Understanding Color Blindness

Color blindness is when you are unable to see some colors in a normal way. In most cases, you can still see colors. But you can't tell the difference between certain colors.

How the eye works

The retina is the light-sensitive part of your eye. It sends visual information to your brain. Your retina has special cells that detect color. These are called cone cells. Your eye has 3 types of cone cells: green, red, and blue. If you have a problem with any of these cone cells, you may have problems seeing some colors. In most cases, the condition won't affect the overall sharpness of your vision.

Types of color blindness

- **Red-green color blindness.** This is the most common type. It is caused by problems with the red or green cone cells. There are different kinds of red-green color blindness. Red, orange, and yellow may look greener. Red may look black. Some colors of orange and green may look yellow. Yellow and green may look reddish. Purple and blue may look largely the same. Or reds look brown or yellow, and greens look beige.
- **Blue-yellow color blindness.** This is a less common type. It is caused by problems with the blue cone cells. There are different kinds of blue-yellow color blindness. Blues may look greener. Yellow and red may look pink. Yellow may look purple or light gray.
- **Complete color blindness (monochromacy).** This is a rare type. It is caused by problems with 2 types of the cone cells, or all of the cone cells. Vision is less clear or nearsighted. You may have uncontrollable eye movements (nystagmus). You may only see black, white, and gray. And you may be unusually sensitive to light.

What causes color blindness?

Color blindness is most often present from birth. It's caused by a faulty gene that is passed from parent to child. It is more easily passed to male children than females. Having other family members with color blindness may increase your risk for the problem. Even if you don't have the condition, you may be at risk of passing the gene to your children. The gene can cause some types of cone cells to form wrongly, or not form at all. Problems with the red or green cones are more common than problems with the blue cones.

In rare cases, color blindness can be caused by a health condition, such as:

- Inflammation of the optic nerve (optic neuritis)
- Damage to the center of the retina (macular degeneration)
- Damage to the retina caused by diabetes (diabetic retinopathy)
- Other diseases affecting the optic nerve or retina
- Diseases that affect the lens
- Toxic effects from medicines or chemical exposure
- Stroke, especially in the occipital lobe of the brain
- Alzheimer disease
- Parkinson disease

- Multiple sclerosis

Symptoms of color blindness

The most common kind of color blindness is having trouble telling reds from greens. Some people may be able to see the difference between these colors, but only with great difficulty. Others may not be able to see the difference at all. Depending on the type of problems you have with your cones, your color blindness may be so slight that you may not even know you have it for many years while other people have red-green color blindness that is more severe. Less commonly color blindness causes a problem seeing the difference between blue and yellow.

Most kinds of color blindness don't affect the sharpness of your vision. Often the only problem present is trouble telling colors apart. If you have a rare and severe form of color blindness, you only see shades of gray. This is called monochromacy (achromatopsia). You may have other symptoms. These may include poor sharpness of vision and eye movements that you can’t control.

Diagnosing color blindness

An eye care provider can diagnose color blindness with a special eye exam. The exam may use special pictures to see if you can tell the difference between colors. If your provider finds a problem, you may need more detailed color vision tests. These are to find out how severe the problem is.

A color blindness test may be given as part of a standard eye exam. Or a parent or teacher might ask for an exam if a child seems to have trouble seeing colors normally. People with mild color blindness might not find out until they take a screening test for a job that needs them to see colors accurately. Anyone who has a family history of color blindness may need screening.