



Healthy Eyes in the Modern Workplace

Tri-Service Vision Conservation and Readiness Branch

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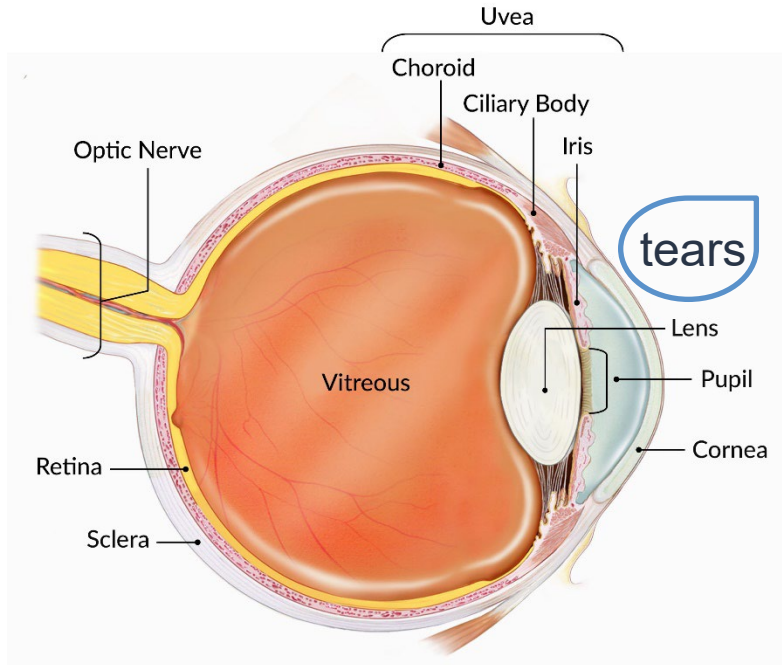


Design of the Eye and the Problem Today

- The eye is designed to mainly look in the distance.
 - Our eyes are “relaxed” at distance; we accommodate to see near.
 - The older we get, the tougher it is for our eyes to accommodate.
- Historically speaking, eyes were mainly used for distance.
- **PROBLEM:** Today’s working environment is all about NEAR.
 - Computers
 - Smart phones
 - Occasional paperwork



Anatomy and Physiology of the Eye



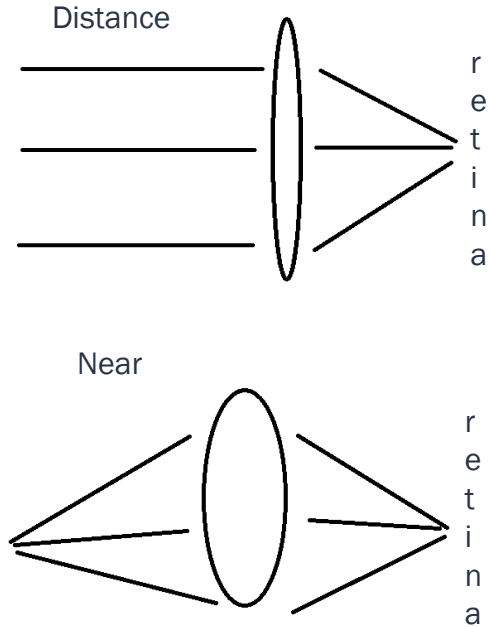
- **Tears, cornea, lens, and vitreous** focus light on retina
- **Iris** makes pupil big or small to regulate amount of light
- **Retina** (rods, cones and lots of “wiring”) receives light and sends to brain

<https://www.nei.nih.gov/learn-about-eye-health/healthy-vision/how-eyes-work>



The Eye Lens

- Roughly the size and shape of an M&M
- Has to “squish” forward to focus when looking at something up close
- Every year we live, the lens is less flexible (less “squishable”), meaning —
 - When we’re young, it’s easy to focus up close.
 - As we get older, it becomes tougher and tougher to do so (presbyopia).



Presbyopia

- Presbyopia is a normal part of aging because the eye lens becomes less “squishy.”
 - Everyone gets presbyopia as they get older.
 - Many people have another refractive error (nearsightedness or farsightedness) in addition to presbyopia.
- Presbyopia symptoms usually develop by the mid-40s to early 50s:
 - Trouble seeing things up close
 - Needing to hold reading materials farther away to focus on them
 - Eye strain (when your eyes feel tired or sore)
 - Headache
- So, we need to get reading glasses, which help us focus up close.

Source: <https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/presbyopia>



Nearsightedness (Myopia)

- Adults have “perfect vision” for distance or must wear eyewear (glasses or contacts) to see distance clearly, which is known as nearsightedness or myopia.
 - Distance vision (far-away objects) is blurry.
 - The eye structure doesn’t bend light properly, so light is focused in front of the retina.
 - Prescription eyeglasses or contact lenses can counteract nearsightedness, or surgery may correct it.
- Nearsighted eyes are focused up close (“near”).
 - The distance vision is always blurry.
 - Seeing “near” (close objects) is easier.
 - Nearsightedness can be inherited, but its risk can increase with intense and continued close visual work/play (computers, reading, video games).
 - Nearsightedness can worsen with age.

Source: <https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/nearsightedness-myopia>



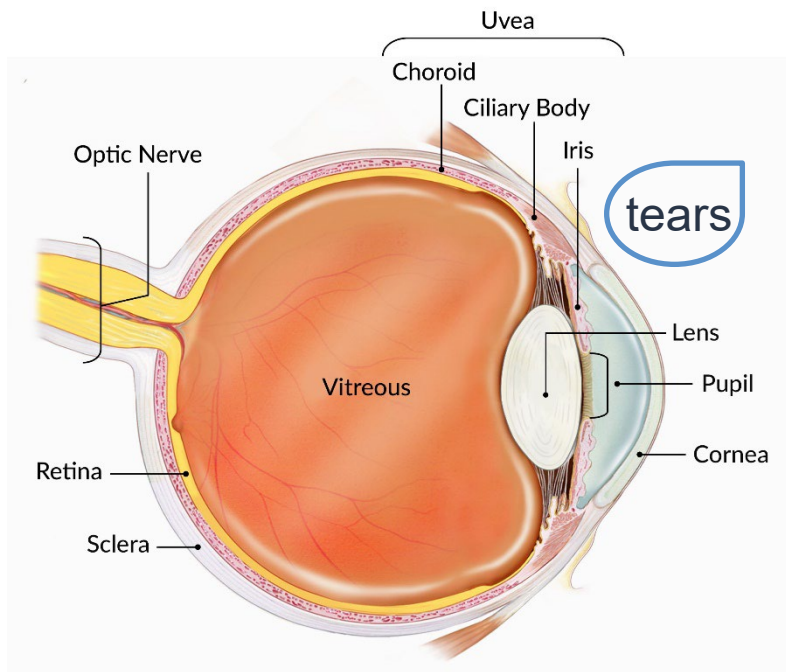
Farsightedness (Hypermetropia)

- Farsightedness is also known as long sightedness, or *hyperopia*.
 - The “near” vision is blurry.
 - The eye structure doesn’t bend light properly, so light is focused behind the retina.
 - Problems occur when reading or using a computer or phone (squint to see things that are close).
 - Corrective eyewear lenses can counteract farsightedness.
- Farsighted eyes focus beyond the distance (“far”), so they have trouble seeing things that are near.
- When we’re young, the lens is still “squishy” enough that farsightedness may not be noticed.
 - Many people don’t even know they are farsighted.
 - Trouble occurs as we get older, especially as distance vision is also affected.

Source: <https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/farsightedness-hyperopia>



The Value of Tears



A tear film forms a smooth layer of water over the cornea.

Otherwise —

- If your eyes are dry, that surface is rough, making your vision *blurry*.
- Plus, dry eyes make your eyes *hurt*.



The Modern Workplace

The modern workplace can be problematic:

- Everything (computer, phone, paperwork, etc.) is close to our eyes.
 - Working our “accommodation” all day
 - Constantly adjusting from computer distance to phone
- When we look at screens (computer, phone, tablet, etc.) we don’t blink as much.
 - Our eyes dry out, so everything gets a little blurry, and our eyes may hurt.



Things to Do to Make Life Easier

- Get glasses for near vision, possibly **computer bifocals or progressive lenses**.
 - Computer bifocals have two focal distances:
 - The top is for computer use (distance will be a little blurry).
 - The bottom is for up-close use (paperwork, phone, etc.).
- **Follow the 20/20/20 rule.**
 - Every 20 minutes, take a break for 20 seconds,
 - Look at things at least 20 feet away, and
 - Blink a lot.
- **Reduce glare.**
 - Lighting should be in front of the screen.
 - Use indirect lighting to minimize the amount of light reflecting off the screen.
 - An anti-glare coating on glasses reduces reflections off the front of the glasses.



Types of Bifocals: Traditional vs. Progressive

Traditional (“lined”) bifocals

The lined lens corrects for distance (upper lens) and close-up reading (lower lens).



- Benefits:
 - Quick adaption to reading or distance
 - Less expensive than progressive lenses
- Cons:
 - Does *not correct* “intermediate” vision (e.g., computers, dashboard in car)
 - Line can be aesthetically unappealing

Progressive bifocals

The no-line lens provides gradual correction for distance, intermediate, and near vision.



- Benefits:
 - Multiple prescriptions in one lens includes intermediate vision
 - No lines more aesthetically appealing
- Cons:
 - Slower adaption time for different distances
 - More expensive than traditional lenses



Additional Sources

National Eye Institute: [https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/refractive-errors#:~:text=Nearsightedness%20\(myopia\)%20makes%20far%2D,objects%20look%20blurry%20or%20distorted](https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/refractive-errors#:~:text=Nearsightedness%20(myopia)%20makes%20far%2D,objects%20look%20blurry%20or%20distorted)

MEDLINE: <https://medlineplus.gov/ency/imagepages/19511.htm>

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