



Original Article

UNDERSTANDING COMPUTER VISION SYNDROME - AN AYURVEDIC PERSPECTIVE

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Abstract

The discovery of the computer has, to a greater extent, revolutionized most of professions. With the advancement of computers, this magnificent invention has brought many health related ailments along with it. CVS is a complex of eye and vision related problems that are experienced during and related to computer use. It is a repetitive strain disorder that appears to be growing rapidly, with some studies estimating that 90% US workers using computers for more than three hours per day experience CVS in some form.

Eye-strain, tired eyes, irritation, burning sensations, redness of eyes, dry eyes, blurred, and double vision are some of the clinical features of computer vision syndrome. These group of symptoms of eye strain are known as asthenopia. The only possible measure to treat CVS is to follow basic ergonomic rules and regular eye examinations to keep prescriptions up to date. In Ayurveda direct reference of this disease is not present. An attempt is made to create a better understanding of the disease using fundamentals of Ayurveda considering it as an *Anukta Vyadhi*.

Keywords: CVS, Asthenopia, Repetitive strain disorder, ergonomics, *Anukta Vyadhi*

INTRODUCTION

The discovery of the computer has to a greater extent revolutionized most of professions. The affordable prices, increased productivity and social changes have led to computers and mobile computing devices being used by a large proportion of population. However, it has also led to increased number of patients complaining about ocular and non-ocular symptoms. The initial concern about use of visual display terminals (VDTs) was centred around radiation, which included X-rays, optical, radio frequency, very low frequency, and extremely low frequency radiation. ^[1]

Somatic disorders, depression, and obsessions were reported in increased frequency in computer users especially when the operating time was more than 30 hours per week and the duration of usage more than 10 years. Eye-strain, tired eyes, irritation, burning sensations, redness of eyes, dry eyes, blurred,

and double vision were reported by the visual display unit users and termed “Computer Vision Syndrome” (CVS).^{[ii][iii] [iv] [v]}

These clinical features appeared to increase as duration of VDT exposure increased.^{vi} These features of CVS are due to ocular (ocular-surface abnormalities or accommodative spasms) and/or extra ocular (ergonomic) aetiologies. It has also been shown that VDT users also have a higher incidence of complaints than non-VDT users in the same environment. The catastrophic effect of the CVS has resulted in low performance and extreme discomfort to the sufferer. The symptoms being vague and slow in onset drift to intolerable severity by the time the sufferer seeks medical advice.^[vii]

Occupational Safety and Health Administration of the US Government (OSHA) has defined CVS as a ‘complex of eye and vision problems that are experienced during and related to computer use; it is repetitive strain disorder that appears to be growing rapidly, with some studies estimating that 90% US workers using computers from more than three hours per day experience CVS in some form’.^[viii]

“The ocular complaints experienced by computer users typically include eyestrain, eye fatigue, burning sensations, irritation, redness, blurred vision, and dry eyes, among others. The condition of a person experiencing one or more of these ocular complaints as a result of operating a computer and looking It is a repetitive strain disorder” defined by the American Optometric.^[ix]

Blehm *et al.* categorized the symptoms in four major categories: asthenopic, ocular surface-related, visual, and extraocular [Table 1].^[x]

Four major categories of symptoms in computer vision syndrome		
Symptom category	Symptoms	Possible causes
Asthenopic	Eyestrain Tired eyes	Binocular vision Accommodation
Ocular surface related	Dry eyes Watery eyes Irritated eyes Contact lens discomfort	
Visual	Blurred vision Slowness of focus change Double vision Presbyopia	Refractive error Accommodation Binocular vision Presbyopia correction
Extraocular	Neck pain Back pain Shoulder pain	Computer screen location

Repetitive Strain Injury (RSI) is the most common occupational injury faced by computer users. Whilst RSI refers to the pain felt in muscles, nerves, tendons and other soft body tissues. RSI caused from prolonged repetitive movement, forceful, or awkward movements and overuse as conditions resulting from continuous use of a tool (Melhorn 2004; Olatunde *et al.* 2013). When viewing near objects meiosis, accommodation and convergence take place. Prolonged work at computer terminals has been associated with changes in both relative accommodations and vergence.^[xi]

The only possible measure to treat CVS is to follow basic ergonomic rules and regular eye examinations to keep prescriptions up to date.

Though new diseases are introducing in human life Ayurveda still remain unchanged. As Acharya Charaka depicts in Samhita, if a knowledgeable physician is unable to name a disease, then he should not be ashamed of his ignorance because it is impossible to name all the diseases in the world.

Vaidya should treat the disease properly on the basis of Ayurveda principles.^[xii] The diseases which existed during the period of Samhita's were mentioned with adequate literature on them. But, they had such an intellect that they left a room for incorporating the newer upcoming diseases with time. All the diseases cannot be named but they can be studied and treated according to the signs, symptoms and *DoshaPradurbhaava*. Also Charaka Acharya in Sutrasthana has said that depending on the *Vedana-nidana-varna-sthana-lakshana* there can be innumerable diseases. But these vitiated *Doshas* causes different diseases at different places due to different causes.^[xiii]

Acharya Charaka mentioned certain tools to assess any disease like one should know the provoking factors, *Doshas* involved, mode of manifestation, cardinal symptoms of disease, location of the *doshas*, diagnostic tools to assess the disease, its complications, its aggravating factors, its relieving factors and precautions to be taken into consideration.^[xiv] Further Acharya Charaka, emphasizes more on the three factors i.e. the nature of the disease, the site of its affection and its aetiology, only then decide the line of treatment. The knowledgeable vaidya who knows these three properly can wisely treat any disease, and he does not get into any state of dilemma. When *aggravated*, one and the same *doshas* may cause manifold diseases depending upon the various etiological factors and the sites of manifestations.^[xv]

Ayurveda has depicted the "cause and effect" theory which is the foundation behind occurrence of all the disease. Without any cause (*Karana*), effect (*Karya*) is not supposed to occur. The effect is always in accordance to the cause and are always interrelated. In computer Vision Syndrome the *Karana* is the overexposure to Visual Display Terminals and the *Karya* is its resultant symptoms.

The basic fundamentals of Ayurveda may help to understand any *Anuktavyadhi*. *Nidana* and *Samprapti* can be understood by *Trividhahetu's* (*AstamyaIndriyarthasamyoga*, *Prajnapradha*, *Parinama*) related to *Chakshurendriya* (eye).

This disease occurs because the visual demands of the task exceed the visual ability of the individual to comfortably perform them. People who spent more than three hours at computer every day tend to get affected from the disease more.^{[xvi][xvii][xviii][xix]}

We shall understand this syndrome with the Ayurvedic perspective of *Hetu*, *Samprapti*, *Purvaroop*, *Roopa* of *Netrarogas* (*Doshikinvolverment*), to find out a suitable *Chikitsa* for treating CVS.^[xx]

	Computer vision syndrome	<i>Sanganakatiprayogjanyanetrasamlakshan</i>
Nidana (Causes/ Risk factors)	<ul style="list-style-type: none"> Continue watching screen Reduced blinking rate. Prolonged staring for near vision 	<ul style="list-style-type: none"> <i>Atidarsanam</i>^[xxi], <i>Durekshnata</i>, <i>Sukshmanireekshnata</i>: Continous staring at small objects and distant objects. <i>Swapnaviprariyata</i>: Improper sleep patterns.) <i>Adharniyavega dharana</i>: Suppression of urges <i>Kopa, Shok, Klesha</i> etc.: stress inducing

	<p>results in convergence spasm of the small eye</p> <ul style="list-style-type: none"> • Improper Posture • Improper placement of computer screen • Improper lightening at workstation • Exposure to bright light with small fonts/pixels • Glare and reflections from the monitor 	<p>factors</p> <ul style="list-style-type: none"> • <i>UshnabhitaptasyaJalpravesata</i>: Sudden change in temperature as by drinking cold water, entering in AC room and pouring cold water over head and face immediately after heat exposure. • <i>Dhoomnishevanata</i>: Excessive exposure to dust, fumes and other pollutants.
Lakshana (Symptoms)	<ul style="list-style-type: none"> • Eyestrain • Headache • Dry eyes • Redness in eyes • Burning sensation in eyes • Watery eyes • Irritated eyes • Contact lens discomfort • Blurred vision • Slowness of focus change • Double vision • Change in colour perception • Neck pain, Back pain and 	<ul style="list-style-type: none"> • <i>Aavilam</i>^[xxii]- Eye strain and asthenopia. • <i>Sasarambham</i>- Foreign body sensations or a typical discomfort in eye. • <i>Ashru</i>: Watering from eyes • <i>Kandu</i> –Itching as a symptom because of eye strain. • <i>Guruta</i> –Eye fatigue. • <i>Usha, Toda</i>- Burning sensation and pain in eyes. • <i>Shookpoornabham</i>– Foreign body sensation • <i>Vihanya mana rupam</i>– Blurring of vision • <i>KriyasvakshyagataKlamam</i>– Eye fatigue • <i>Sashulamvartamkoshaisu</i> – Pain in eyes

	Shoulder pain	
Chikitsa (Treatment)	Change the habit & avoid use of social media apparatus Medicine according to symptoms	Nidana-parivarjan Vata-PittadoshaPratighataChikitsa ,Chakshushya and Rasayanachikitsa

The symptoms of CVS can be considered on the vitiation of Doshas.(↑ - increase and ↓ - decrease)

Symptoms	Dosha vitiation
Dry and irritated eye	Vata (rookshata ,khara) guna↑ Pitta (sneha,sara,drava) guna ↓
Eye strain and fatigue	Vata (rookshata, sookshma) guna↑ Pitta (sneha,sara,dravya) guna↓
Blurred vision	Vata(chala) guna↑Pitta (sneha,sara,drava) guna↓
Red eyes	Pitta (sasneha,teekshna,usna) guna↑
Burning eyes	Vatarookshata, sookshma) guna↑ Pitta (teekshna, usna) guna↑
Excessive secretion of tears	Vata (laghu,chala) guna↑
Double vision	Vata (chala) guna↑Pitta (sneha,sara,drava) guna↓
Headache	Vata (rookshata, khara, chala) guna↑
Light or glare sensitivity	Vata (chala) guna↑Pitta (sneha, sara, dravya,) ↓teekshna↑
Contact lens discomfort	Vata (rookshata,kharata) guna↑Pitta (sneha) guna↓, (teekshna and ushna) guna↑
Slowness in changing focus of eyes	Vata (rookshata, kharata) guna↑Pitta (teekshna, ushna↑,sara,dravya↓)
Change in colour perception	Vata (chala) guna↑Pitta (sneha, sara, drava) ↓,(teekshna,ushna) guna↑
Neck and shoulder pain	Vata (rookshata,khara,chala) guna↑

Though direct reference of Computer vision syndrome is not there in classical texts, we may still correlate its symptoms with other eye diseases in Ayurveda.

Differential diagnosis:

Even though total 76 diseases have been explained in the context of Netra Roga, but we don't get any exact correlation for CVS. However, some of the clinical feature of CVS similar to a condition Sushka-akshipaka–dry eye syndrome.

Computer vision syndrome	Dry eye syndrome- Sushka-akshipaka
Working with computer is the main cause.	It is the symptoms complex occurring as a sequel to deficiency of tear.
Abnormality of the tear film is not found as	Abnormality of the tear film are the

the sequel of the disease	diagnostic measure of dry eye Syndrome
Normal tear meniscus will be seen	Aqueous tear deficiency, mucin deficiency, lipid deficiency will be seen
Tear film break up time may be normal or reduced.	Abnormal tear film break up, values less than 10 seconds imply unstable tear film
Schirmer –I test negative	Schirmer –I test will be positive .Values will be 5-10 mm
No relation with the hormonal imbalance	Related with the hormonal imbalance
Occurs in all age groups and in both sex	Most commonly found in menopausal female
Available treatment is contact lens wetting solutions, tear substitute	Presently no permanent cure for dry eye, supplementation by tear substitutes are mainstay, mucolytic such as 5% acetylcystine

Preventive measures:

Certain ergonomics counselling can be of help as the disease occurs mainly due to poor lifestyle habits, so it should be corrected in order to manage the disease well.

1. **Making Accommodation Easier-** A closer screen requires more accommodation, moving the screen back will reduce the load on accommodation. Another way to reduce visual stress is to take vision breaks, looking at something at a farther distance or closing the eyes.
2. **Making Convergence easier-** Just as placing the monitor farther away reduces the demand on accommodation, the farther away a visual target is, the less convergence is required.
3. **Sitting posture:** Sitting with the body close to the desk. The head and neck are in a forward facing and midline position (i.e. no backward arching of the neck or forward extension of the chin). The shoulders are relaxed and symmetrical and elbows slightly closer to the side of the body. The back is supported by the chair backrest. One should be having feet flat on the floor or footrest.
4. **Adjustable chair:** An office chair should have an adjustable seat height, curved lower back (lumbar) support on backrest and adjustable backrest height (allowing the lumbar support to be adjusted to suit the individual).
5. **A general guide to setting up the monitor:**
 - Screen height - The top of the screen should be set at eye level or lower this may reduce visual fatigue.
 - Viewing distance – The position the screen about one arm length away or slightly further. This may reduce visual fatigue.
 - Display - Adjust the font size or display so that the content can be read easily.
 - Avoid extended and elevated reaching for keyboard and mouse. Wrist should be in neutral position (not excessively flexed or extended)
6. **Specific eyewear for computer users-**Eyezen lenses are computerglasses made to protect eyes from harmful blue light given out by these devices.

7. **Change postures throughout the day:** There is no perfect computer workstation set up that can be used all day. Extended periods in similar postures can lead to fatigue or overloading parts of the body and can contribute to injuries such as sprains and strains. It is better to take several short breaks rather than one long one. One can use 20-20-20 rule for having breaks. Rule says in order to avoid computer vision syndrome a person should take 20 seconds break and focus at minimum 20 feet distant object after every 20 minutes of computer use.
8. **Lighting levels consideration for lighting includes:** Higher lighting levels are required for writing and reading tasks, particularly more detailed work. Lower lighting levels are may be suitable for tasks that are predominantly computer based.
9. **Avoid glare:** Position the computer workstation so that the users' line of sight is parallel to the window. Control natural light from the windows e.g. use venetian blinds (best angled up rather than down).

MANAGEMENT

As per the preventive and therapeutic principles mentioned in ayurvedic ophthalmic sciences, it can be of great help in dealing the modern occupational ailments. Therapeutic measures like *Kriya Kalpa*, *ShamanaAushadhis*, *Chakshushya* and *Rasayanas*, etc., which improve the homeostasis and ocular strength can be practiced. Computer vision syndrome can be managed by *Ayurvedic Chakshushya* and *Vata-pitta* pacifying therapies.

Ghritapana: The old *Ghrita* preserved in an iron vessel should be used for oral administration, *Nasya* and *Tarpana*^[xxiii].

Ghrita processed with drugs having *Vata pitta* pacifying properties *Dashmoolaghrita*^[xxiv], *Triphalaghrita*, *Mahatriphalaghrita*, *Jeevaniyaganasidhaghrita*, *Drakshadighrita* etc.^[xxv], are used.

Nasya : Administration of medications like goat's milk, cow's ghee, anu taila etc. via nasal route. *Nasya* should only be done if the doshas have just manifested.

In the advanced stage, in addition to *Nasya*, *Virechana*, *BastiKarma* and other *kriya kalpa* are useful^[xxvi].

Virechana: On the basis of predominant doshas, drugs should be selected for purgation therapy such as castor oil in *vata* predominance and *goghrita* with *triphalachurna* and *trivrutchurna* in *pitta* predominance can be given^[xxvii].

Basti karma/enema : Both *Niruha* and *AnuvasanBasti* mentioned in *VatajaPeenasaRoga* are useful^[xxviii].

Kriyakalpa: *Anjana*, *Seka*, *Aschyotana*, *Tarpana* and *Putpaka* should be administered on the basis of predominant doshas.

Conclusion

Computer use has become an essential part of work stations. Due to high demanding tasks and work stress people are unable to manage the required visual hygiene. This invariably exposes the masses towards the computer vision syndrome. Abstinence from the cause is the fundamental principle of treatment in Ayurveda. In *Shalakya tantra*, a branch that is dedicated to description of eye ailments,

both local measures as well as various internal medicaments are described that can be of great help in treating this disease. Medications that have specifically *Vata-Pitta* pacifying properties, *Rasayana* (rejuvenating) and *Chakshushya* properties should be used as the disease has predominance of *Vata* and *Pitta*^[xxix]. There are certain lifestyle guidelines mentioned by Acharyas that one should follow to maintain their visual hygiene.

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