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.

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.

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

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

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