Color blindness, or more properly termed, color vision deficiency, can be a misleading term. There is no actual blindness involved; rather the afflicted person has a color deficiency that prevents them from distinguishing between colors. Color vision deficiency occurs predominately in males because it is an X linked recessive condition. Approximately 10% of all males are affected.

Color vision deficiency can either be acquired or inherited. Acquired color vision deficiency can occur with aging, ocular injury, as a result of a medication side effect, or as a result of some other eye diseases such as glaucoma or macular degeneration. There are three different types of inherited color blindness: monochromacy, dichromacy, and anomalous trichromacy. In order to briefly understand the inherited causes, we will need to discuss the areas of the eye that is not functioning.

The retina consists of rod and cone cells. Cones are responsible for color vision, and there are three different types of cone cells. (Figure 1) Each type responds to different wavelengths, but are commonly referred to as blue, green, and red cones.

Monochromacy (Figure 2) is caused when two or three of the cone pigments are defective. It is also known as total color blindness. Dichromacy occurs when one of the three cone pigments are missing or defective. The red-green (Figure 3), blue-yellow color vision deficiency are categorized as dichromatic vision. Trichromacy results from an alteration of spectral sensitivity.

The main way a patient can be diagnosed with color vision deficiency is with an Ishihara colorblind test (Figure 4). It consists of a series of numbers that are composed of spots. The background spots and the spots of the number are different colors, but a color vision deficient person would not be able to distinguish between the two, resulting in failure to distinguish the number.

There are currently no treatments for color blindness though there are specialty tinted contact lenses that can be prescribed to help people distinguish between colors more easily.