



COLOUR VISION DEFICIENCY

Colour vision deficiency is the inability to distinguish certain shades of color or in more severe cases, see colors at all. The term "colour blindness" is also used to describe this visual condition, but very few people are completely colour blind.

Most people with color vision deficiency can see colors, but they have difficulty differentiating between particular shades of reds and greens (most common) or blues and yellows (less common).

Colour deficiency is usually inherited and affects up to 8 percent of males and less than 1 percent of females. The severity of color vision deficiency can range from mild to severe depending on the cause. It will affect both eyes if it is inherited and usually just one if the cause for the deficiency is injury or illness. Acquired colour deficiency can result from certain diseases, trauma or as a side effect of certain medications.

What causes inherited colour deficiency?

Color vision is possible due to photoreceptors in the retina of the eye known as **cones**. These cones have light sensitive pigments that enable us to recognize color. Found in the macula, the central portion of the retina, each cone is sensitive to either red, green or blue light, which the cones recognize based upon light wavelengths.

Normally, the pigments inside the cones register differing colors and send that information through the optic nerve to the brain enabling you to distinguish countless shades of color. But if the cones lack one or more light sensitive pigments, you will be unable to see one or more of the three primary colors thereby causing a deficiency in your color perception.

How does a colour deficient person see?

The most common form of color deficiency is red-green. This does not mean that people with this deficiency cannot see these colors at all; they simply have a harder time differentiating between them. The difficulty they have in correctly identifying them depends on how dark or light the colors are. Another form of color deficiency is blue-yellow. This is a rarer and more severe form of color vision loss than red-green since persons with blue-yellow deficiency frequently have red-green blindness too. In both cases, it is common for people with color vision deficiency to see neutral or gray areas where a particular color should appear.

Red-green color blindness is split into two different types:

1. Red deficiencies:

- Protanopia
- Protanomaly

The color receptors (cones) in the eyes of people with protanopia are not sensitive to long wavelengths (the reds). Reds look more like beiges and appear to be somewhat darker than they actually are. The greens tend to look similar to the reds. Protanomaly is milder than protanopia, but the end result is similar. Although many people with protanomaly can distinguish some reds and greens, they cannot do so as easily as someone with color-normal vision, and, as with protanopia, reds tend to look darker as well.

2. Green deficiencies:

- Deuteranopia
- Deuteranomaly

Deuteranopia and deuteranomaly are the most common forms of color-blindness. People with these conditions have cones that are insensitive to medium wavelengths (greens), but the end result is similar to protanopia, with the exception that reds do not look as dark. Deuteranomaly is the less serious of the two conditions. Although individuals with deuteranomaly probably cannot see reds and greens in the same way that color-normal people can, they can often distinguish between the shades of reds and greens relatively accurately.

How is colour deficiency detected?

People who are colour deficient are generally unaware of their condition. They assume that everyone sees things the way they do. As a result, a complete optometric examination, including a test for colour vision, is recommended. The test for colour deficiency is a relatively simple one, typically involving the viewing of a series of coloured designs. The designs have been created in such a way that a person with normal colour vision can see certain figures in the designs. A colour deficient person will not be able to distinguish the figures.

When should a person be tested for colour deficiency?

Every child should be checked for colour deficiency by at least age five. It is important to detect colour deficiency early because colour coded learning materials are used extensively in the primary grades. In addition, colour deficiency may affect the career path of an individual, since the ability to distinguish colours is an important aspect of some jobs, such as pilots, electricians, some military personnel, police officers and others.

Can colour deficiency be cured?

Unfortunately a cure for colour deficiency has not yet been discovered. A person with colour deficiency can, however, be taught to adapt to the inability to distinguish colours. For example, you can be taught to recognize the brightness and location of a traffic light rather than the colour itself. It is sometimes possible to increase the ability to distinguish colours with the use of special filters. A special red tinted contact lens used in one eye, and other devices are used, in some cases to aid persons with certain colour deficiencies.