

See

Celebrating
a World
of Vision



EYE TECH

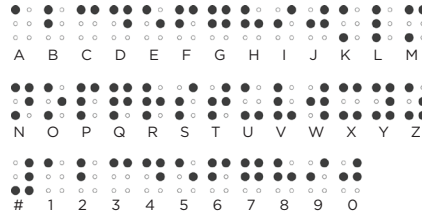
Exploring New & Emerging Braille Technologies

Braille is a representation of the alphabet, numbers, punctuation marks, and symbols made from “cells” of dots. There are 6-8 possible dots in a cell, and one cell makes a single letter, number, or punctuation mark. When vision rehabilitation is needed, learning braille can be useful. It can also help when someone has recently acquired vision loss or if low vision is present. Recent efforts have been made to develop newer, portable, and more affordable devices to encourage readers into the world of braille.



A Brief History Lesson

Braille was first used in printed magazines or books, but it was often cumbersome for users because it required embossed paper that was large in size. Over time, braille penetrated the electronic world, with the first braille displays appearing in the mid-1970s. In 1987, the Braille ‘n Speak was released as the first portable notetaker. It used a braille-style keyboard for inputting data instead of the traditional QWERTY keyboard.



Computer, smartphone, and tablet users with acquired vision loss may be unaware of the value or use of braille in these devices. For example, many of these technologies can connect to braille displays so that text on the screen can be read as tactile characters on displays and then read by touch. Electronic refreshable braille displays can create dots in braille cells by raising and lowering plastic or metal pins to correspond to dots in letters or numbers.

On the Horizon

An important goal for inventors has been to create braille displays for devices that are cheaper without reducing the durability of displays or the feel of the dots. Several projects are promising, including the Orbit Reader 20 and the Holy Braille full tablet braille display. The Orbit Reader 20 is a braille-reading device that is similar to the original Kindle device. It is designed specifically to read, with a few secondary add-on features using specific software. The Holy Braille project is developing and creating a full-page braille and tactile graphic display device. The goal is to create a flat screen tablet that can basically come alive with a full page of braille or bar graphs that users can touch on the screen.

These devices—and others that are still in development—promise to make braille more accessible to a larger group of users. With greater access to lower-cost braille reading technology, it's possible that braille will become a more viable alternative in the future for people with low vision or recent vision loss.



EYE HEALTH

Learn More About Dilated Eye Exams



The only way to be completely sure your eyes are healthy is to have a comprehensive dilated eye exam from an eye care professional. Drops are placed in both eyes to allow the pupil to open almost fully and more light to enter the eyes. Once dilated, each eye is examined using a special magnifying lens. This lens gives a clear view of the eye, including the retina, macula, and optic nerve.

During dilated eye exams, your doctor looks for signs of common vision problems and eye diseases, many of which have no early warning signs. Comprehensive dilated eye exams are recommended once a year beginning at age 60, but African Americans are advised to have annual exams starting at age 40 because of their higher risk of glaucoma. People with diabetes must also have dilated eye exams at least once a year. Talk to your optometrist about if and when your eyes should be dilated.



EYE-Q

Q: About how wide is the human eye?

See answer on back.

The Increasing Utility of Retina Scanning



Biometric verification technologies can identify someone using one or more distinguishing biological traits. Some of the most common unique identifiers include fingerprints, DNA, and signatures. Retinal scanning is an emerging type of biometric verification approach that is extremely accurate. The error rate for fingerprint identification is sometimes as high as 1 in 500, but retinal scans have an error rate of just 1 in 10,000,000. Retinal scans have mainly been used to gain physical access to specific locations or buildings. These devices are usually used in places that require very high degrees of security, such as high-level government buildings like the CIA and FBI facilities and for military or correctional facilities.

How It Works

Retinal scans map the unique patterns of the retina. During a retinal scan, users must remove glasses, stare at a specific point, and hold their head still for 10-15 seconds so that the scanning device can complete the scan. Once the scanner captures a retinal image, specialized software compiles the unique features of the network of retinal blood vessels into a template. Retinal scan algorithms will not let a user enroll or verify until the system captures an image of sufficient quality. A retinal scan is difficult to fake because the human

retina can't be forged. Also, a scan can only be accessed from a living human because the retina decays so quickly after death.

Retinal Vs Iris Scans

Although some smartphone apps claim to use retina scanning, the reality is they use iris scanning. This type of scan is different from retinal scans. Iris scanning uses video camera technology with subtle near infrared light to get images of the intricate structures of the iris (colored part of the eye), but these patterns can change over time. The retina's network of blood vessels remains stable throughout a person's life. In addition, retinal scans can differentiate between identical twins. They are about 70 times more accurate than iris scans.

Emerging Capabilities

As retinal scanners have become easier to use and more affordable, the technology is increasingly being used to safeguard critical computers. In addition, they are being tested to help diagnose other chronic health conditions (Table). This is because health problems can show up in your eyes early in some diseases. As the technology continues to advance, these scans may be used to supplement other tests as a non-invasive way to improve medical care.

Table: Retinal Scans & Your Health

Retinal scans may potentially be used to help diagnose and monitor several chronic health conditions, such as:

- Atherosclerosis
- Chicken pox
- Congestive heart failure
- Leukemia
- Lyme disease
- Lymphoma
- Malaria
- Sickle cell anemia
- Syphilis

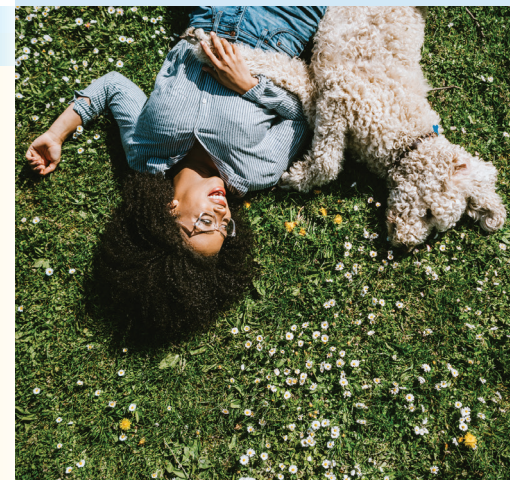
Man Vs Dog: A Look at Vision Differences



Anyone who is a dog lover knows that they see the world differently than humans, but why? The reason lies within the light receptors of the eyes called cones and rods.

Dogs have fewer cone receptors than humans, meaning they can't see as many colors. Human cones can detect 3 colors while dog cones can only detect 2. It's tough to know exactly what colors dogs see, but it's probably similar to what we see at dusk.

Human eyes have fewer rods than dogs. This means dogs can see much better at night. Dogs also have a layer of eye tissue that humans lack called the tapetum lucidum, which reflects light into the retina. It boosts night vision for dogs even more and it's why their eyes shine in the dark. It turns out that dogs see much more than just black and white.





First Aid Eye Care Tips for Kids

It's important to teach kids about what to do if they suffer eye injuries. Here are some helpful tips from the National Eye Institute for some unique situations:

Problem: "I got sand (or dust) in my eye!"

Solution: Don't rub the eyes. Wash them out with water or saline.

Problem: "I got hit in the eye with a ball (or rock or elbow)"

Solution: Use a gentle cold compress on the eye for 15 minutes to reduce swelling and relieve pain. If swelling or pain persist, take the child to a doctor.

Problem: "A chemical (or cleaning fluid or battery acid) splashed in my eye!"

Solution: Wash the eyes out with water or saline for at least 10 minutes and take the child to the doctor immediately after this washout period.



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2. Zhou Z, Chen T, Wang M, Jin L, Zhao Y, Chen S, et al. (2017) Pilot study of a novel classroom designed to prevent myopia by increasing children's exposure

3. Wells, N.M., and Evans, G.W. "Nearby Nature: A Buffer of Life Stress Among Rural Children." *Environment and Behavior*. Vol. 35:3, 311-330.

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INFOTR 1/19

How Better Sleep Hygiene Helps the Eyes



Insufficient sleep is a big problem for many people. Studies show that one-third of Americans get fewer than 6 hours of sleep per night. Not getting enough sleep has been linked to many different diseases and health conditions, but it can also hurt your eyesight. According to studies, the eyes need at least 5 hours of sleep each night to properly replenish and revive themselves to work at their full potential.

Lack of sleep can sometimes lead to less serious vision problems like involuntary eye spasms, a condition called myokymia. These spasms cause twitches in your eyes that won't go away. Although they're not painful and don't cause vision damage, they can be frustrating and may disrupt your daily routine. Over time, lack of sleep can lead to more severe eye problems.

Poor Sleep & More Serious Eye Problems

Lack of sleep may lead to popping of blood vessels in the eyes due to continuous straining. Another more serious problem from lack of sleep is dry eye, which can lead to pain, light sensitivity, itching, redness, or blurred vision. Long-lasting sleep deprivation may also cause anterior ischemic optic neuropathy (AION), a serious eye condition that tends to affect older people and those with a history of sleep apnea. If the optic nerve is damaged from AION, you can have vision loss.

Better Sleep Suggestions

"Sleep hygiene" is a term that refers to a variety of different practices and habits that are needed to have good sleep quality and daytime alertness. To practice good sleep hygiene, it's critical to make healthy sleeping patterns a bigger priority.

The Centers for Disease Control and Prevention recommend the following to improve sleep health:

- Go to bed at the same time each night and wake up at the same time each morning, including weekends.
- Make the bedroom quiet, dark, and relaxing, and keep the temperature comfortable.
- Remove electronic devices (TVs, computers, and smart phones) from the bedroom.
- Avoid large meals, caffeine, and alcohol before bedtime.
- Exercise during the day to help you fall asleep more easily at night.

Your eyes stay busy all day long, meaning the only time they have a chance to replenish themselves is during sleep. Practicing good sleep hygiene can help you get a good night's sleep and ensures the eyes will get the rest they need so you can continue to have healthy vision.



Eye Charts: A Closer Look

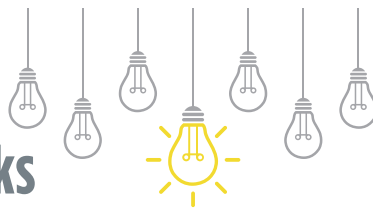


The eye chart measures the sharpness of your vision, or visual acuity. If you don't wear glasses or contacts, your eye doctor will use the results to find out if you may need them. If you already wear corrective lenses, the eye chart test results will help determine if your glasses or contacts prescription needs to change.

The most commonly used eye chart is the Snellen chart. It usually shows 11 rows of capital letters. The first line has one very large letter, and each row after that has more letters that are smaller in size. Standing 20 feet from the chart, you will be asked to read from it without your glasses or contacts. You cover one eye and read out the smallest line of letters you can see. The test is done on each eye. If you have 20/20 vision, you have normal visual acuity.



LED Lighting: Assessing Eye Risks



Light-emitting diode (LED) lights are up to 95% more energy efficient than incandescent bulbs and are cost saving to consumers. In addition to lighting houses, office buildings, schools, stores, and streets, LEDs have become the dominant technology for back-lighted tablet displays, such as iPads and e-readers, and large television sets. However, recent studies suggest LEDs generate blue light that is isolated from all the other colors on the light spectrum. This can damage the retinas and may ultimately contribute to vision loss.

Comparing Light Sources

Natural light gives off all the colors of the rainbow in a somewhat continuous manner whereas typical “white” LED lights consist of a fluorescent coating. This coating transforms part of the blue light into longer wavelengths, creating a yellowish light. However, much of the light emitted is still invisible blue light, an aggressive high-energy, short wavelength light that’s responsible for keeping people awake and alert. Blue light is present in sunlight and a necessary ingredient for life, but it needs to be balanced by all other colors of light, particularly red, which is its opposite color of light.

The heat generated by incandescent light bulbs is infrared radiation. This heat requires more electricity, but the

infrared light that is created benefits your health. Near-infrared light, such as the light generated by candles or fires, primes the cells in the retina for rest, repair, and regeneration. LED lighting is a key source of the electromagnetic radiation that we’re exposed to daily. Even brief periods of exposure to too much blue light can damage the retinal pigment epithelium, which can lead to photoreceptor cell death. When too many of these cells die, the result can be vision loss.

Protect Yourself

There are steps you can take to protect yourself from potential damage from overexposure to LED lighting. When shopping for light bulbs, look at their color rendering index (CRI). Incandescent bulbs, candles, and sunlight have a CRI of 100. When buying LED bulbs, look for those with a CRI of 97, which is the closest they will come to natural light.

LEDs are most dangerous at night because there is no counterbalancing of red light. Consider using incandescent bulbs or candles if the night’s activities do not require intense amounts of light. An alternative is to use crystal clear “vintage” incandescent bulbs or low-voltage halogen bulbs. If you must be exposed to blue light after dark, think about using blue-light blocking glasses. Talk to your optometrist if you have concerns about the effects of LED lighting on your eyes.



Eye Cosmetics & Hygiene



Women often wear eye cosmetics like mascara, eyeliner, and eye shadow to emphasize and highlight their eyes to look and feel more attractive. Although eye cosmetics can boost self-esteem, they can also move around the face and across the eyelids, which can lead to eye film instability and dry eye.

Proper eyelid hygiene is important, especially for people at risk of dry eye and those who wear contact lens. Eyelid scrubs and warm compress products are two ways for clean your eyelids and lashes. Practicing good lid hygiene can also help. Talk to your doctor about the safest and most effective strategies to maintain lid hygiene and tear health.

Open Your Eyes

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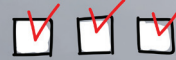
Important information for AIR OPTIX® plus HydraGlyde® Multifocal (Itrafilcon B) contact lenses: For daily wear or extended wear up to 6 nights for near/far-sightedness, presbyopia and/or astigmatism. Risk of serious eye problems (i.e., corneal ulcer) is greater for extended wear. In rare cases, loss of vision may result. Side effects like discomfort, mild burning or stinging may occur.

Ask your eye care professional for complete wear, care, and safety information

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EYE DROPS



A Checklist for Your Eye Doctor Appointment

Answer these questions:

Have I noticed any recent signs or symptoms of eye problems?

Have I had any recent eye injuries?

What prescription and over-the-counter drugs am I currently taking?

What questions do I have for my doctor about my vision?

What general health conditions should I talk to my doctor about?

What is my family history of eye problems?

Bring these things:

My glasses, contact lenses, or both.

The prescription and over-the-counter drugs I'm taking.

My medical or health insurance card or my membership certificate.

At the examination:

Ask questions if anything seems unclear.

Ask if there were any changes since my last exam.

When should I return for my next exam?

EYE-Q

Answer to Eye-Q (from page 1)

A: 1 inch across

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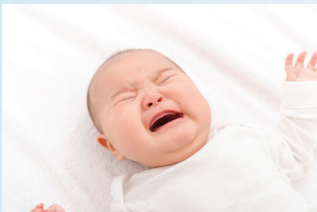
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EYE DROPS

1 Newborns don't produce tears. They make crying sounds, but the tears don't start flowing until they are about 4-13 weeks old.



2 Some people are born with two different colored eyes. This condition is **heterochromia**.



3 It's impossible to sneeze with your eyes open. Your eyes and nose are connected by cranial nerves, so the stimulation from a sneeze travels up one nerve to the brain, then down another nerve to the eyelids, typically prompting a blink.

