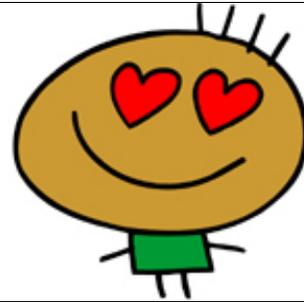


The Eyes Have It

By Tamara Mitchell



Eye strain and eye fatigue tend to creep up on us when we aren't looking...well actually, when we ARE looking, especially when we stare for hours at objects within two feet, such as computer monitors, microscopes, reading material or craftwork. Over the past 40,000 years, humans have primarily used their eyes for distant vision.¹ In the last 100 years, our viewing tasks have gradually become predominantly near vision work.¹ We tend to ignore our eyes until they start bothering us, or we experience headaches that don't go away.

Taking care of your eyes reaches beyond the hours you spend at work. Eye health is a reflection of overall health and specifically taking care of your eyes will improve your vision at work and keep your eyes functioning and feeling their best all the time. Your eyes are one of the most important organs of the body and they deserve some special attention and consideration.

Focusing on things that are close to us requires that the muscles in our eyes work harder to adjust the lens of the eye. Focusing on distant things allows the eyes to relax. Computer Vision Syndrome is brought on in most part by the habits of people who use the computer rather than anything inherent in the computer itself.² We'll address each of these things in more detail, but the factors responsible for Computer Vision Syndrome are:³

- Poor vision that is uncorrected
- Inappropriate glasses for computer use
- Decreased blink rate
- Prolonged viewing and infrequent breaks
- Dry eye and tearing problems
- Strain of the eye focusing muscles
- Poor setup or improper use of the computer workstation
- Job nature and stress

The good news is that our eyes don't have to hurt! There are several things we can do to avoid problems and keep our eyes healthy.⁴

- ☞ Rest, look away from work, focus on distance or out window
- ☞ Close eyes
- ☞ Take a break, go for a walk, change your activity
- ☞ Use eye drops
- ☞ Put on glasses

- ☞ Get plenty of sleep
- ☞ Improve lighting
- ☞ Blink
- ☞ Wash eyes
- ☞ Stay hydrated
- ☞ Protect your eyes from the sun, wind, and water
- ☞ Reduce stress levels
- ☞ Eat lots of fruits and vegetables and reduce intake of sugar, caffeine, alcohol, red meat, and fats
- ☞ Stop using chemical-laden makeup, clean brushes frequently, throw out old eye makeup, don't share makeup with others or use testers in the store, and always thoroughly wash your makeup off at night before bed. Watch this video for more tips on using eye makeup in a safe and healthy way:
<http://www.webmd.com/eye-health/eye-vision-tv/video-how-to-apply-eye-makeup-safely>
- ☞ Bright light, sun, wind, and water disturb the balance of your eyes, so wear sunglasses, scarves, or caps to shield your eyes from the elements outside.⁵

Get your eyes checked and wear your glasses.

It's important to get your eyes checked if you use the computer many hours every day.⁵ If your eyes feel dry, tired, gritty or sore after a few hours of work you may need glasses. Being far-sighted or near-sighted, having astigmatism, or wearing bifocals, trifocals, or progressive lenses can make computer use a problem. Depending on your condition, focusing at close range may cause your eyes to work harder, resulting in eye strain and fatigue. A thorough exam will determine if your eyes are functioning properly, especially at close distances. It is important to provide the examiner information about all objects you view (e.g., computer monitor, journals or books, a microscope). Make note of the distance from your eyes to your computer monitor, reading material, or tools, estimate how many hours you spend daily on each work task, if you have multiple screens, and the type of lighting in the area.⁵ All of these things are important to an optometrist or ophthalmologist.

An annual exam is strongly recommended, even for individuals with 20/20 vision. As we get older, our eyes change. Without an exam, the subtle changes might go unnoticed until it is too late.

Rather than waiting until your eyes are tired, you should consider wearing your computer or reading glasses to avoid eye fatigue whenever you perform near vision work. Computer glasses can be coated to avoid fatigue caused by flickering light sources such as computer monitors and fluorescent lighting, or a very pale light gray, brown, or pink tint can be incorporated which offsets the scattering of light around the office.^{1,3}

The light emitted by computer screens, smartphones, and other digital devices includes blue light at the blue-violet end of the spectrum which can cause eye strain and possibly macular degeneration over time.^{6,7} Not enough is known yet, but a coating on your glasses to protect from computer blue light is advisable if you spend many hours every

day on a computer or other electronic device.⁶ Note that blocking blue light all the time is not a good idea either because this high-energy wavelength boosts alertness, helps memory and cognitive function, and elevates mood.⁶ Blue light filters are available for digital devices which may be a better solution than coating computer glasses, especially if you don't need glasses at the computer.⁶ Many are available online for almost every device. Make sure you are taking enough lutein, which protects the eye from several eye conditions and absorbs blue light and near ultraviolet light in the eye.⁸

Computer glasses are intended for viewing objects at an arm's distance, while reading glasses focus closer at 14-18 inches.¹ If you choose to wear bifocals, trifocals, or progressive lenses instead of computer glasses, be sure to lower the monitor to accommodate the focus at the bottom of the lenses so you don't have to tip your head back to focus. There is a good video describing this at: https://youtu.be/gPUN5_ObfPo



Photo courtesy of Structured Health Resources. www.StructuredHealth.com

Adjust and care for your monitor.

If the monitor is too close or too far away, it will cause your eyes to work harder. Your monitor should be close enough for you to see the screen without squinting or holding your head forward. A common place to start is to position your monitor about an arm's length away, but do not leave it there if you cannot see it while your head is vertically aligned with your hips. Positioning the computer as far away as possible (up to 35-40 inches) without causing the user to lean forward allows the eyes to relax more and may reduce eye strain.³ This adjustment is unique for each user and there is no distance that is right for everyone.

The part of the display viewed most frequently should be about 20 degrees below eye level.⁵ If your monitor is too high, you will have to open your eyes too wide, causing them to dry out or you will tip your head back resulting in neck strain.



The brightness of the display should match the brightness of the surroundings to prevent eye fatigue.⁵ Set color and contrast tones to suit yourself. Some monitors have control buttons on the display while others use a software dialog box associated with the graphics processor (such as Intel Graphics and Media Processor). Refer to the user manual for your particular monitor to determine how to adjust brightness and contrast.

Finally, remember to clean your display frequently to keep it free of fingerprints and dust which can reduce clarity.⁵

Control lighting and glare.

Bright light that causes glare on the computer screen, or insufficient illumination of reference materials, will cause eye strain.² Overall illumination in the room should be diffuse. Poor lighting not only increases visual discomfort and eye strain, but it also contributes to overall body fatigue, especially in the neck, shoulders and back as people adopt awkward postures while trying to read.⁹



Illustration courtesy of DecorZoom.
<http://www.decor-zoom.com/2014/05/modern-work-office-decorating-ideas.html>

Avoid excess light on the screen by rearranging your office, dimming overhead lights, using filters to diffuse light or closing blinds.⁹ Reading material can be illuminated by a task lamp. We suggest sources for task lighting on our web page: <http://working-well.org/Website/ptskltg.html>

It is important that task lighting is adjustable so that documents can be illuminated, without creating glare on the computer screen. Task lighting that is too bright causes high contrast between the reference material and the display, which will cause eye fatigue.



Illustration courtesy of SAB magazine: <http://www.sabmagazine.com/blog/2007/03/06/luminaire-life-cycle/>

Some of us are so used to dealing with glare on the computer screen that we are no longer aware that your eyes are working too hard. When you struggle to see, your eyes fatigue more rapidly.

Do a quick test to see if glare is an issue for you. If your office gets natural light, you will need to test for glare several times throughout the day since the light inside changes with the sun. Try the following four steps while looking at your computer screen. Which actions help your eyes to relax?

1. Shield your eyes with your hand or a piece of cardboard to block excess overhead light.
2. Shield your eyes on each side, one at a time (as if you were putting blinders on).
3. Using a large piece of cardboard, shield the top of the computer monitor (as if you were putting a visor on it), and then each of the sides.
4. Turn off the computer monitor and notice if you see any objects brightly reflected on the monitor.

Once you diagnose a glare problem, there are many quick fixes to try:

1. If you have glare from too much overhead light (and all the office lighting turns on at the same time):
 - a. Remove some of the bulbs from the light overhead and switch to task lighting.
 - b. Try repositioning your desk so that light is not bouncing directly into your eyes or on the screen. Place the monitor parallel (not directly below) overhead lights.⁵
 - c. Wear a visor or hat with a brim (you may feel silly, but at least you won't have a headache).
 - d. Switch to full spectrum lighting. Fluorescent full spectrum tubes are available.
2. If you have too much glare on the computer monitor:

- a. Reposition your monitor. It is best to set up your computer workstation perpendicular to the window. A desk for reading and writing can be in front of the window to utilize natural light.
- b. Construct a cardboard shield for the monitor by taping a file folder to the side.
- c. Reduce the amount of light from windows with blinds or a sheer curtain.
- d. Buy a monitor hood to shield the display from sources of glare.
- e. Use a glare screen only as a last resort. Since a glare screen does not solve the problem, it should be considered only if the source of glare cannot be controlled.



- In some cases, glare screens reflect glare almost as badly as the monitor itself, they make the display less bright, and they reduce the quality of the image.^{1,9}
3. If you have bright objects reflected on your monitor:
 - a. Remove the objects.
 - b. Cover the objects with dark fabric or paper.
 - c. Move your monitor.

Watch this video for more information about adjusting your monitor for glare, brightness, and environmental brightness: <http://www.webmd.com/eye-health/eye-vision-tv/video-how-to-deal-with-computer-eyestrain>

Avoid dry eyes.

Blinking renews the fluids in your eyes and keeps them from drying out.³ Dry Eye occurs when the eye's tears aren't able to provide adequate moisture and it results in eyes feeling gritty, irritated, scratchy or burning. It may feel like there is something in your eye, vision may be blurred, lids may stick together, or there may be excessive watering of the eye.¹⁰ There are actually three layers of tear film. An outer oily layer that helps prevent moisture evaporation, a middle watery layer which nourishes the eye, and an inner mucous layer which works with the middle watery layer to spread nutrients across the eye and keep the cornea wet (outer lens of the eye).^{11,12}

Ordinarily, we blink about 20-22 times a minute, but people working at a computer tend to blink only 4-6 times a minute!³ Other activities are also associated with less blinking including reading, thinking, or concentrating on a particular task.¹ Computer use is not the only reason people may develop Dry Eye, so when you get your eyes checked make sure to mention these symptoms. Allergies are sometimes to blame as are other physical problems.¹⁰ If you have allergies that are affecting your eyes, you should try to find a medication that will help you manage them.¹²

Watch this video to understand more about dry eye: <http://www.webmd.com/eye-health/eye-vision-tv/video-how-to-soothe-dry-eyes>

Squinting also reduces how often you blink and can lead to dry, irritated eyes, as shown in a study at Ohio State University.⁷ We squint to focus our eyes for a better look. But just a slight amount of squinting reduced blink rates by half, from 15 blinks a minute to 7.5 blinks a minute.⁷ The more that participants in the study squinted, the less they blinked. The less they blinked, the more their eyes ached or burned and became dry.

Air conditioning can cause faster evaporation of tears, resulting in dry eyes.³ Note where vents are located and try to move your computer location so that air is not blowing directly toward your face.³

If your eyes dry out, eye drops can help, but there are so many choices it can be confusing. The simplest eye drops are saline solution that contain no drugs or preservatives.¹³ It is recommended that you purchase saline in individual use dispensers without preservatives. Eye drops in large bottles without preservatives tend to grow bacteria, increasing the risk for eye infections.¹⁴ Many people are allergic to preservatives. Read the ingredients on the package. Eye drops for sensitive eyes still generally contain preservatives.¹⁴ Finding individual dose vials of pure saline solution for eyes is not easy. Almost all eye drops are a combination of saline with other drugs. Two brands currently available online are Modudose and Addipak from VitalityMedical.com.



Modudose - Image courtesy of VitalityMedical.com

- Cellulose Derivatives are next on the list for mild cases of dry, irritated eyes.³ The most widely used cellulose derivatives are carboxymethylcellulose sodium (CMC) and hydroxypropyl methylcellulose (HPMC). HPMC is preferable as it is best to start with the lowest possible concentration of the drug (0.2%).¹⁵ CMC tends to cause vision blurring, but it is available in 0.5% concentrations.¹⁵
- Dextran 70 is often combined with HPMC in a solution with 0.3% HPMC and 0.1% dextran 70. It is a fairly safe, viscous and soothing eye drop which lasts about 2 hours. Look for Tears Naturale by Alcon.¹⁵
- Carbomer eye gels provide longer lasting relief from dry eyes than more common polyvinyl alcohol, but they tend to cause temporary blurred vision.¹⁶
- Polyvinyl Alcohol in 1.4% solution is common, but doesn't offer the longest lasting relief.^{3,16}



Avoid products that whiten the eyes. Eye drops that whiten the eyes contain vasoconstrictors (drugs that cause the blood vessels to contract) and use of these drops may lead to chronic eye redness through a rebound effect.¹² These drops are not intended

to moisturize your eyes. They are for temporary cosmetic effect and should be used infrequently if ever.

Drink plenty of water throughout the day.^{4,17} Constipation and dehydration are harmful to the eyes.¹⁷

Rubbing your eyes is a common response to dry, irritated eyes. Rubbing your eyes tends to increase the irritation and can lead to a vicious cycle of increased irritation and more rubbing. In addition, hands carry lots of bacteria that can lead to eye infection.¹⁸ A lot of eye rubbing can actually damage the cornea (the outer lens of the eye), and it can break the tiny blood vessels around your eyes contributing to dark circles around your eyes.¹⁸

Take a break.

Taking breaks is *essential* to the health of your eyes.^{4,17} When you perform work that is close to the eye, there are several sets of muscles that have to work harder. It is fatigue of the ciliary muscles that results in blurry vision, pain, headaches, and other eye fatigue symptoms.⁷

- Extraocular muscles work to converge the eyes to a specific near location
- Ciliary muscles fine tune the shape of the lens in the eye to focus the image on the retina
- Pupillary muscles control the diameter of the pupil to respond to the amount of light

We highly recommend that you download a break reminder such as WorkRave (www.workrave.org) which is free, and set it to remind you to rest not only your body, but also your eyes. Optometrists recommend the 20-20-20 rule: every 20 minutes take a 20 second break and focus your eyes on something 20 feet away.³

Splash your eyes and face with slightly warm water 10-15 times to refresh them and to prevent eye fatigue.¹⁷ You can also place a cloth soaked in rose water (or just clean warm water) over your eyes for a few minutes to refresh and soothe them.¹⁷

Sleep.

Lack of sleep is one of the biggest enemies of the eyes.¹⁷ Getting adequate rest is important for your entire body, but especially the eyes. Try to follow the suggestions of ayurvedic routine and get to bed before 10:00 pm.¹⁷ Stress disturbs sleep and when you are tense, angry, or unhappy your eyes will reflect your stressful mood.⁴ Avoid stressful situations as much as possible and respond as calmly as you can to life's curve balls. Refer to our article on Stress for information on how your body deals with stress and possible ways to manage it. <http://working-well.org/articles/pdf/Stress.pdf>

Do some “Eye Yoga”.

There are several exercises that can help maintain the health of your eyes. It is important to remember that even just taking time to breathe can relax the eye muscles, as well as increase the supply of oxygen in the blood.¹ We tend to hold our breath when we are stressed or when we are concentrating.¹

Yogic Exercises¹⁷

There are several exercises that help strengthen the muscles of the eyes, help rebalance the ability to process light, dark, and colors, and to relax the eyes. For a demonstration of some exercises watch this video on YouTube.com and follow the descriptions below.

<https://youtu.be/PRwXuRIR3Co>

1. Sit comfortably on the floor with legs crossed, keeping your spine, neck and head in a straight line. Look directly ahead of you at eye-level and breathe normally.
2. Move your eyes up to the ceiling and look focus for 2 seconds. Look downward for 2 seconds. Look right as far as you can for 2 seconds. Look left as far as you can for 2 seconds. Then look forward again.
3. Close your eyes for 6-8 seconds.
4. Repeat 2-4 times.

Sunning.

This exercise increases circulation to the eyes, exercises the pupils as they dilate and constrict, and enhances your eyes' adaptability to darkness and light. Sunning should *always* be followed by palming (below).¹⁹

1. Stand with your *eyes closed* facing either the sun or a very bright light (e.g., a 150 watt incandescent light).
2. Turn your head gently from left to right, side to side taking about 3 seconds or so to move from one side to the other.
3. Notice the differences between partial shade and brightness. Breathe and relax.
4. Sun for no more than 3 minutes. Then palm as described below.¹⁹

Palming.^{9,19}

After sunning, do this exercise to accustom your eyes to dark. You can palm without sunning and you should plan on palming at least once daily.¹⁹

1. Rub your palms together for 8-10 seconds to create mild heat from friction.
2. Close your eyes and gently place your palms over your eyes without applying any pressure to the eyeballs. There should be little or no light entering the eye. Rest your palms there for one minute while breathing in and out slowly to release stress.
3. Repeat 2-3 times.



Image courtesy of businesspundit.com

Take supplements.

Supplements can help keep your eyes healthy. Since its hard to obtain enough of these nutrients through the diet, supplementation is a good idea.

1. *Lutein and zeaxanthin.* Lutein and zeaxanthin, members of the carotenoid family of natural plant pigments, are important in maintaining general eye health. They can also help prevent cataracts and macular degeneration.⁸ Lutein is an antioxidant that fights damaging free-radicals. It also protects the eye from sun damage.⁸ Recommended daily dosage of lutein is 6 to 20 mg daily and of zeaxanthin, 3 to 20 mg daily (less for prevention/more for treatment).^{8,20} This is virtually impossible to consume through the diet, so supplements are recommended. Absorption is improved when it is taken with Vitamin C.⁸ Rich dietary sources of lutein are collard greens, kale, mustard greens, spinach, and broccoli as well as yellow foods such as corn and eggs.⁸ Rich dietary sources of zeaxanthin are saffron, orange peppers and paprika, spinach, goji berry, corn, greens listed as sources for lutein, oranges, tangerines.²⁰ Most multivitamins do not contain these antioxidants, so check the ingredients and add supplements specifically with these powerful antioxidants if you need to.
2. *Astaxanthin.* This fat-soluble carotenoid is a very powerful antioxidant with unique structure that allow it to pass directly through the blood brain barrier to benefit the brain, eyes, and nervous system.²¹ It acts directly to stop oxidative damage to the retina caused by light and it protects photoreceptors from deterioration.²¹ It shows promise in preventing and treating age-related macular degeneration as well as nervous system disorders.²¹ Unlike other antioxidants, astaxanthin is available both within and outside cell walls, so it is able to fight free radicals both inside and outside cells.²¹ It is available in pill form and a recommended therapeutic dose is 205 mg daily. It is also available in foods such as salmon, pink trout species, shrimp or other pink seafood that consume the algae *Haemotococcus*.²¹
3. *Bilberry.* Bilberry (*Vaccinium myrtillus*) berries have had a reputation for improving night vision, visual acuity, and other eye functions and recently controlled studies are finding that there is merit to these claims.^{22,23,24,25} Bilberry extract appears to protect the eye from retinal damage from light, improves vision in myopic eyes, reduces strain, eye irritation, and eye fatigue in video display terminal workers, and reduces inflammation of the retina.^{22,23,24,25} Bilberry is a very rich source of anthocyanins, a plant-derived antioxidant.²⁵

A couple of supplements that contain these ingredients are shown below.

| | |
|---|---|
|  |  |
| <p>Eyes Alive Vision Nutrition 320 mg Bilberry Extract 20 mg Lutein 4 mg Astaxanthin 4 mg Zeaxanthin</p> | <p>Ocular Antioxidant 20 mg. Lutein 4 mg. Astaxanthin 4 mg Zeaxanthin</p> |
| <p>Illustrations courtesy SwansonVitamins.com</p> | |

Schedule a workstation evaluation.

It's important to make sure that your workstation is set up correctly to avoid unnecessary fatigue. Use our workstation design web page to help you or consult a professional ergonomist to help you. http://working-well.org/Website/wkstn_design.html

Most importantly -- remember to blink, breathe, and look into the distance to relax and rejuvenate your eyes! If you have continuing eye or vision problems after trying our suggestions, you should make an appointment with an optometrist or ophthalmologist to rule out more serious problems.

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This article and all of our articles are intended for your information and education. We are not experts in the diagnosis and treatment of specific medical or mental problems. When dealing with a severe problem, please consult your healthcare or mental health professional and research the alternatives available for your particular diagnosis prior to embarking on a treatment plan. You are ultimately responsible for your health and treatment!

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