

EYE STRAIN IN THE OFFICE ENVIRONMENT



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Eyestrain and Visual Issues

Eyestrain can vary from person to person as can its meaning and perception. Some people can report burning, tightness, watering, blurring, double vision, and headaches. Although your computer monitor can potentially increase your risk for experiencing eye strain, it is not at all the only factor to consider. Various aspects of your workstation and work environment can play a role in eye strain and perhaps be more of a problem than your computer monitor itself.



According to the [Vision Council](#), 70 percent of adults reported some kind of digital eye strain (strained, dry, or red eyes; blurred vision; headaches; back pain; neck pain; or general fatigue) as a result of using digital devices for hours at a time. Ultimately, we spend more time looking at the computer than we should, not to mention tablets, MP3 players, laptops, and gaming consoles/TVs, etc. Getting away from the computer and/or other digital devices should be one of the first considerations.

In a computer workstation environment, the factors affecting the ability to see include but are not limited to glare, contrast, lighting, monitor placement, breaks, glasses, and reference materials. These and other issues regarding vision and the work environment will be further mentioned below.

Glare

Direct glare involves a light source shining directly into the eyes such as overhead lights (ceiling lights), task lights, or bright windows. To determine how direct glare may affect you, place your hand over your eyes (much like if you were outside on a very bright day without your sunglasses) and temporarily shield your eyes. If shading your eyes with your hands provides some relief, it is likely that the lighting levels are too bright and changes would be beneficial.

Reflected glare, such as on a computer monitor, can sometimes contribute to eyestrain and or other awkward postures due to 'fighting the glare' by changing your neck and/or back posture to an uncomfortable one, in order to see the screen and 'fight the glare'. However, with new monitor designs, a 'glare filter' has already been built into the monitor to help minimize glare. It is very highly unlikely that adding in a device such as an anti-glare filter is needed. This can also make the screen harder to see by decreasing the overall brightness. Changes to monitor angle, height, and depth along with changes to lighting and other aspects of the work environment should instead be a primary focus as more often than not, they may be the primary cause of the problem.

Glare doesn't only come from overhead lighting. To minimize direct or indirect glare from the sun, avoid placing the monitor parallel to the window. Instead, try placing the monitor perpendicular to windows. If you are unable to do this based on the office layout, consider using blinds and other window treatments to minimize or eliminate this glare.

Contrast

Contrast is often not considered as much as it should be in the office environment. (Picture your computer screen surrounded by a window or other bright background like a lit wall). As we age, we need significantly more contrast (Those over 61 years of age need more than 350 percent more contrast than those in their 20s.)

To counteract the contrast problem, try to darken the area or wall around the screen. Problems with contrast can occur on computer screens where light letters on a dark background are used. Use contrasting colors and the standard white background with dark (black) font.

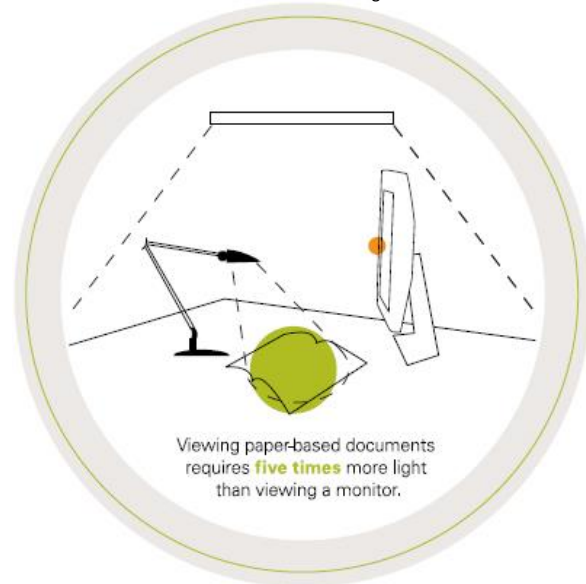
Lighting

Lighting or illuminance levels are more often than not higher than they need to be, especially for computer work. However, the amount of light needed varies by person, especially as we age. At 40 years of age, eye sight begins to deteriorate more drastically and the amount of light needed for a given task may increase.

This does not however mean that we need to light up the computer screen. Because the computer monitor itself is a light source, adding additional light on the monitor itself is unnecessary. Changing brightness, color setting and contrast can be done to improve the monitor display but lighting an already lit monitor is unwarranted.

Overhead lighting should likely be reduced in the computer environment. The lighting design should ideally allow for the amount of light to be adjustable (i.e. dimmer switch). However, finding the right amount of light for all workers can be challenging, especially in multiple person office or cubicles. Again, because of this overhead lighting may need to be minimized and to improve individual lighting for each worker, individual task lighting should be provided. Ideal task lighting can be adjusted individually for each worker based on their needs as well as the task. The task light should be adjustable (both the amount of light as well as its position (i.e. on an articulating arm directed towards paperwork, not toward the monitor which is preferable to

Picture from Humanscale Ergonomics





Picture from Humanscale Ergonomics

commonly seen ‘under the overhead cabinet lighting’ which is not position adjustable). A task light should also preferably be placed to the opposite side of the writing hand to avoid casting a shadow.

When thinking about paperwork in the office, environment think about your dentist. One of the first things the dentist does when looking at your teeth is grab the light and shine it where it’s needed. When they finish, they turn the light off and push it out of the way. Consider your paperwork the teeth you need to illuminate. Because of heavy computer

based tasks and less frequent paper based tasks, this type of adjustable lighting is very beneficial.

Ideal lighting levels

- Lighting levels for computer work should be approximately 20-25 foot-candles
- Lighting for non-computer work (i.e. writing and paper work) should be approximately 50-200+ foot-candles
 - Task lighting should be directed towards paperwork and away from the eyes and positioned between the eyes and the work surface. Task lighting should never be above a user’s eyes.

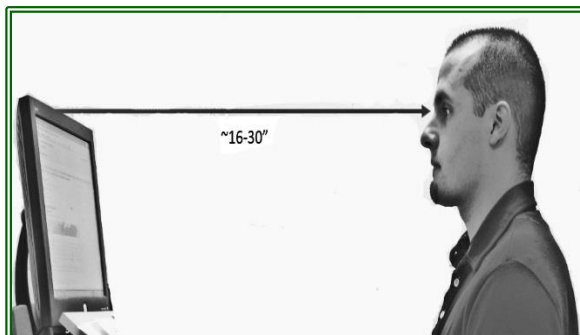
Contact an ergonomics program specialist and schedule an ergonomic evaluation for measurements of lighting in your work environment by filling out the below questionnaire.

[Ergonomic Evaluation Setup](#)

Monitor Placement

Monitor Distance

The correct distance for a computer monitor and source documents depends on how well you can actually see it at the given distance it is placed. A monitor positioned further away from the body is more ideal however, a good “rule of thumb” is the monitor should be arm’s length away



or ~16”-30” from the eyes. However, make regular adjustments! Monitor placement may need to move regularly throughout the day based on what is on the screen as well as its size. A monitor arm may be needed to allow for quick and easy monitor height, distance and angle changes. A monitor arm will also free up desktop space for writing and other tasks.

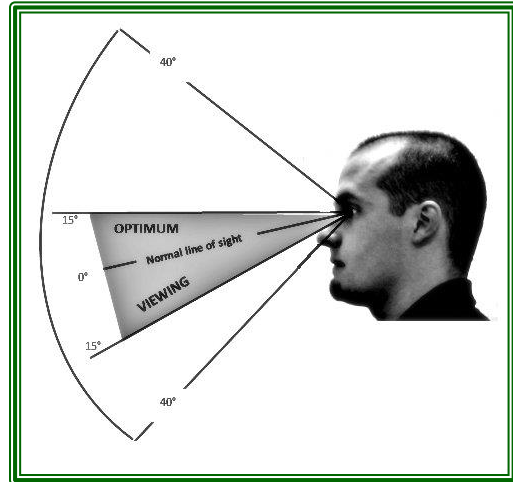
Click the below link or a short video on monitor placement and adjustment.

[See Better](#)

Monitor Height

The overall height of the monitor is very important in preventing awkward neck postures. Natural gaze as a human being is slightly downward which ultimately means that as humans, we need to have what we are trying to see below the level of the eyes. When performing computer work, the top of the monitor should be in line with the eyes or slightly below them which will allow for the ideal viewing angle which will help minimize awkward postures and risk for discomfort and injury.

If the monitor is too high, your neck will likely begin to tip backwards into extension. (Picture sitting in the front row of the movie theatre for 8 hours per day 40 hours per week). (If using glasses or more specifically multifocal lenses, the monitor height will need to be lower than eye level. This will depend on the user and their glasses. See below for additional information on glasses).



If the monitor is too low, your neck will become fatigued more quickly because of the weight of your head. These awkward postures can impact blood flow and oxygen and lead to headaches and eye strain as well as neck, upper back and shoulder muscle discomfort and fatigue.

Use of tablets, phones and laptops for extended durations is common in creating awkward neck flexion.

Click the below link for a short video on monitor placement and adjustment.

[See Better](#)

Vision & Eye Breaks

The Eyes

Sometimes eyestrain is just a case of dry eyes. Lowering the monitor can help in prevention of this. When looking slightly downward more of the eye surface is covered by the eyelid, and the eyes unconsciously blink more and they produce more lubrication. Use of eye drops can also be useful, especially in dry climates. Remembering to blink to lubricate the eyes can be beneficial as well.

Eye Breaks

Reading for too long, especially without breaks can wear out the eyes and the eyes need to rest just like other parts of the body when they are overworked. Changing focus from one distance to another from time to time needs to take place.

Be sure to follow the "20/20 rule" every twenty minutes, look twenty feet away for twenty seconds.

[See Better](#)

Reference Materials, Paperwork and Data Entry



Keep reference materials and other paperwork on a document holder. If the screen and paperwork remains close to one another, the eyes and the neck do not have to work as hard focusing and re-focusing from the monitor to paperwork and vice versa. The further the distance between the screen and reference materials, the harder the eyes have to work.

In addition, excessive and repetitive rotation of the neck is likely to occur when looking at reference materials and other paperwork which is not correctly placed. This awkward neck rotation can lead to fatigue, stress and discomfort in the neck and upper back. As muscles fatigue and become tighter, blood flow and oxygen supply is compromised.

Corrective Lenses/Glasses & Other Computer Eyewear

Multifocal lenses

Consider options other than multifocal lenses (i.e. bifocal, trifocal, etc.) Always seek the council of your eye doctor and ask about computer specific glasses that focus at the right distance when viewing the computer.

Those who wear multifocal lenses (bifocal, trifocal, etc.) can experience neck and shoulder pain because of the awkward neck posture needed to look downward in their glasses. (Think again about the front row of the movie theatre example). This awkward neck posture called extension places a great deal of fatigue on the neck. The human head, which weighs approximately 8-12 pounds is simply too much weight for the neck to hold especially for extended periods. Muscle fatigue as well as compromised blood flow to the tissues can occur. This can also contribute to eye strain and tension headaches.

With appropriate eye glasses, awkward postures, squinting, etc. can be minimized which will help reduce awkward postures and minimize risk for injury.

Tinted 'computer' glasses

These types of computer glasses purportedly designed to minimize glare, improve comfort and focus may be more of a hindrance than a benefit.

The Director of Glaucoma for Ophthalmic Consultants of Connecticut, notes that:

Computer eyewear does not necessarily prevent eye strain in an already optimized environment. Also, the range that the eyes can sweep from one side to the other is maximized without any eyewear. The frame edges limit this range of motion and may actually hinder people more who are not getting much benefit from wearing the glasses. Also eyeglasses get smudges which can interfere with vision as well.

Use of tinted 'computer' glasses may offer potential benefits however these may be subjective. According to several ergonomists who have dealt with computer glasses like these, there have been mixed reviews. Some individuals find these glasses to be a lifesaver whereas others found no effect at all. Other sources reported they are gimmicky and do not provide a tremendous benefit.

Before going out and spending money on a pair of these specially tinted glasses, the most ideal thing to do is setup your workstation correctly. Once these things have been completed, a visit to your eye doctor may be warranted. Thereafter, tinted glasses may be a consideration if your doctor and other office environmental solutions have not helped.

Ergonomics is not just about your chair or keyboard. There are a great deal of factors to consider, including the lighting and your eyes as illustrated in this document. Always consider an office ergonomic evaluation to ensure concerns are identified and controlled with appropriate tools, equipment and work practice changes.

Ergonomics Program Resources

- [CSU Ergonomics Program Home Webpage](#)
- [Ergonomic Evaluation Request](#)
- [Ergo Lab & Equipment Trials](#)
- [Ergonomics Matching Funds Program](#)

Contact Information

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References:

- [Humanscale Ergonomics](#)
- [Office-ergo](#)
- [State Compensation Ins. Fund](#)
- [Lifehacker](#)