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## Research Article

### CLINICAL STUDY TO ASSESS THE ROLE OF AN AYURVEDIC PROCEDURE IN CHILDHOOD COMPUTER VISION SYNDROME

Singh Omendra Pal<sup>1\*</sup>, Singh Laxmi<sup>2</sup>

<sup>1</sup>Lecturer, Department of Kaumarbhritya (Ayurvedic Pediatrics), M.S.D. Singh Ayurvedic Medical College, Fatehgarh, Farrukhabad, Uttar Pradesh, India

<sup>2</sup>Lecturer, Department of Kaumarbhritya (Ayurvedic Pediatrics), Government Ayurvedic College, Lucknow, Uttar Pradesh, India

\*Corresponding Author Email: omendrapalsingh@gmail.com

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#### ABSTRACT

Computer Vision Syndrome is the complex of eye and vision problems caused by computer use. In present scenario children are equally being affected with computer vision syndrome because of excessive exposure to video display terminals. Therefore considering these prospects a clinical trial was carried with 10 clinically diagnosed children of computer Vision Syndrome. An Ayurvedic procedure (akshitarpana) was carried out on up to 20 min for 7 days. It was observed that akshitarpana procedure was highly effective in the complaints of computer vision syndrome exclusively related to eyes viz. red eyes, burning eyes, dry eyes, teary eyes, itching eyes, eyestrain and also in headache.

**Keywords:** Computer vision syndrome, Akshitarpana, lifestyle disorders in children.

#### INTRODUCTION

Children are equally being affected with computer vision syndrome in present scenario. This may be because of excessive exposure to video display terminals like television and computers. Apart from these, children have limited degree of self-awareness and participate in long drawn-out activity without taking time for a momentous break. The American Optometric Association has defined computer vision syndrome as “The complex of eye and vision problems related to near work which are experienced during or related to computer use”. The signs and symptoms of computer vision syndrome may vary according to age but in children these include red eyes, burning eyes, dry eyes, teary eyes, itching eyes, eye strain blurred vision, difficulty in focusing, double vision, squinting for better vision, headache, fatigue neck, shoulder or back pain<sup>1</sup>.

#### Computer vision syndrome and Ayurveda

Though ‘computer vision syndrome’ has no direct reference in Ayurvedic classics, an Ayurvedic approach to its perceptive and treatment protocol can be understood on the basis of the fundamentals of Ayurveda. The nidana (etiological factors) and samprapti (pathogenesis) of computer vision syndrome can be well understood by trividha hetu<sup>2</sup> (three types of etiological factors) viz. asatmendriyartha samyoga (incompatible correlation of the senses with their objects), prajnaparadha (intellectual error), parinama (time or age) with respect to chakshurendriya (visual objects). Asatmendriyartha sanyoga<sup>3</sup>: among trividha hetu’s it is the nearest or immediate cause in the disease manifestation. It includes the ati, mithya and heena yoga of the chakshurendriya. atiyoga (long exposure to screen), heenayoga (very small fonts, poorly illuminated room), mithyayoga (constantly staring, not blinking). Pragyaparadha<sup>4</sup>: wrong understanding by the intellect and wrong actions accordingly is known as intellectual error that is committed by mind; it includes dhi vibhrama (unable to differentiate between

good and bad i.e. continuous exposure to screen), dhrti vibhrama (in spite of knowing its harmful effects, can’t control), smriti vibhrama (forgets advice for evasion of unhealthy exposure)<sup>5</sup>. Parinama: It is the unavoidable cause. By the indulgence in above said nidana (etiological factors) child is excessively exposed to UV rays and glare, emitted from TV and computer monitors. These are vata-paittakara nidana (etiological factors vitiating vata and pitta humours) as having speed (vata humour’s property) and are the forms of energy (pitta humour’s property) leading to Vata - Pitta pradhana tridosha (vata-pitta predominant all three body humours) vitiation at chakshurendriya (eyes) then sthanasamsraya (localization) of these vitiated doshas (humours) occur in vahya and second patala of netra<sup>6</sup> (external and second sheath of the eye, consists of tear film, conjunctiva and ciliary muscles of the eyes) producing the symptoms like dry eyes, eye strain, blurred vision (vataja) burning eyes (Pittaja) etc.

#### MATERIAL AND METHODS

##### Selection of the cases

10 Clinically diagnosed children (5-15 years age group) of computer vision syndrome were selected for the open clinical study from O.P.D. /I.P.D. of Department of Balroga (Ayurvedic pediatrics) National Institute of Ayurveda, Jaipur, India. The akshitarpana procedure was performed with triphala ghrita for 20 min daily for 7 days. A detailed comparative clinical trial was also performed later as an exploration of this study<sup>7</sup>.

##### Akshitarpana

The procedure of keeping medicated ghrita (butter oil) on the eye balls for a definitive period of time contained by a small tank constructed around the eyes with paste of black gram flour. In this procedure the patient is made lie down in supine position. The area around the eyes is cleaned with sterile water. When it becomes dry the area around eyes are covered with dough

prepared by the mixture of black gram flour (masha pishiti) about 3.9 cm high and 2.5 cm wide. The space between skin and the wall made up of black gram dough is tightly sealed with the paste of black gram. The patient is asked to close his eyes. Then about 12-15 ml lukewarm (between 38-39°C) triphala ghrita is poured with the help of sterile cotton swab or dropper on each eye so that the eyelashes should be completely merged in ghrita (medicated butter oil). The temperature of triphala ghrita should be carefully checked before pouring it on the eyes of the patient. When the ghrita becomes cold it is replaced with the fresh lukewarm. During the procedure patient is asked to open and slightly move his eyes keeping his head still up to 20 min daily for 7 days<sup>8</sup>. Regimen during the course: After the procedure patient is asked not to open eyes for 15-20 min. Patient is instructed to avoid works related to near vision and watching towards glittering objects during the period of akshitarpana treatment. This procedure is effective in the management of dry eyes, blepharitis, madarosis and chronic inflammatory conditions of the eyes<sup>9</sup>. However, it is contraindicated in acute inflammatory conditions of the eyes, in extreme hot or cold climatic conditions<sup>10</sup>. Triphala Ghrita: The Triphala Ghrita was prepared under sterile conditions. Though the method of preparation was according to the classical Ayurvedic text Sharandhara Samhita<sup>11</sup>, but the drugs with which the ghrita was prepared were amalaki (*Embllica officinalis*), vibhitaki (*Terminalia bellirica*) and haritaki (*Terminalia chebula*). The triphala ghrita was preserved in autoclaved glass bottles.

### Criteria adopted

#### Inclusion criteria

- Children who spend more than two hours/day in front of screen (T.V. or computer).
- Children showing minimum three symptoms of computer vision syndrome.

#### Exclusion Criteria

- Children below the age of 5 years and above 15 years.
- Children with any systemic disorder.
- Children with physical disability.
- Children with any psychotic disorder.

#### Assessment Criteria

Symptoms of computer vision syndrome were graded on four point scale and assessment on the basis of pre and post observations found on this scale was done.

### RESULT

The statistical analysis (paired student's - t test) of clinical changes in the symptoms of computer vision syndrome after 7 days course of akshitarpana procedure shows highly significant improvement ( $p < 0.001$ ) in symptom of red eyes, dry eyes, burning eyes, teary eyes, itching eyes, eye strain, blurred distant vision, difficulty in focusing, squinting for better vision and headache, while moderately significant improvement ( $p < 0.01$ ) was observed in complaint of fatigue. The improvement was insignificant for complaint of double vision ( $p < 0.10$ ) and pain in neck, shoulder or back ( $p < 0.05$ ).

**Table 1: The Incidence of Demographic Profile**

S. No.	Findings	Predominance	Percent
1.	Age	13-15 yr age group	60.00
2.	Sex	Male	80.00
3.	Liking of Rasa(taste) in diet	Amla	50.00
4.	Sharirik Prakriti (body constitution)	Vata-Pittaja Prakriti	60.00
5.	Mansik Prakriti (mental constitution)	Rajasika	50.00
6.	Agni (appetite )	Vishama	40.00
7.	Koshta (bowel)	Krura	50.00
8.	Family/H/O Ophthalmic illness	No	80.00
9.	Visual acuity	6/6 – 6/9	80.00
10.	Workplace lighting	Poor	70.00
11.	Angle of gaze	Above eye level	80.00

**Table 2: Statistical Improvement in the Patients of Computer Vision Syndrome**

Clinical Features	N	Mean		Diff.	Mean%	SD ±	SE ±	T	p
		BT	AT						
Red eyes	10	2.5	0.4	2.1	84.00	0.56	0.17	11.69	< 0.001
Burning Eyes	10	2.3	0.2	2.1	91.30	0.31	0.10	21.00	< 0.001
Dry Eyes	10	2.1	0.2	1.9	90.47	0.87	0.27	6.86	< 0.001
Teary Eyes	10	2.0	0.1	1.9	95.00	0.99	0.31	6.04	< 0.001
Itching eyes	10	1.7	0.2	1.5	88.23	0.84	0.26	5.58	< 0.001
Eye strain	10	1.8	0.3	1.5	83.33	0.70	0.22	6.70	< 0.001
Difficulty in focusing	10	1.4	0.5	0.9	64.28	0.73	0.23	3.85	< 0.001
Double vision	10	0.8	0.5	0.3	37.50	0.67	0.21	1.40	< 0.10
Squinting for better vision	10	1.4	0.1	1.3	92.85	0.94	0.30	4.33	< 0.001
Headache	10	2.3	0.4	1.9	82.60	0.56	0.17	10.28	< 0.001
Pain Neck/ shoulder /back	10	0.9	0.6	0.3	33.33	0.48	0.15	1.96	< 0.05
Fatigue	10	1.9	1.4	0.5	26.31	0.52	0.16	3.00	< 0.01

BT: Before Treatment, AT: After Treatment

**DISCUSSION****Demographic data****Age**

The highest incidence of computer vision syndrome was seen in the age group of 13-15years (60 %) that shows the fact that computer vision syndrome is most common in this pediatric age group because of the more use of computer in school and indulgence in watching TV at home. The lower age group has relatively less understanding of the computer functioning thus show less interest in it.

**Sex**

Male children (80 %) incidence was more in clinical trial showing that this gender is more prone to computer vision syndrome in children. The probable reason may be that girls usually obey more to parents and hesitate to avoid the instructions while boys becoming more stubborn to watch more TV and computer.

**Dominant rasa in diet (taste preference in diet)**

In clinical trial it was found that the patients of computer vision syndrome like amla rasa (sour taste) the most (50 %); the observation is supported by the classical reference of netraroga nidana (etiology of eye disorders). In our classics it is given that the excessive intake of sour food items leads to eye disorders<sup>13</sup>.

**Sharirika Prakriti (Body constitution)**

On exploring the sharira prakriti, it was revealed that all the patients registered in present clinical trial belonged to only dwandaja type of prakriti, out of which maximum number of patients (50.00 %) were of vata- pittaja prakriti. In manasika prakriti (Mental constitution) maximum patients (50.00 %) belonged to rajasika prakriti as raja dosha has a relation with vata sharirika dosha, later has important role in samprapti of computer vision syndrome. When the samprapti ghatakas (factors involved in etio-pathogenesis) are analyzed more involvement of vata and pittaja Dosh is seen. So by dosha and prakriti concept we can understand that vata –pitta prakriti children are more prone to computer vision syndrome.

**Agni (appetite)**

The profile of computer vision syndrome patient indicates that predominant patients (40.00 %) were having vishamagni (agni –veshmya due to vata dominancy). This is supported by the prakriti profile of computer vision syndrome patients that shows dominancy of vata prakriti.

**Koshta (Bowel)**

The status of koshta in patients of computer vision syndrome was kroora type in maximum number of patients (50.00 %). vata prakriti children have kruru koshta (hard bowel) and the vata prakriti children were in majority in clinical trial.

**Effect of therapy in relieving chief complaints****Red eyes**

On statistical analysis there was highly significant improvement with  $p < 0.001$  and 84.00 % relief; this shows that the akshitarpana procedure is having highly significant results in managing red eyes.

**Burning eyes**

Blinking is very essential to keep the eye surface moist. When blinking slows down the eyes becomes dried which leads to the burning sensation. Highly significant improvement was seen on statistical analysis ( $p < 0.001$ , 91.30 %); it suggest that akshitarpana procedure is highly effective in managing burning eyes.

**Dry eyes**

Blink rate in Video display terminal users gets reduced considerably. The possible explanation for the decreased blink rate includes more concentration on the task and a relatively limited range of eye movements. On statistical analysis there was highly significant improvement ( $p < 0.001$ , 90.47 %) in complaint of dry eyes. This is the indicative of highly effectiveness of akshitarpana procedure on management of dry eyes.

**Teary eyes**

Tear keeps the eye moist which is necessary for normal ocular functions. It helps to maintain the proper oxygen balance of the anterior surface of the eye. The statistical analysis shows highly significant improvement ( $p < 0.001$ , 95.00 %) in the symptom of teary eyes. This indicates the highly efficacy of akshitarpana procedure in teary eyes management.

**Itching eyes**

Itching in eyes is the result of dryness in the anterior surface of the eyes giving rise to the friction during blinking. The clinical study shows highly significant improvement ( $p < 0.001$ , 88.23 %) in complaint of itching eyes.

**Eye strain**

Eye strain is the most common complaint of the children suffering from computer vision syndrome. There is no set definition of eye strain. The technical term used for eye strain is 'asthenopia'. Asthenopia is defined as the subjective complaint of uncomfortable, painful and irritable vision. The statistical analysis shows highly significant improvement ( $p < 0.001$ , 88.30 %) that suggests highly effectiveness of akshitarpana procedure on management of eye strain in computer vision syndrome.

**Blurred vision**

Blurred vision in children can occur from refractive error, improper prescription of lenses, or other focusing disorders. Considering the working environment, blurred images can also arise from a dirty screen, poor viewing angle, reflected glare or a poor quality or defective monitor. Statistically highly significant improvement was seen ( $p < 0.001$ , 69.23 %) that is suggestive of highly efficacy of akshitarpana in management of blurred vision.

**Difficulty in focusing**

This may be a symptom is many eye diseases but in computer vision syndrome it may be because of poor viewing angle, reflected glare or a poor quality or defective monitor. There was highly significant improvement ( $p < 0.001$ , 64.28 %) in the complaint of difficulty in focusing suggesting towards the effectiveness of akshitarpana in relieving this complaint.

**Double vision**

Double vision is a serious symptom and can be caused by several factors. In computer vision syndrome this condition is because of continuous staring on Video Display Terminal screen. A complete eye examination is indicated if this symptom persists because whole visual system starting from cornea to higher centers in brain may involve in this condition. The improvement in this symptom was found insignificant ( $p < 0.10$ , 37.5 %) during the clinical trial. Double vision is the symptom that is seen in chronic conditions of computer vision syndrome in which improvement may be observed by longer trial of akshitarpana procedure.

**Squinting for better vision**

The continuous exposure to glare and reduced blink rate make the tear film thinner thus make the vision blurred since tear film also act as refractive media. It is associated with blurred vision which is corrected by changing viewing angle. The highly significant improvement ( $p < 0.001$ , 92.85 %) observed here also suggests that akshitarpana procedure is very effective in management of this complaint.

**Headache**

Headache is one among the discomforts of computer vision syndrome and it occurs mostly towards frontal region and during middle or end of the day. The study reveals highly significant improvement ( $p < 0.001$ , 82.6 %) in complaint of headache.

**Pain in Neck/ shoulder /back**

The statistical analysis shows that there was insignificant improvement ( $p < 0.10$ , 33.33 %) in complaint of Pain in Neck, shoulder, back in computer vision syndrome.

**Fatigue**

The statistical analysis of clinical study shows that akshitarpana procedure is moderately effective ( $p < 0.01$ , 26.31 %) in the management of fatigue in computer vision syndrome.

**Discussion on overall effect of the therapy**

It was assessed that among the symptoms of computer vision syndrome double vision, pain in neck, shoulder and back, fatigue reduced mildly (25-50 %) while blurred distant vision and difficulty in focusing were reduced moderately (50-75 %). The marked improvement was seen in red eyes, burning eyes, dry eyes, itching eyes, teary eyes, eye strain, squinting for better vision and headache (75-100 %). Overall it was observed during study that akshitarpana procedure was highly effective in the complaint of computer vision syndrome that are exclusively related to eyes viz. red eyes, burning eyes, dry eyes, teary eyes, itching eyes, eyestrain, and blurred vision, difficulty in focusing, squinting for better vision and also in headache. It had significant role in providing relief in complaints of fatigue.

**Probable mode of action of therapy**

In the study akshitarpana was performed with triphala ghrita. Triphala has proven effect in ocular diseases having tridoshagna (pacify all three humours) property so it also helps in pacifying

the disease by reversing the vitiated vata-pitta doshas by virtue of their properties- rasa (taste), guna (property), virya (potency), vipaka (metabolic property) and dosha karmata (action on body humours), and by combination they act as chakshushya (improves visual functions). Ghrita is told one among the best rasayana (rejuvenative) for eye in Ayurvedic classic<sup>13</sup>. It is having vata- pitta shamaka (pacifying) properties (sheeta veerya, snigdha guna) that are the dominant doshas in samprapti ghataka of computer vision syndrome.

**CONCLUSION**

Vata pitta trait of sharirika prakriti can render a child more prone to computer vision syndrome. Rajasika trait of manasika prakriti can add to the severity of the symptoms of this disease. Akshitarpana procedure is highly effective in the complaints of computer vision syndrome those are exclusively related to eyes viz. red eyes, burning eyes, dry eyes, teary eyes, itching eyes, eyestrain and also in headache. No adverse effect of the procedure was observed during the study.

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