*, *akshepka* and *vatavikara.*

10. Saptamritalauham Tablet (Ref.Text: Bhaishajyaratnavali)
Used in *thimira, ratryandha*, *urdhwajatrugataroga, sula, amlapitta, and pandu*. Prescribed in computer vision syndrome, optic nerve neuritis, age related macular degeneration, diabetic retinopathy, diminished vision, hyper acidity and headache.

11. Triphala tablet (Ref.Text:Bhavaprakasham)
It is an Anti-oxidant, good for eye health and rejuvenative.

12. Triphalaguggulu tablet (Ref.Text:Sarngadharasamhita)
This medicine is prescribed in ulcer, obesity, atherosclerosis, arthritis, eye edema, neurological eye disorders and thyroid disorders.

13. Triphaladi churnam (Ref.Text:Ashtangahridayam)
This powder is beneficial in eye disorders, allergic eye problems, computer vision syndrome, constipation, edema, conjunctivitis and painful conditions of eyes.

14. Elaneer kuzhampu (Ref.Text:Sahasrayogam)
This eye drop helps to prevent cataract, corneal ulcer, early cataract, eye strain, blurred vision and pterygium.

15. Nayanamritam kuzhampu (Ref.Text:Arogyakalpadrumam)
This eye drop contains gold. Prescribed in degenerative eye disorders, optic neuritis, eye stress and prevents cataract

16. Netramritam (Proprietary medicine)
This unique eye drop of AVS is used in conjunctivitis, eye irritation, swelling, inflammation, eye strain due to over usage of computer ,mobile phone etc. It is cooling in nature and provides clear vision.

17. Kachayapanam kuzhampu (Ref.Text: Ashtangahridayam)
Used as an eye drop in early stages of cataract.

18. Kayyanyadi tailam/ Keratailam (Ref.Text: Sahsrayogam)
This oil is indicated for external application on head before bath. It is cooling, relieves headache, good for eyes and improves vision.

19. Triphaladi tailam/ Keratailam (Ref.Text: Sahsrayogam)
Used for external application on head in *urdhwajatrugatha rogas, netra rogas, siroruja* and it is *tridosha shamana* also. Useful in eye strain due to continuous computer usage and it is cooling also.

20. Tenginpushpadi tailam (Ref.Text: Sarvarogachikitsaratnam)
Useful in diseases of head, eyes, burning sensation and redness in eyes and headache.

21. Asanavilvadi tailam/ Keratailam (Ref.Text: Sahsrayogam)
This oil is for external application on head before bath. Useful in diseases of head and eyes.

22. Asanamanjishtadi taila (Proprietary medicine)
This oil can be applied on head that helps to prevent cataract and is used in diseases of head and neck.

23. Baladhatryadi tailam (Ref.Text:Sahasrayogam)
This oil for application on head before bath is beneficial in eye disorders, and the diseases of

head. It is cooling in nature and suitable for insomnia conditions.

24. Tungadrumaditailam
(Ref.Text: Sahasrayogam)
This oil is very cooling, used to apply on head in diseases like insomnia, head ache and ophthalmic complaints.

Vimalavarthi, Chandanadi varthi, Mukkadi purampada etc. are commonly used external medicines in eye irritation, redness and swelling and also to improve vision.

Daily oil massage on head and feet, regular exercise, yoga, and nutrient food items are necessary for clear vision. *Upavasa*, *virechana*, *sirovasthi*, *nasya*, *aschyothana*, *seka*, *anjana*, *tharppana*, *putapaka* etc. are the treatment procedures in eye ailments according to the disease conditions. Daily oil massage on feet and head, usage of medicated ghee, *nasya karma*, and consumption of *triphala* are recommended for the protection of eyes.

Diet for improving vision: Food items like carrots, milk, ghee, fish, eggs, nuts, grapes, leafy vegetables, etc., must be included in the diet for improving the vision. Avoid hot spicy food, deep fried food items and *pitta* provoking diet.

Herbal remedies in Ophthalmic disorders



Dr. Jyolsna G Krishna, M.D (Ay.)
Professor
Dravyaguna Department
VPSV Ayurveda College, Kottakkal

Ayurveda offers a comprehensive, holistic approach to the management of various eye diseases, emphasising both preventive and therapeutic measures using herbal remedies, special eye therapies, lifestyle modifications and dietary management. These treatment modalities aim at long-term eye health, reduced recurrence and minimal side-effects. Treatments are individualised based on various factors like the patient's *dosa prakrti*, the specific eye condition, age and season.

The following is a list of medicinal plants traditionally used in treating eye disorders, along with their proven clinical uses:

Sigru *(Moringa oleifera Lam.)*



Moringa oleifera is widely recognised for its strong antioxidant potential and demonstrates significant promise in promoting ocular health and preventing various eye diseases. Research indicates that *Moringa oleifera* stem extracts-naturally sourced and showing no major adverse effects-can effectively protect the lens from oxidative-stress induced cataract formation. Additionally, *Moringa* extracts have been shown to guard ocular tissues against sodium valproate–induced oxidative damage, thereby preventing corneal epithelial injury and supporting individuals with lacrimal gland dysfunction during sodium valproate therapy. Clinical studies further reveal that consumption of *Moringa oleifera* leaves reduces intra-ocular pressure (IOP) and blood pressure, with greater reductions observed at higher dosages, highlighting its potential as an adjunct therapy for conditions such as glaucoma. The leaves are rich in bioactive components-including vitamin A, carotenoids and flavonoids like myricetin, quercetin and kaempferol-that contribute to their protective role against chronic and degenerative eye disorders. Moreover, aqueous extracts of *Moringa oleifera* seeds help lower blood glucose levels and produce beneficial histological changes in ocular tissues, indicating their usefulness in managing diabetes-related eye complications.

Matsyakshi (*Alternanthera sessilis* (L.) DC)



Alternanthera sessilis is widely consumed as a leafy vegetable in many parts of India, valued for its rich content of minerals,

vitamins, dietary fibre, flavonoids and carotenoids. According to Siddha literature, this herb is believed to contain trace amounts of gold, which is associated with its cooling effects on the eyes and body. Traditionally regarded as a noxious weed, *A. sessilis* has long been used in folk medicine to manage dysentery, night-blindness and stomach disorders. The leaves, when fried with ghee, are said to provide a soothing effect to the eyes. The plant exhibits strong antioxidant potential and offers essential nutrients that contribute to overall health. Oxidative stress and inflammation are critical factors in the development of age-related ocular conditions. The phytochemicals present in *Alternanthera sessilis* may play a beneficial role in supporting eye health and preventing age-related diseases such as cataracts, glaucoma and macular degeneration, thereby contributing to healthy ageing. The leaves are also used traditionally for treating eye diseases, cuts, wounds, skin disorders and as an antidote for snake-bite. A medicated oil prepared using the plant juice as a key ingredient is applied during bathing to provide cooling effects, relieve neuritis and manage conditions such as piles, halitosis and several types of eye disorders.

Daruharidra (*Berberis aristata* DC.)



Studies show that berberine-a natural alkaloid found in *Berberis aristata*-can help protect the eyes in many ways. It is beneficial in conditions like diabetic eye disease and immune-related eye problems. Berberine helps reduce harmful new blood-vessel growth in the retina, lowers inflammation and protects the delicate cells of the eye from damage. It also decreases oxidative stress, prevents cell death and supports the health of important cells such as Müller cells and retinal ganglion cells, which are essential for vision. Newer advanced formulations of berberine are proving more effective by helping the inner layers of the retina stay healthy and reducing injury caused by stress and inflammation. Berberine also helps calm overactive immune responses, making it beneficial in certain inflammatory eye conditions. Overall, berberine acts as an anti-inflammatory, antioxidant and nerve-protecting agent, making it a promising natural option for various eye disorders.

Yastimadhu (*Glycyrrhiza glabra* L.)



Recent findings suggest that glycyrrhizin-a natural compound from licorice-can be very helpful for several eye problems. Eye drops containing glycyrrhizin have been shown to soothe dryness, improve moisture on the eye's surface and reduce irritation, making the eyes feel more comfortable and healthier. In conditions where eye pressure becomes high due to steroid use, glycyrrhizin helped to bring the pressure down. It also seems to support normal metabolic activities inside the eye, which can be disturbed by certain medications. Traditional use also supports its benefits: licorice-based eye drops have been used to ease redness, discomfort and inflammation in conjunctivitis, helping many people recover within a few days. Overall, glycyrrhizin shows strong calming, protective and healing effects, making it a promising natural option for dry eyes, high eye pressure caused by steroids and inflammatory eye conditions.

Lodhra (*Symplocos racemosa* Roxb.)



Lodhra plays a significant role in ayurvedic management of eye diseases, traditionally valued for its cooling, astringent and anti-inflammatory qualities that help soothe irritated ocular tissues. Classical practices describe using its bark in the form of pastes or decoctions, often combined with ghee or breast-milk for external application to relieve burning, itching, redness and

discomfort associated with conjunctivitis and other inflammatory eye conditions. These traditional insights align with modern findings showing that *Lodhra's* rich phytochemical profile-including flavonoids, phenolic glycosides and triterpenoids-contributes to strong antioxidant, antimicrobial and tissue-toning actions. Contemporary formulations such as standardised *Nimba-Lodhra* herbal eye drops further validate its relevance in managing infective conjunctivitis by reducing microbial load and ocular inflammation. Overall, *Symplocos racemosa* supports eye health by protecting ocular tissues, reducing inflammation and promoting the natural healing of irritated or infected eyes.

Haritaki (*Terminalia chebula* Retz.)



Haritaki is recognised in Ayurveda for its rejuvenating and protective effects on the eyes, supported by its rich content of tannins, flavonoids and phenolic acids that help counter inflammation and oxidative stress within ocular tissues. By inhibiting pro-inflammatory cytokines and enzymes, *Haritaki* helps reduce irritation, dryness and inflammatory changes that can exacerbate conditions such as conjunctivitis or contribute to the progression of myopia. Its strong antioxidant activity also supports retinal and optic-nerve health by minimising oxidative damage and promoting tissue repair. Additionally, emerging research highlights the therapeutic potential of its key bioactive compound, chebulagic acid, which has shown anti-proliferative effects on retinoblastoma cells, suggesting a possible role in developing supportive strategies for ocular tumours where treatment options remain limited. Overall, *Terminalia chebula* contributes to maintaining healthy vision through its anti-inflammatory, antioxidant and tissue-protective properties.

Draksha (*Vitis vinifera* L.)



The use of *draksha* and its derivatives, particularly grape-seed proanthocyanidin extract (GSPE), in ophthalmic disorders is scientifically supported by its potent protective effects against the key mechanisms of eye disease. Its high polyphenol content mediates antioxidant protection by safeguarding human lens-epithelial cells from oxidative stress induced by agents like H_2O_2, thereby reducing apoptosis and delaying the progression of cataract formation. Furthermore, the consumption of grapes has been shown to support macular health by increasing macular-pigment optical density (MPOD) and reducing harmful biomarkers such as advanced glycation end-products (AGEs), which are implicated in age-related macular degeneration (AMD) and diabetic retinopathy. The principal polyphenols, including resveratrol and proanthocyanidins, also exert significant anti-inflammatory and anti-angiogenic effects, which are crucial for mitigating the chronic inflammation and abnormal blood-vessel growth central to conditions like diabetic retinopathy and uveitis.

Yoga for Eye ailments: A Holistic approach towards Eye health



Dr. Prasanth P., BAMS. MD (Ay)
Superintendent & Senior Medical Officer
Ayurvedic Hospital & Research Centre
New Delhi
Arya Vaidya Sala, Kottakkal

In today's digital age, problems related to eyes have become very common due to prolonged use of computers, mobile phones, poor lighting and stress. Many people suffer from eye strain, dryness, blurred vision and even more serious conditions like glaucoma and myopia. While medical treatments and glasses are essential, many also seek natural methods to support their

eye health. Yoga, the ancient Indian practice well-known for its physical and mental benefits, offers some simple yet effective ways to improve eye health. This essay will discuss how yoga can be helpful in managing and preventing common eye ailments.

Understanding Common Eye Problems and Eye Strain

First, it is important to understand what causes most eye problems. Eye strain or 'asthenopia' happens when the eyes get tired from continuous use, especially while reading or staring at screens without rest. Symptoms include headaches, difficulty in focusing, dryness and blurred vision. Other issues include myopia (short-sightedness), hypermetropia (long-sightedness), cataract, glaucoma and age-related problems. Many of these arise from poor blood circulation around the eyes, muscle fatigue and mental stress.

Yoga for eyes is not meant to replace medical treatment but can be a complementary way to improve eye function, ease tiredness of eye muscles, and delay progression of some eye conditions.

Basic Concepts of Yoga for Eye Care

The main aim of yoga for eyes is to relax eye muscles, improve blood circulation, enhance focusing ability and reduce stress which can worsen eye problems. Our eyes have small muscles to help in movement and focus, and like any muscle, these need gentle exercise and relaxation. Yoga also encourages mindfulness and controlled breathing, which help reduce overall mental tension and eye strain.

Important Yoga Exercises for Eyes

1.Palming

Palming is a very simple and useful technique to relax the eyes. You need to rub your palms together to create warmth and gently place them around closed eyes without pressing. The warmth and darkness help soothe the optic nerves and relax the muscles surrounding the eyes. Doing this for a few minutes several times a day can reduce eye tiredness and improve clarity.



2.Blinking Exercises

Blinking helps keep the eyes moist and prevents dryness-especially important during long screen use, when we tend to blink less. Yoga recommends slow, mindful blinking, about 10-15 times, to stimulate tear production and freshen the eyes.

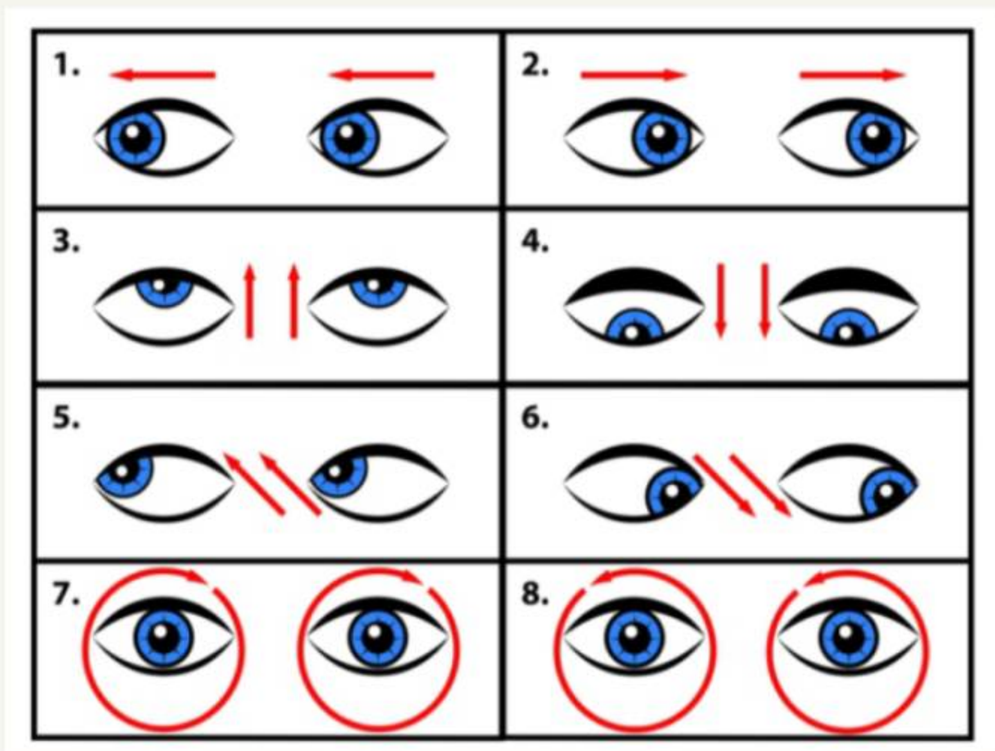


3. Eye Movements

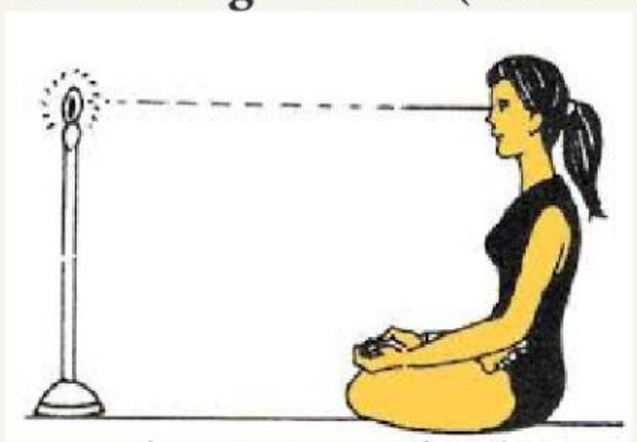
Performing controlled eye movements can improve the flexibility and coordination of eye muscles. These include:

- o Looking up and down slowly,
- o Moving eyes left to right without moving the head,
- o Diagonal movements,
- o Circular movements in both directions.

These movements stretch different muscles, reduce stiffness and improve eye mobility. Practicing them daily for 5-10 minutes helps avoid muscle fatigue and supports better vision.



4. Focusing Practice (*Trataka*)



Trataka means steady gazing at a small object or flame without blinking. It helps strengthen eye muscles, improve concentration, and is believed to improve eyesight and reduce certain eye disorders. Beginners should start with short duration and gradually increase as per comfort while keeping calm breathing.

5. Yoga Postures Supporting Eye Health

Certain yogasanas help improve blood flow towards the head and eyes, supporting eye health indirectly. Examples include:



Shirshasana
Increases blood circulation to brain and eyes; should be done under expert guidance.



Sarvangasana
Helps circulation and relaxation.



***Balasana* (Child's Pose)**
Relieves stress and tension around eyes.

Scientific View on Yoga for Eyes

Though scientific research on yoga for eyes is still developing, early studies show encouraging results. Regular eye yoga practice has been found to reduce eye strain symptoms, improve focusing ability, and increase strength of eye muscles. For example, a 2014 study in the International Journal of Yoga showed improved eye sharpness and less fatigue among computer users after eye exercises.

While yoga can't cure serious eye diseases like cataract or glaucoma, it serves as a preventive and supportive therapy that keeps the eyes fit and reduces discomfort from tiredness.

Additional Tips for Eye Care

For best results, yoga for eyes should be part of an overall healthy lifestyle:

- Follow the 20-20-20 rule: every 20 minutes, look at something 20 feet away for 20 seconds to prevent digital eye strain.
- Ensure proper lighting while reading or working.
- Follow a balanced diet rich in Vitamin A, C, E, lutein and omega-3 fatty acids for healthy eyes.
- Drink enough water and get good sleep for proper eye tissue rejuvenation.
- Manage stress through meditation and pranayama as they complement yoga by reducing eye strain.

Conclusion

Yoga offers a natural and easy way to take care of eyes in today's fast-paced life. By doing simple eye exercises and adopting mindful practices, we can relax eye muscles, improve blood flow and reduce stress which often worsens eye problems. It should be used as a supportive method along with regular eye check-ups and medical treatment. As awareness about holistic health increases, yoga for eye ailments stands out as a gentle and effective way to protect our precious vision.





Nirnaya – Diagnostic tips

Investigations in Eye diseases



Dr. R.G. Unnikrishnan, MD(Ay)
Professor & Head
Dept. of Roganidana
Vaidyaratnam P.S.Varier Ayurveda College
Kottakkal

Investigations in eye diseases play a central role in establishing an accurate diagnosis, assessing disease severity, and guiding treatment. The eye offers a unique advantage because many of its structures can be examined directly, yet subtle pathology often requires specialized tests to uncover functional or anatomical changes. Clinical evaluation begins with simple bedside assessments which provide a broad overview of ocular health. Advanced investigations add deeper insight into retinal, optic nerve and anterior segment disorders. These investigations help differentiate between similar presentations, monitor progression and evaluate response to therapy.

Investigations	Significance
1. Basic clinical tests:	
Visual acuity testing (Snellen / LogMAR)	Assesses central visual function and helps gauge severity of refractive errors, media opacities and macular or optic nerve disease.
Refraction (Objective and Subjective)	Identifies and quantifies refractive errors, helps to differentiate optical and pathological causes of reduced vision.
Pupillary reaction testing	Identifies afferent or efferent pathway involvement, detects optic neuropathy and severe retinal disease.
Amsler Grid	Screens for macular dysfunction, detects metamorphopsia and central scotoma.
2. Anterior segment evaluation	
Slit-Lamp Examination	Provides high-magnification view of anterior segment, detects conjunctival, corneal, anterior chamber, iris and lens abnormalities.
Tonometry (IOP measurement)	Measures intraocular pressure, essential for diagnosing and monitoring glaucoma and ocular hypertension.
Gonioscopy	Evaluates angle width and structure, differentiates open-from closed-angle glaucoma and detects angle neovascularization or synechiae (scar tissue that form between different structures within the eye).
Pachymetry	Measures corneal thickness, essential in interpreting IOP and diagnosing corneal ectasias (thinning and bulging outward of the cornea).
Keratometry / Corneal topography	Maps corneal curvature, diagnoses astigmatism and keratoconus, essential for refractive surgery planning.
Specular microscopy	Evaluates corneal endothelial cell density and morphology, important before cataract surgery and in endothelial dystrophies.

3. Posterior segment evaluation	
Fundus examination / Indirect ophthalmoscopy	Visualizes retina, macula, optic nerve and vessels, identifies retinopathy, detachment, optic neuropathies and macular disease.
Optical coherence tomography (OCT)	Provides cross-sectional retinal and optic nerve images, crucial for diagnosing macular edema, macular holes, ARMD (Age-related macular degeneration) and RNFL (Retinal nerve fiber layer) thinning in glaucoma.
Fundus fluorescein angiography (FFA)	Shows retinal vascular leakage, non-perfusion and neovascularization in diabetic retinopathy, vasculitis and ARMD.
Indocyanine green angiography (ICGA)	Evaluates choroidal circulation, useful for diagnosing polypoidal choroidal vasculopathy and choroidal neovascular membranes.
Visual field testing (Perimetry)	Detects visual field defects, essential in glaucoma, optic neuropathy and neurological lesions of the visual pathway.
Colour vision testing (Ishihara / Farnsworth)	Assesses cone function, detects optic nerve disease and macular pathology, used for occupational screening.
Contrast sensitivity testing	Detects subtle visual impairment in cataract, ARMD, early glaucoma and diabetic retinopathy.

4. Ocular surface and tear film tests	
Schirmer test	Measures tear production, supports diagnosis of aqueous-deficient dry eye.
Tear break-up time (TBUT)	Assesses tear film stability, helps diagnose evaporative dry eye and meibomian gland dysfunction.
5. Microbiological tests	
Corneal scraping and Microbiological culture	Identifies bacterial, fungal or parasitic organisms in keratitis, guides targeted therapy.
6. Imaging and Ultrasound	
B-Scan ultrasonography	Visualizes posterior segment when media are opaque, detects retinal detachment, vitreous haemorrhage and intraocular tumours.
CT Orbit / Paranasal sinuses	Assesses orbital trauma, fractures, foreign bodies, cellulitis and sinus-related complications.
MRI Orbit and brain	Provides high soft-tissue detail, essential for optic nerve lesions, intracranial pathology and orbital tumours.
7. Neuro-Ophthalmology & Electrophysiology	
Visual evoked potential (VEP)	Measures the speed of electrical conduction from the eye to the brain; detects demyelination in Optic neuritis.
Electroretinogram (ERG)	Measures the electrical response of the retina's photoreceptors (rods and cones); diagnoses inherited diseases like Retinitis pigmentosa.
8. Systemic investigations (Blood tests)	
Blood Tests (ESR, CRP, HLA-B27 RPR (Rapid plasma reagin), TSH etc.)	Detect systemic associations of uveitis, autoimmune disease, syphilis and thyroid orbitopathy.