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COMPUTER VISION SYNDROME: A REVIEW

Dr. Shashi Prakash Gupta*[1], Dr. D. B. Vaghela[2] and Dr. Surendra Kumar[3]

[1]Ph.D. Scholar, Shalakya Dept., I.P.G.T. & R.A. Jamnagar, Gujarat, India.
[2]Associate Professor, Shalakya Dept., I.P.G.T. & R.A. Jamnagar, Gujarat, India.
[3]Ph.D.scholar, Panchakarma Dept., National Institute of Ayurveda, Jaipur, India.

***Corresponding Author: Dr. Shashi Prakash Gupta**
Ph.D.scholar, Shalakya Dept., I.P.G.T. & R.A. Jamnagar, Gujarat, India.

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ABSTRACT
Computer Vision Syndrome (CVS) is a condition in which a person experience one or more of eye symptoms and/or headache and back pain as a result of prolonged working on a computer. American Optometric Association concluded that working at the computer is unnatural for human eyesight and 70-75% of all users who work with the computers have problems with the eyesight. On the basis of *Dosha* involvement, it is a *Vata-pittajanya Vyadhi*. Treatment modalities in modern science includes meticulous work environment as a precaution and use of artificial tear or contact lens wetting solutions that are not satisfactory. *Ayurveda* works through *Samprapti Vighatana* of disease which includes preventive and therapeutic principles like *Kriyakalpa* and *Chakshushya Dravya*. Two works have been done in the department of Shalakya tantra, I.P.G.T. & R.A. Jamnagar on computer vision syndrome. One work completed by Dr. M.P.Gangamma(2007) et.al with *Triphala* eye drops and *Saptamrita lauha* where marked improvement was found in 54.71% patients and moderate improvement in 22.64% patients among 151 patients. Another work completed by Dr. Arun Kumar (2014) et.al on 60 patients with *Satavaryadi* Compound And *Durvadi Aschyotana* where 6.67% patients showed complete remission, marked improvement in 80% patients and moderate improvement in 13.33% patients was noted.

KEYWORDS: *Ayurveda, Dosha, Chakshushya, Kriyakalpa.*

INTRODUCTION
The American Optometric Association defines COMPUTER VISION SYNDROME is caused by extensive use of computers which reduces the blinking rate of a person and due to this water flow across the eyes is reduced drastically and leads to dryness. People in the age group of 18 to 30years are at the risk of being affected by this syndrome if they spend a lot of time on Computer. Symptoms comprising CVS are dry and irritated eyes, eye strain/fatigue, blurred vision, red eyes, burning eyes, excessive tear secretion, double vision, headache, light or glare sensitivity, contact lens discomfort, slowness in changing focus, changes in colour perception, and neck, shoulder and backache. These symptoms of CVS are due to ocular (ocular-surface abnormalities or accommodative spasms) and/or extra ocular (ergonomic) aetiologies. Previous studies have estimated that the prevalence of CVS ranges between 64 and 90% among computer users(Hayes et al.,2007).It has been estimated that nearly 60 million people suffer from CVS globally and about one million new cases occur each year (sen and Richardson,2007). Computer Vision Syndrome has no direct reference in *Ayurvedic* Classics. It can be correlated to symptoms of *Shushkaakshipak* of *Sarvagata Netravyadhi*. Causes of CVS as per *Ayurveda* point of view are *Atiyoga* of *Chakshuendriya*(Excessive use of eye), *Mithyayoga* of *Chakshuendriya* (improper use of eyes),*Sooksma Nirikshanat* (seeing very small objects), *Atisammipayat*(from very close distance). On critical analysis of the symptoms of CVS on *Tridoshik* theory of *Ayurveda*, as per the road map given by *Acharya Charaka*, it seems to be a *Vata pittajanya vyadhi*. Modern science includes treatment like meticulous work environment as a precaution and use of artificial tear or contact lens wetting solutions to suffice the symptoms. Artificial tears can reduce the effects of dry eye in computer vision syndrome. But its preservatives are harmful to eye. So long term use is not possible and effects of artificial drops are temporary. A recent study in Japan revealed that the majority of lubricating eye drop users were dissatisfied with the therapeutic effects(Shimmura 1999).[1] In the treatment of CVS, *Ayurveda* has much to offer through *Kriyakalpa*, eye exercises and internal medications. Present study is aimed to highlight effectiveness of *Ayurvedic* Treatment protocol In this study, works done on computer vision syndrome in the department of *Shalakya*, I.P.G.T. & R.A. Jamnagar has been reviewed.

MATERIALS AND METHODS

All the research works carried out in IPGT and RA, Gujarat Ayurved University, Jamnagar, under department of *Shalakya Tantra* on Computer Vision Syndrome(CVS) from 2005 to 2015 were compiled and screened and cited to analyze the outcomes on the *Ayurvedic* lines of management on CVS.

Drugs: All trial drugs were prepared in the Pharmacy of Gujarat Ayurved University, Jamnagar. Pharmacognostical and Analytical study of trial drugs were done in laboratories of IPGT & RA, GAU, Jamnagar.

Investigation: Routine hematological and biochemical(Hb%, TC, DC, ESR and RBS), Urine Routine & Microscopic were done before treatment for assessment. Routine eye examination including intraocular pressure, visual acuity and slit lamp examination, were carried out to exclude any other ocular pathology.

Criteria for Assessment: Assessment was done on the basis of clinical improvement of the patients in terms of relief in symptoms of Computer vision syndrome like eye strain, blurred vision, headache, redness of eyes, burning sensation in eyes, dry eyes, slow refocusing, excessive fatigue(neck/shoulder/back pain).

Overall Assessment: An assessment scale was made to assess the rate of improvement. At the end of treatment, the result in view of percentage of relief was classified.

Statistical Analysis: The obtained data were analyzed statistically. The values were expressed as percentage of relief and Standard Error Mean. The data was analyzed statistically by 't' test and Chi-square test.

OBSERVATIONS

Following studies had been conducted till date on Computer vision syndrome in *Shalakya* dept.

1. M.P.Gangamma et al.(2007), I.P.G.T. & R.A., G.A.U., Jamnagar- A clinical study on Computer vision syndrome and its management with *Triphala* eye drops and *Saptamrita Lauha*

In this clinical study, 151 patients from the Out-patient Department of *Shalakya Tantra* of I.P.G.T. & R.A., G.A.U, Jamnagar, who were suffering from CVS and fulfilling the criteria of inclusion for the present study, were registered and divided randomly into three groups with the following drug schedule in a particular group:
Group A: *Triphala* eye drops; one drop in each eye, 4 times/day for 30 days.

Group B: oral administration of *Saptamrita Lauha* tablets, 500 mg BD with unequal quantity of *Madhu* and *Ghrita* and *Triphala* eye drops one drop in each eye, 4 times/day for 30 days and Group C: oral administration of placebo tablets 500 mg, 2 times/day, and distilled water eye drops one drop in each eye, 4 times/day for 30 days.

Table. 1: Effect of therapy on chief complaints.

Chief complaints	Group A		Group B		Group C	
Dry and irritated eyes	**n**	**%improvement**	**n**	**%improvement**	**n**	**%improvement**
	25	60.98	24	65.79	21	40.00
Eyestrain	39	63.08	50	67.86	41	20.30
Blurred vision	24	44.74	31	69.23	22	15.79
Red eyes	35	55.36	34	69.23	24	15.95
Burning sensation	37	65.08	46	77.33	37	52.38
Excessive tear secretion	25	51.22	31	58.33	25	19.05
Double vision	06	50.00	05	44.44	07	09.09
Headache	36	28.57	45	47.56	35	20.00
Light/glare sensitivity	26	55.81	30	59.57	17	16.67
Contact lens discomfort	03	41.33	04	55.56	01	100
Slowness in changing focus of eyes	06	44.44	09	42.86	04	16.67
Changes in colour perception	01	100	02	00	00	00
Neck, shoulder and backache	22	20.51	19	29.63	09	00

When computed statistically Group A and Group B with Group C by using Chi-square test, Group A patients showed significant improvement ($P < 0.05$) in the chief complaints over that of Group C in three symptoms, i.e., blurred vision, light and glare sensitivity, and eye strain/ fatigue.

Group B (*Saptamrita Lauha* and *Triphala* eye drops) patients showed statistically significant improvement ($P < 0.05$) in chief complaints over that of placebo with regard to three symptoms, i.e., dry and irritated eye, excessive secretion of tears, and light or glare sensitivity test. Whereas, in relation to blurred vision and eye strain/fatigue, the significance was at the level of $P < 0.01$, and in the case of burning eyes, the test has shown highly significant effect with $P < 0.001$.

2. Arun Kumar et al.(2014), I.P.G.T. & R.A., G.A.U., Jamnagar- A Clinical Study on *Satavaryadi* Compound and *Durvadi Aschyotana* (Eye Drop) in the treatment of Computer Vision Syndrome

A total of 60 patients presenting with clinical features of CVS were selected from the O.P.D. and I.P.D. of the Department of *Shalakya Tantra (Netra Roga* Unit) of I.P.G.T. & R.A. Hospital, Jamnagar by simple random sampling method and divided into following 3 groups:-

Group A- In this group *Satavaryadi* Compound; 500 mg BD and *Durvadi Aschyotana* (eye drop); one drop in each eye, 4 times/day for 30 days were given.

Group B- In this group CMC eye drops one drop in each eye, 4 times/day for 30 days were used.

Group C- In this group counseling of preventive measures was done without any medication.

Table. 2: Effect of therapy on chief complaints.

No.	Chief complaints	Group-A		Group-B		Group-C	
		n	% of improvement	n	% of improvement	n	% of improvement
1	**Eye Strain**	30	85.96	15	54.84	14	29.17
2	**Blurred Vision**	28	73.53	12	33.33	12	30.76
3	**Headache**	26	82.05	15	57.69	10	50
4	**Redness**	28	87.88	15	46.15	11	50
5	**Burning sensation**	28	86.95	14	44.82	10	50
6	**Dry & irritated eyes**	30	84.21	13	86.67	12	55.55
7	**Slow refocusing**	23	83.33	05	42.85	06	37.50
8	**Fatigue (neck & shouder pain)**	24	65.51	08	62.50	09	11.11
9	**Dizziness**	11	81.81	06	85.71	02	50
10	**Changes in colour perception**	13	86.67	04	75	02	100

By applying Chi square test, it was found Highly Statistically Significant difference is obtained in Eye strain, Redness & Burning sensation for Group-A over that of Group-B with p value<0.001.

In Headache Moderately Significant result was found in Group-A with p<0.01. Significant results were found in Blurred vision & Slow refocusing with p<0.05.

Insignificant results were found in Dry/Irritated eyes, Fatigue, Dizziness & Change in color perception with p>0.05.

By applying Chi square test, Highly Statistically Significant result was obtained in Eye strain, Redness for Group-A over that of Group-C with p value<0.001.

In Burning sensation, Slow refocusing & Fatigue; Moderately Significant result was found in Group-A with p<0.01. Significant results were found in Blurred vision, Headache & Dry/Irritated eyes with p<0.05.

Insignificant results were found in Dizziness & Change in color perception with p>0.05.

RESULT

Table. 3: Overall effect of therapy.

Name of Researchers	Groups	Cured	Marked improvement	Moderate improvement	Mild improvement	Unchanged
M.P.Gangamma	A	0%	48.89%	13.33%	37.78%	0%
	B	07.55%	54.71%	22.64%	15.09%	0%
	C	0%	06.98%	09.30%	39.53%	44.19%
Arun Kumar	A	6.61%	80%	13.33%	0%	0%
	B	0%	6.67%	53.33%	40%	0%
	C	0%	0%	28.57%	50%	21.43%

DISCUSSION

Probable mode of action

The reference quoted as per *Bhaishajya Ratnavali* suggests that *Saptamrita Lauha* not only cures various *Netra Rogas* but also acts as *Rasayana*. All the constituents of *Saptamrita Lauha*, i.e., *Haritaki, Vibhitaki, Aamalaki, Yashtimadhu, Lauha Bhasma* have the Tridoshagna properties, especially helping in *Vata-Pitta* Shamana by their Gunas like *Guru, Snigdha, Mridhu, Ushna, Sheeta, Rooksha, Laghu*. Five of these drugs have *Sheeta Veerya*, whereas the other two drugs have *Ushna Veerya* and all the drugs have *Madhura Vipaka*. *Ghrita* is the drug of choice in *Netra Rogas*. Because of its *Sanskaranuvaratana Guna, Sheeta Veerya* and *Madhura Vipaka*,[2] it helps in pacifying the *Pitta Dosha*. So, these drugs reduce the vitiated *Doshas* and help in correcting the pathology of the disease. By virtue of its *Rasayana* and *Chakshushya* properties, it helps to increase the strength

of the organ, which in turn increases the speedy recovery from its pathological state.

Triphala (*Anubhoota Yoga*) eye drops relieve the eye strain and strengthen the visual function. The fruit triad of *Haritaki, Vibhitaki, Aamalaki* holds excellent in Ayurvedic ocular therapies, as it is prescribed for the treatment of many ocular diseases in the different forms. *Triphala* has *Tridoshaghna* property; so, it also helps in reversing the disease by reversing the vitiated *Vata-Pitta Doshas* by its *Gunas* like *Ruksha*, *Laghu*; *Sheeta*, *Guru*, and with *Panch Rasatmaka Lavana Varjita Kashaya Rasa*. Also, *Triphala* in the eye drops form helps to reduce the local symptoms as well as it strengthens the eye. Application of *Triphala* in the form of eye drops makes the drug available for immediate action.[3]

Durvadi Ghrita mentioned in *Chakradatta*, *Rakta-Pitta Chikitsa adhyaya* which has been slightly modified with addition of *Yasthimadhu* for *Snehana Aschyotana* and *Satavryadi Churna* mentioned in *Yogratnakara-Netrarogadhikara* which has also been modified with addition of *Saptamrita Laauha* and *Abhraka Bhasma* have *Vata Pitta shamaka* and *chakshushya* properties.

Satavryadi Compound having *Sheeta Virya*, *Madhura Vipaka* and *Rasayana* properties help in pacifying *Vata-pitta Dosha*. *Durvadi Aschoyatana* having *Chakshushya* and *Vata-pitta Shamaka* properties lubricates the ocular surface and immediately increases the tear film break up time by virtue of its lipid nature and makes the tear film stable.[4]

Thus, both the drugs help to increase the ocular strength, which in turn increases the organ's capacity to overcome its pathological condition.

CONCLUSION

Computer users are invariably exposed to the risk of developing “CVS” leading to marked deterioration in performance owing to the severity and persistence of disorders. By analyzing the previous works it can be said that *Ayurvedic* treatment protocol was more effective over the current modern artificial tears and placebo treatment in pacifying the symptoms of Computer vision syndrome.

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