

Computer Vision Syndrome - A Homoeopathic Approach with Ergonomic Intervention

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ABSTRACT

The introduction of computer and other digital visual screens (smart phones, tablets, iPad, iPhone) have brought a phenomenal change in our lives and soon became an integral part of our daily life. The use of digital visual screens in the society is on rise and expected to follow the same trend in coming years. Although these devices offer great advantages however, these are not free from health-related problems if not used properly. Computer Vision Syndrome, also known as Digital Eye Strain, encompasses a range of ocular, visual symptoms & other musculoskeletal symptoms which estimates suggest its prevalence of 50% or more among digital screen users.

Keywords: Computer Vision Syndrome (CVS), Digital Eye Strain, Visual Display Terminals (VDT), Ergonomics.

INTRODUCTION

The Visual Display Terminals are essential in many aspects of modern academic, professional & social life. VDT is a broad term used to describe computers, mobile phones, tablets, iPad and e-readers. Some decades back, before the invention of computers and other visual display units, the office work involved a range of activities, including typing, filing, reading and writing etc. All these activities needed different posture and vision, causing a natural break from each activity. With the introduction of

digital screens all these activities were combined and needed no change of posture or vision of the user from his digital screen.

It certainly improved the quality of the work and efficiency but caused ocular problems like asthenopia /eyestrain, dry eyes, redness irritation, blurred vision, light sensitivity and musculoskeletal problems. All these symptoms collectively referred to as computer vision syndrome, which comprised of ocular surface abnormalities or accommodative spasms & extraocular (ergonomic) etiologies due to improper posture, poor lighting, display quality of screens, etc.

may cause neck, shoulder and backpain and headache¹. These symptoms are usually temporary and disappear at the end of the working day for some people even though majority of people will experience continuity of symptoms after work. If no intervention is initiated, these symptoms will recur and worsen in the future.

Some studies show that people work more than 3 hours a day with computers run the risk of CVS². Employees who are at the risk of experiencing CVS include Computer data entry officers, Programmers, Telephone operators, Graphic artists, Architects, Insurance Guarantors, Air traffic controllers, Journalists, Lawyers, Bank employees. Along with medicinal intervention

modification in the ergonomics of the working environment, proper eye care is very important in preventing CVS. Prevention remains the main strategy in managing of computer vision syndrome

DEFINITION

Computer vision syndrome, also referred to as digital eye strain, describes a group of eye and vision-related problems that result from prolonged computer, tablet, e-reader and cell phone use³.

PREVALENCE

CVS is a significant public health problem and possible occupational epidemics of the 21st century as it affects computer users from all walks of life. The prevalence of CVS ranges from 64% to 90% amongst computer users with nearly 60 million people affected globally⁴.

A nationwide study in Sri Lanka reported that more than two-thirds of computer users in office were suffering from CVS⁵. A couple of studies conducted in Gondar, Ethiopia, reported that more than 73% of computer users who are working as secretaries, data processors, and bankers were developing CVS⁶.

According to the Seattle Times Company, worldwide, up to 70 million workers are at threat for cvs, and these figures are likely to grow, report has indicated 70 percent to 90 percent of people uses computers considerably, whether for work or play, and have one or further symptoms of computer vision syndrome⁷. The computer-using population in India is more than 40 million, & 80% of them have discomfort due to Computer Vision Syndrome.

The National Institute of Occupational Safety and Health survey has reported that visual symptoms occur in 75-90% and musculoskeletal disorders occur in 22% of the people who spend three or more hours daily at a visual display terminals⁸.

A recent study conducted at Armed Forces Medical Clinic New Delhi on Curse of technology computer-related

musculoskeletal disorders and vision syndrome, CVS is present in 40.98% (Out of 1193 subjects). Another study conducted by Armugam Seshadri et al among information technology professionals in Chennai found a prevalence of CVS of 69.3%,⁹ while Logaraj et al in Chennai found a prevalence of 81.9% among engineering students and 78.6% among medical students¹⁰.

CLINICAL FEATURES OF CVS¹¹

Computer vision syndrome (CVS) by itself is not denoting any condition instead it includes all those numerous symptoms that are eye and vision related and is associated with the computer use. It also includes some of the musculoskeletal problem that may arise because of computer working environment. CVS is a temporary condition and commonly arises because visual demands of the occupation exceed the visual ability of the person concerned. The condition is further aggravated by the improper lighting condition or workplace surrounding environments. Most people who spend long hours looking at a computer monitor, whether it be for work, play, or a combination of the two are most likely to present the symptoms of CVS.

VISUAL SYMPTOMS

- Constant blurred vision
- Postwork distance blur
- Intermittent blurred vision at near

OCULAR SYMPTOMS

- Dry and irritated eyes.
- Complaints of itching eyes
- Burning eyes,
- Foreign body sensation
- Sore eyes
- Excessive tears and excessive blinks.

ASTHENOPIC SYMPTOMS

- Eyestrain
- Headache
- Eye fatigue
- Tired eyes

MUSCULOSKELETAL SYMPTOMS

- Neck aches
- Shoulder pain
- Backaches
- Wrist pain
- Pain in arms
- Pain in waist

GENERAL SYMPTOMS

- Tension,
- Physical fatigue,
- Irritability,
- Increased nervousness,
- Frequent error,
- General fatigue, and drowsiness

RISK FACTORS FOR CVS

INCLUDE^{11,12}:

- Environmental factors: Dry Air, Ventilation Fans, Electrostatic Build Up, Airborne Paper Dust, Laser And Photocopy Toner, And Building Contaminants.
- Reduced blink rate results in dry eyes.
- Duration of computer use
- Height and inclination of monitor: The height of VDT should be at least 5 to 6 inches below the straight line of the viewer's vision.
- Not Taking frequent breaks
- Distance of VDT from the eyes
- Position of monitor
- Gender: The prevalence of CVS is twice as frequent in females as compared to males
- Age: Tear production normally decreases with age.
- Systemic diseases DES is associated with various systemic diseases. In the case of Sjögren's syndrome, dry mouth and rheumatoid arthritis can assist in making the diagnosis. Several autoimmune diseases also have association with CVS.
- Medications: diuretics, antihistamines, and anti-hypertensives.
- Spectacle wear: CVS with eye redness has significant association with the use of spectacles.

- Contact lens wear
- Cosmetics

VISUAL EFFECTS OF DISPLAY FEATURES

- Display quality
- Lighting and glare
- Refresh rates
- Radiation

MANAGEMENT

The treatment of CVS requires a multidimensional approach due to the diverseness of symptoms in patients. Management should be in such a way that giving prompt importance to both ocular and non ocular symptoms as well as adjustment of workstation. First and Foremost thing is to do a complete Eye checkup with the optometrist to rule out other diseases of eye.

In Homoeopathy, patients are treated with Individualized homoeopathic remedies which covers whole symptoms of the patient & with proper ergonomic interventions in their work environment. Adequate breaks from computer work and limiting the screen time is believed to have dramatic effect in controlling the symptoms of CVS. It is recommended that the eyes should be about 35-40 inches from the screen and the screen should be placed 10-20 degrees below or that the middle of the screen be 5-6 inches below eye level.

Use of a proper chair that provides good support to the back, legs, and arms to control the musculoskeletal issues that arise in CVS. Using the keyboard in such a position that the arms and wrists are in neutral position may help avoid contact stress. Limiting the computer and screen time is postulated to have a dramatic impact on symptoms of CVS

The **20/20/20 rule** – After working on a computer for 20 minutes, the computer user should gaze into the distance in excess of 20 feet for at least 20 seconds.

HOMOEOPATHIC APPROACH:

Homoeopathy recognizes the individuality of each patient or case. By modifying susceptibility, the individualized medicine has a capacity to correct the tendencies and reactions to environment. A constitutional prescription should be based on the mental and physical reactions. It should be able to cover the level of susceptibility, tendencies, behavioural pattern and the underlying miasm.

In Aphorism 5, Hahnemann States¹³,

Useful to the physician in assisting him to cure are the particulars of the most probable exciting cause of the acute disease, as also the most significant points in the whole history of the chronic disease, to enable him to discover its fundamental cause, which is generally due to a chronic miasm. In these investigations, the ascertainable physical constitution of the patient (especially when the disease is chronic), his moral and intellectual character, his **occupation, mode of living and habits**, his social and domestic relations, his age, sexual function, etc. are to be taken into consideration

In Aphorism 208¹³, he states, The age of the patient, his mode of living and diet, **his occupation**, his domestic position, his social relations and so forth, must next be taken into consideration, in order to ascertain whether these things have tended to increase his malady, or in how far they may favor or hinder the treatment. In like manner the state of disposition and mind must be attended to, to learn whether that presents any obstacle to the treatment, or requires to be directed, encouraged or modified.

REPERTORIAL APPROACH¹⁴

Rubrics related to ocular symptoms

COMPLETE REPERTORY:

- EYE - Dryness Artificial Light
- EYE - Lachrymation Looking Steadily, Agg
- EYE - Lachrymation Light, Bright
- EYE - Strained Feeling

- EYES - Tired Sensation, Reading
- EYE - Staring Headache, During
- EYE - Pain Strained, As If
- EYE - Pain General Using Eyes
- EYE - Pain Exertion Of Vision, From
- EYE - Itching eyelids
- EYE - Lachrymation headache during
- EYE - Heaviness of lids
- EYE - Dryness
- VISION - Blurred
- VISION - Dim after exertion

Rubrics Related to Musculoskeletal Complaints:

COMPLETE REPERTORY

BACK - Pain Cervical Position As From Wrong

BACK - Pain General Cervical Region Straining From

BACK - Pain General Sitting, While Bent Has To Sit

BACK - Pain General Sitting While, Agg, Long After

BACK - Pain Lumbar Region

EXTREMITIES - Pain Upper limb

Rubrics Related to General Symptoms

HEAD - Pain General

GENERALITIES- Weariness Tendency Mental Exertion Aggravation

MIND Concentration Difficult

HOMOEOPATHIC

THERAPEUTICS^{15,16,17}

These are few indicated medicines for CVS, but its not conclusive. Medicines can be prescribed only with proper and complete homoeopathic casetaking of each patient.

ACONITUM NAPELLUS

Eyes are Red, inflamed. Sensation as if, sand in them with Feeling of dryness and hot. Eyelids swollen, hard and red. Person has aversion to light. Profuse lachrymation after exposure to dry, cold winds, reflection from snow, after extraction of cinders and other foreign bodies. Feeling of Fullness; heavy, pulsating, hot, bursting, burning

undulating sensation. Intercranial pressure sensation

APIS MELLIFICA

Eyelids swollen, red, edematous, everted, inflamed; burn and sting. Conjunctiva appears bright red, puffy. Lachrymation hot. Photophobia. Sudden piercing pains. Pain around orbits. Serous exudation, edema, and sharp pains. Suppurative inflammation of eyes. Keratitis with intense chemosis of ocular conjunctiva. Staphyloma of cornea following suppurative inflammation. Styes, also prevents their recurrence. Whole brain feels very tired.

ARGENTUM NITRICUM

Swelling and redness in Inner canthi. Spots seen in vision. Complaints of Blurred vision. Photophobia in warm room. Purulent ophthalmia. Great swelling of conjunctiva; discharge will be abundant and purulent. Chronic ulceration of margin of lids; sore, thick, swollen. Unable to keep eyes fixed steadily. Eye-strain from sewing; Gets worse in warm room. Aching, tired feeling in eyes, better closing or pressing upon them. Useful in restoring power to the weakened ciliary muscles. Paretic condition of ciliary muscle. Used in Acute granular conjunctivitis, Cornea opaque, Ulcer in cornea. Aching in frontal eminence, with enlarged feeling in corresponding eye.

ARSENICUM ALBUM

Indicated in Great dryness of the eyelids, chiefly in the edges, and on reading by the light (of a candle). Marked in Dryness of eyes from artificial light. Spasmodic closing of the eyelids, sometimes from the effect of light. Aching, burning, and shooting pains in the eyes, aggravated by light, as also by the movement of the eyes, accompanied sometimes with a necessity to lie down, or with anguish which does not permit to rest in bed. Eyes inflamed and red, with redness of the conjunctiva.

CIMICIFUGA RACEMOSA

Well indicated in Asthenopia associated with pelvic trouble. Deep seated throbbing and shooting pains in eyes, with photophobia from artificial light. Intense aching of eyeball. Pain from eyes to top of head. Has a Wild feeling in brain. Shooting and throbbing pains in head after mental worry, over-study. Uneasy, restless feeling in limbs. Aching in limbs and muscular soreness. Spine very sensitive, especially upper part. Marked Stiffness and contraction in neck and back

EUPHRASIA

Eyes are very sensitive to light, and candlelight. Dry pressure in eyes, as if sleepy. Has Frequent burning and biting in eyes, leads to frequent winking of eyes. Acrid water runs from eyes. Sensation as if dust or sand were in eyes. Person feels the sensation as if a hair hung over eyes and must be wiped away. While looking at light feels pressure in the eye. Burning in eyes, with lachrymation. Violent pressure in the left eye, with lachrymation, seems smaller and weaker.

GELSEMIUM

Indicated to manage complaints of double vision in computer vision syndrome double vision is most felt when looking sideways. Dimness of sight. Heaviness of the eyes is prominent. Soreness of eyes with aching pains. Redness of the eyes along with lachrymation .Smoky appearance before eyes, with pain above them. Great irritability of the eye, resulting from want of tone or energy of muscular structures. Persons Eyes feel sore in the evening. Sensation of heaviness in head; band-feeling around the head. Marked in occipital headache. Dullness with heaviness of eyelids; Eyes feel bruised sensation; better by compression and lying with head high.

LITHIUM CARB

Marked pain in eyes after reading especially in artificial light. Has great sensitivity to

artificial light. Sensation of dryness and pain in eyes aggravated after reading. Indicated in Soreness of eyes. Eyes sensitive after using them by candlelight. Useful in Half vision. Invisible right half. Indicated in Photophobia. Dry eyelids. Light Sensitivity with lachrymation. Eye lids feel full and congested

PHOSPHORUS

Marked in Cataract. Patient has the Sensation as if everything were covered with a mist or veil, or dust, or something pulled tightly over eyes. Feels as if black points seem to float before the eyes. Patient watch better by shading eyes with hand. Given in Fatigue of eyes and head even without much use of eyes. Presence of Green halo about the candlelight. Letters will appear red. Indicated in Atrophy of optic nerve. Presence of odema of lids and about eyes. conjunctiva appears pearly white and has long curved lashes. Abuse of tobacco cause partial loss of vision. Pain in orbital bones. Extrinsic muscles are prone to paresis. Diplopia caused by deviation of the visual axis. Amaurosis due to sexual excess. Indicated in Glaucoma. Well-Marked in Thrombosis of retinal vessels and degenerative changes in retinal cells. Degenerative changes are soreness and curved lines in old people. Hallucination of vision. Burning pains. Chronic head congestion. Coldness of occiput with Brain-fag

PHYSOSTIGMA

Indicated in Photophobia. Pupils are Contracted. Patient has Twitching of ocular muscles. Marked Dull pain over and between eyes. Weakness of eyes. Dimness of vision. Pain after using eyes, given in muscae volitantes. flashes of light before eyes. Twitching of eyelids. Indicated in myopia. Profuse lachrymation. Used in Spasm of ciliary muscles, with irritability after using eyes.

PILOCARPUS MICROPHYLLUS

(Jaborandi)

Well-marked for Eye strain from any cause. Used in Irritability of the ciliary muscle. Tiredness of eyes from slightest use. Eyes are hot and burning. Headache. Smarting pain in the globe. Everything at a distance appears hazy. Indistinct vision every few moments. Retinal images retained long after using eyes. Irritation occurs due to electric or other artificial light. Spasm of the accommodation aggravated on reading.

PULSATILLA

Discharges are Thick, profuse, yellow and bland. Marked in Itching and burning in eyes. Best used for Profuse lachrymation and mucus secretion. Eyelids are inflamed and agglutinated. Used for Styes. Enlarged veins of fundus oculi. Indicated for Ophthalmia neonatorum. Can be used in Subacute conjunctivitis, with dyspepsia; worse, in warm room. Patient with Neuralgic pains, begins in right temporal region, along with scalding lachrymation of affected side. Has Headache from overwork. Pressure on vertex.

RUTA GRAVEOLENS

Pain in eyes when viewing an object minutely. Aching in eyes. Eyes hot like balls of fire. Feel strained. Sensation of Burning in eyes while reading with candlelight. Itching in inner canthi and on lower lids, which becomes smarting after rubbing them, whereupon the eye becomes filled with water. Transient vision loss from reading too much, with clouds, or like a veil before eyes. Bad effects from over-straining eyes, from continuous reading, especially during fine work at night

SEPIA

Indicated in Muscular asthenopia; Presence of black spots in the field of vision; Asthenic inflammations, and in connection with uterine trouble. eye troubles are aggravated in morning and evening. Used in Tarsal tumors. Ciliary irritation and Ptosis. Venous congestion of the fundus. Used for

Weakness in small of back. Pains will extend into back. Sensation of Coldness between shoulders

SILICEA

Affection of angles of eyes. Indicated for the swelling of lachrymal duct. Patient have Aversion to light, especially daylight; Tendency to produces dazzling, sharp pain through eyes; tenderness in eyes aggravation on closing eyes. Confused Vision, Feeling as if letters will run together on reading. Styes. Marked in Iritis and irido-choroiditis, with pus in anterior chamber. Can be given for Perforating or sloughing ulcer of cornea. Abscess in cornea after traumatic injury. Indicated in Cataract of office workers. Given for After-effects of keratitis and ulcus cornea, clearing the opacity. Use 30th potency for months.

RP PATEL'S MIASMATIC REPERTORIZATION¹⁸

EYE

- Pain in eyes - Psora
- Watery eyes - Psora
- Dry eyes - Psora
- Burning in eyes – Psora
- Redness of eyes - Latent Psora
- Irritation in eyes - Psora
- Twitching of lids - Psora

VISION

- Blurred vision - Psora
- Dim vision - Psora
- Difficulty in changing focus of eyes after exertion of eyes – Psora

HEAD

- Heaviness of head after exertion of eyes- Syphilis

EXTREMITIES

- Pain in cervical - Psora
- Pain in wrist – Psora
- Pain in shoulder – Psora
- Pain in back – Psora

MIND - Concentration difficult - covers all three miasms

ERGONOMIC INTERVENTIONS¹¹

Ergonomics is a science that designs the job, equipment and the workplace to fit the worker. It includes design theory, principles, data and methods in order to optimise human wellbeing and overall performance. Now the question arises why it is important for a physician to have an idea about computer workstation designs. Yes, it may not be very important for a physician to know about it if he is in general practice. But this is very important for a physician who specializes in the practice of computer vision syndrome. The reasons are simple. Knowing information about computer workstation forms an important part of history taking that allows him to relate the signs and symptoms to actual cause. In turn, it helps him to design a comprehensive treatment plan for the patient.

FACTORS ASSOCIATED WITH BODY POSTURE

A neutral body posture lets you work with comfort and ease for which it is essential that the workstation is matched to the worker. A mismatch workstation may force uncomfortable posture that leads the symptoms of CVS. Several factors are important to ensure neutral body posture while working on computer.

1. The ideal ocular gaze angle for optimal performance is downward angle of 15-20° relative to straight ahead gaze. When we look down, our eyes converge, accommodate to focus and pupil constrict that alters depth of focus. The condition is just opposite when we look straight ahead or upwards. In such a position, it is harder to focus for close objects.
2. Resting of feet on the floor while working on computers for a long period of time allows support for legs which inturn reduces pressure on the lower back and prevents odema on legs. In case the height of the chair is higher, keep a separate footrest.
3. It is very important to have support for the forearm while working with a mouse

or keyboard in order to reduce tension mainly in the neck and shoulder muscles as well as localized pressure on the wrist. Together with the arm rest, a soft wrist rest in front of keyboard or mouse is helpful to prevent carpal tunnel syndrome.

4. While sitting vertically straight on chair, our back has to be fully supported with backrest. This is important to reduce stress and strain on the muscles, tendons and skeletal system and to reduce developing a musculoskeletal problem.
5. Body posture as a whole is very important while seating for a longer duration of time in one position. Having just one part of our body out of neutral posture can affect the rest of the posture. It is, therefore, essential that a comfortable working posture in which all our joints are naturally aligned has to be maintained to reduce the musculoskeletal disorder.
6. Despite of how good our posture may be, sitting still for long hours of time is not healthy. Small changes in the posture at about every 15 minutes flex the body muscles. Larger changes in posture are also important. It may be a good idea to stand up, stretch or walk around for one or two minutes at regular interval

FACTORS ASSOCIATED WITH FURNITURE

1. The distance between the eyes and the computer monitor determines the working viewing distance. The most commonly accepted distance where the computer display should be placed is 50-70 cm from eyes. However, screen size and font size used while working should be taken into consideration while deciding onto it
2. A comfortable chair is most important for the computer user as he spends almost entire day sitting on it. It must be designed to his body with easily adjustable and reachable controls. The chair should have five legs with lockable

casters to prevent tipping and allow easy roll on the floor. It should have large, wide and soft padded two armrests to support the forearm. The backrest should be large enough to support the entire back and should contour to the curve of the lower back.

3. Computer desk should provide adequate space to place both the feet together with footrest if needed. The top of the desk should be laminated with matte surface to minimize the glare. It should be large enough to accommodate all the parts of computer system with all attachments needed to work efficiently

FACTORS ASSOCIATED WITH COMPUTER HARDWARE

1. Monitor Distance: Place the monitor at a distance of 50-70 cm from the eyes.
2. Monitor Height: Adjust the height of the monitor screen to allow gazing slightly down to view the center of the screen.
3. Monitor Angle: Tilt the monitor screen slightly to accommodate your line of sight. If you are using bifocal glasses, monitor position might be shifted lower
4. Monitor Size: Monitor should be large enough to display sizeable amount of information.
5. Keyboard: Placement of keyboard determines the comfort for forearm, wrist and shoulder. The most comfortable position for the wrist is straight and extended 10-20° upwards. A soft padded wrist rest in front of the keyboard is helpful. The height of the keyboard depends on the height of the work surface and chair. To reduce tension in your shoulder muscles, the keyboard should be low enough so that your arms are relaxed at your sides.
6. Mouse: The mouse should be located immediately next to the keyboard so that reaching is easy, placing mouse too far away, or too low, or un much on one side can cause shoulder, wrist, elbow, and forearm discomfort

FACTORS ASSOCIATED WITH COMPUTER DISPLAY

- Resolution
- Pixel Settings
- Character Size
- Screen Luminance
- Contrast
- Contrast Polarity
- Screen Color

CONCLUSION

Computer vision syndrome is an emerging occupational hazard in this century following the increased usage of digital screens both at home and at work. Prevention remains the main strategy in managing of CVS. Modification in the ergonomics of the working environment, patient education and proper eye care are important strategies in preventing computer vision syndrome. In addition, using indicated homoeopathic medicines can play a major role in alleviating symptoms. Individualised homoeopathic medicines can play a beneficial role in countering the effects of eyestrain due to glare, improper lighting and continuous work

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