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## UPCOMING OCULAR DIGITAL STRAIN AMONG THE CHILDREN'S EXPOSED TO SMARTPHONES AND DIGITAL DEVICES FOR LONGER DURATION OF TIME IN NORTHERN INDIA

Munish Rastogi<sup>1</sup>, Dolly Rastogi<sup>2</sup>, Tushar Sharma<sup>3</sup>, Yashvi Gupta<sup>4</sup>, Anjali Verma<sup>5</sup>, Mansi Singh<sup>6</sup>, Alish Ansari<sup>7</sup>, Shivani<sup>8</sup>, Mohit Kumar<sup>9\*</sup>

<sup>1,3,4,5,6,7,8</sup>Department of Medical Microbiology, School of Health Sciences, C.S.J.M.U. Kanpur

<sup>2</sup>Professor & Head, Dept. of Physiology (G.S.V.M. Medical College Kanpur)

\*Corresponding author: Mohit Kumar

<sup>9\*</sup>Tutor, Department of Microbiology (Government Medical College Kannauj)

### Abstract

Technology has greatly impacted our lives, particularly through the increased use of smartphones among teens and young adults worldwide. However, this reliance on electronic devices can result in various health issues, including asthenopia and digital eye strain. Symptoms of digital eye strain include dry eyes, headaches, blurred vision, and eye fatigue. Factors contributing to this condition include extended screen time, lack of blinking, and exposure to blue light. To alleviate these symptoms, various techniques such as artificial tears, warm compresses, and adjusting screen settings can be used. By following the 20-20-20 rule can also help reduce digital eye strain.

**Keywords:-** Eye strain, World Health Organization, Health issues, Technology

### Introduction:

From Healthcare to Education, technology has completely changed every aspect of our lives in the information era, But every action has an equal and opposite response and the digital revolution is no exception to this principle, a smartphone is regarded as a vital instrument for communication and is increasingly becoming a part of our societies because it serves as both a social supplement and a communication tool.<sup>[1]</sup>All age groups use smartphones on a daily basis these days, but teens and young adults use them the most.<sup>[2]</sup> Furthermore, a growing number of jobs and duties can be executed by these devices and as a result, their use is becoming more widespread worldwide than that of traditional fixed phones.<sup>[3]</sup> While using a smartphone all day can make life more easier, it can also lead to neurological, ocular, musculoskeletal, and auditory issues.<sup>[4]</sup> According to a recent meta-analysis, a large population of children have asthenopia although in medical terms, asthenopia is the subjective experience of visual tiredness, eye weakening, or eyestrain as It is caused by uneven illumination, uncorrected refractive defects, receptive dysfunction, and imbalance of the extraocular muscles.<sup>[5]</sup> A headache, excessively wet eyes, double vision, blurred vision, itching, itchy eyes, dry eye sensation, and redness are common symptoms of asthenopia.<sup>[6]</sup> Nowadays, kids (even toddler) are growing up with touch screen technology at their fingertips therefore one could reasonably surmise that amongst the youngsters the growing incidence of digital eye strain could be partly attributed to the increased usage of tablets, smartphones, and other electronic devices, as of a current scenario Cell Phone Vision Syndrome or Digital Eye Strain or Computer Vision Syndrome(CVS) is a common issue that arises from increased use of mobile phones, Digital eye strain is a collective term for a range of vision-related disorders that affect people who use computers, smartphones, tablets, e-readers for extended periods of time and as it is a prevalent disorder that affects a lot of people who use displays for extended periods of time on a regular basis.<sup>[7]</sup> Eye strain, headaches, blurry vision, dry eyes, soreness in the neck and shoulders are the signs of cell phone vision syndrome additionally the World Health Organization (WHO) claims that using a mobile phone has turned into an addiction and has replaced

the term "addiction" with "dependency syndrome."<sup>[8]</sup> Screen time in children is defined as the amount of time spent engaging in screen-based activities (activities using digital screens), such as using computers, laptops, smartphones or televisions, either passively (reading) or actively (e.g., online learning, games or communication).<sup>[9]</sup> Any activity that involves youngsters using screen-based media—such as computers, video games, televisions and gadgets—is referred to as screen-based activity, according to earlier studies, children spent 5.9 hours per day after 2020 compared to 2.6 hours per day in 2018, a large rise in screen time and video game activity.<sup>[10]</sup> A review of the literature revealed that many of the factors linked to Computer Vision Syndrome (CVS) can be categorised as personal factors.<sup>[11]</sup> These include things like bad sitting posture, an incorrect eye-to-screen distance, insufficient working procedures, incorrect viewing angles and distances, age, health conditions, and prolonged computer use.<sup>[12]</sup> Factors related to the computer environment and workstations include inadequate lighting, contrast, and resolution rooms; slow refresh rates; display glare; high screen brightness; and an uneven distribution of light between the computer screen and the adjacent working area.<sup>[13]</sup> The important thing to note about cell phone vision syndrome is that users do not recognise they have the condition until its symptoms start to interfere with their quality of life.<sup>[14,15]</sup>

### Symptoms:

Computer vision syndrome, another name for digital eye strain, can result in a number of symptoms, such as:

- Dry eyes: Low tear production or low-quality tears as a result of fewer blinks during prolonged screen use.
- Headaches: Extended usage of screens can result in headaches, which are frequently brought on by problems with focus or bad posture.
- Blurred vision: After spending a lot of time in front of a screen, there may be a brief loss of focus or blurriness.
- Eye fatigue: Following screen time, experiencing heavy, strained, or exhausted eyes.
- Redness and irritation: Dryness or extended screen time can cause red, irritated, or itchy eyes.
- Double vision or ghosting: After screen time, there may be brief instances of double vision or ghosting.
- Eye pain or discomfort: Sensations of pain or discomfort in the eyebrows, eyes, or surrounding tissues.
- Trouble switching focus: You have trouble focussing on things that are close to you or on distant screens.
- Increased light sensitivity: After screen use, there is an increase in light sensitivity or glare.
- Shoulder and neck aches: Bad posture during screen usage might cause shoulder and neck aches.

### ETIOLOGY OF DIGITAL EYE STRAIN:

Many elements that lead to the development of eye pain and vision issues are involved in the pathophysiology of digital eye strain. This includes:

- **Extended screen time:** Staring at digital screens for long periods of time might cause blinking to decrease and eye concentration to increase.
- **Decreased blinking:** When using a computer, blinking rates drop by 60–70%, which leads to dry eyes and tear evaporation.
- **Disruption of the tear film:** Dryness, irritation, and inflammation result from the tear film's breakdown.
- The emission of digital blue light can cause oxidative stress and probable retinal injury as blue light from screens reaches the eye.
- **Near vision focus:** Extended near vision focus strains and wears out the ocular muscles.

Digital eye strain can be caused by bad posture, a dry atmosphere, using contacts, underlying eye disorders, infrequent eye movements, inadequate screen settings, and genetic predisposition. Factors such as dry eye syndrome, refractive errors, infrequent eye movements, insufficient eye exercises, incorrect screen settings, and genetic predisposition can all contribute to its development.

### **TREATMENT:**

The following techniques can be used to relieve dry eye strain:

- Artificial tears: To lubricate and moisturise the eyes, use over-the-counter or prescription eye drops.
- Eye creams: Usually applied at night, these creams are thicker and more lubricating for extremely dry eyes.
- Restasis: Prescription eye drops that stimulate the production of tears.
- Prescribed eye drops or eye lubricants are used to treat dry eye syndrome.
- Punctal plugs: Tiny devices used to hold moisture in tear ducts.
- Warm compresses: Using a warm, moist washcloth, apply it to the eyes to clear obstructions.
- Massage your eyes gently to encourage better tear production.
- Humidifiers: These devices add moisture to the air to lower evaporation.
- Omega-3 supplements: Eating fatty acid supplements to ensure the health of your tears.
- Practice frequent and deliberate blinking, particularly when using a screen.
- Practice focussing, relaxing, and rotating your eye muscles.
- Reducing irritations: Steer clear of smoke, wind, and dry surroundings.
- Modifying the screen's settings: use appropriate lighting, reduce brightness, and alter colour temperature.
- Seeking medical advice: For individualized direction, get advice from an eye care specialist if symptoms continue.

To reduce digital eye strain, one should follow the 20-20-20 rule: In every 20 minutes, one should look away from screens and focus on something 20 feet away for 20 seconds. Adjust display settings, blink regularly, and maintain good posture.

### **CONCLUSION:**

The profound effect that digital devices have on children's developing vision show that childrens had a significant prevalence of vision issues, such as myopia, asthenopia, eye strain, and mild astigmatism.<sup>[11]</sup> It is found that children's daily lives are significantly impacted by smartphones although the availability of smartphones and the length of smartphone contact hours were the two main factors that led to a rise in the use of cellphones among students.<sup>[2]</sup> Furthermore, there was a direct correlation between smartphone use and the incidence and occurrence of visual impairments.<sup>[15]</sup> Extended usage of digital devices can also result in tear film instability and symptoms of dry eyes, such as burning, irritation, heavy lids, sticky eyes, and excessive blinking.<sup>[15]</sup> Long-term use of digital gadgets can lead to asthenopia, moderate astigmatism, and eye strain, in 90% of cases these conditions can be optically corrected with a -0.50D (Diopters) spherical lens.<sup>[2]</sup> Separate negative cylinders (-0.50D to 0.75D) are needed for correction in 5% of mild astigmatism patients.<sup>[2]</sup> Alternative therapies encompass the application of artificial tears, guidance on judicious gadget usage—using them for no more than half an hour at a time—and instruction on getting 30 seconds of ocular relaxation by closing the eyes.<sup>[7]</sup>

**Social Awareness:**

The main risk factors for developing Digital Eye Syndrome (DES) are using digital devices for more than four hours a day, having underlying refractive problems, female gender and having had dry eyes in the past, henceforth it is imperative that doctors in vision health and eye care have thorough knowledge about Digital eye syndrome.<sup>[11]</sup> It is important to raise awareness of the negative consequences of excessive screen time, ergonomic techniques, and preventive measures, particularly among educators, children, and professionals who work with people who are exposed to prolonged or excessive screen time.<sup>[2]</sup> It is still debatable and requires more research how anti-glare screens, anti-fatigue lenses, and blue-blocking filters work.<sup>[9]</sup> Research in the future should concentrate on creating educational initiatives and public health policies that try to educate parents, teachers, and medical experts about the possible dangers of excessive use of digital devices.<sup>[6]</sup> The significance of routine eye exams for early diagnosis and treatment must also be emphasised.<sup>[14]</sup>

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