

Submitted by: Sobia

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Submitted to: Sir Majid Raza

Assignment: General Science and Ability

Assignment No: 1

Topic: Short Sightedness, Long Sightedness,
Night Blindness and Colour Blindness

Short Sightedness:

Short sightedness or near sightedness, is an eye disorder in which a person can see closer objects clearly, but the distant objects are not clearly visible. Technically this disorder is known as myopia. Myopia occurs when light coming from distant objects is 'overfocused', so that the point of focus is in front of the retina. It occurs because either the eyeball is too long or, less commonly, because the cornea is too curved. Despite maximum flattening of the lens, the eye is not able to focus the light ray further back and on to the retina. Light coming from near objects requires a stronger focusing activity anyway, so in myopia light from near objects is more likely to be focused in the right place.

Symptoms of Short Sightedness:

The main symptom of short sightedness is a difficulty with seeing things that are far away. The earlier short-sightedness starts, the more severe it is likely to become. By the time early adulthood is reached, the level of short-sightedness has usually reached its peak.

Causes of Short Sightedness:

Short-sightedness tends to start in childhood and the young teenage years. There is ongoing research into what exactly causes short-sightedness, but it is likely to be a combination of genes and lifestyle factors (such as spending long periods of time doing close-up work or indoors). It often runs in families. Temporary short-sightedness can also occur with certain illness - for example, in diabetes.

Treatment for Short Sightedness:

Glasses:

Short-sightedness can be corrected with glasses, which is the simplest, cheapest and safest way. Concave prescription lenses (called minus lenses) are used to bend light rays slightly outwards to counteract

the over-focusing tendency. As a result, the light rays focus further back in the eye on the retina. There is an enormous choice of glasses frames available, to suit all budgets.

Lenses:

Lenses do the same job like glasses but they sit right on the surface of the eye. Many different types of contact lenses are available. Lenses may be soft or rigid glass-permeable. They can be daily disposable, extended wear, monthly disposable, or non-disposable. ~~Some~~ Contact lenses tend to be more expensive than glasses. They provide good all-round vision and do not mist over (for example, while doing sports or in hot environments). However, they require more care and meticulous hygiene, and should not be worn during swimming, showering or sleeping. They are more suitable for older teenagers and adults rather than very young children.

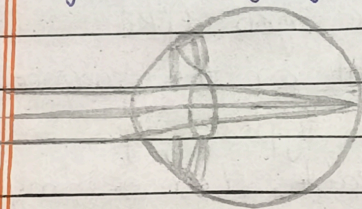
Laser eye surgery:

Laser eye surgery is an option for some people with short-sightedness. Complete and permanent resolution of the refractive error is possible in a number of people. Others may have a significant improvement

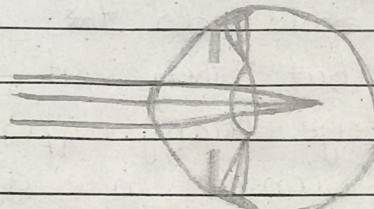
even though perfect vision is not achieved and glasses or contact lenses may still be needed.

Generally, a person's vision after laser eye surgery is comparable to how it would be with contact lenses before eye surgery.

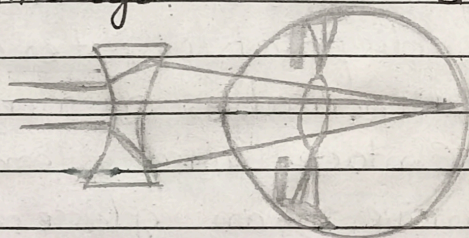
Myopia



Normal eye



Light focused in front of retina



Corrected with concave lens

Long-sightedness:

The medical name for long-sightedness is hypermetropia, sometimes called hyperopia. Eyesight problems, such as hypermetropia, are also known as refractive errors. Hypermetropia is the condition of the eye where the image of a nearby object is formed behind the retina. Here, the light is focused behind the retina instead of focusing on the retina. The person suffering from hypermetropia will have difficulty focusing on nearby objects but can clearly see distant objects.

Symptoms of Long-sightedness:

The main symptom of long-sightedness is a difficulty with near vision. "Tiring" of the eyes (asthenopia) is common and long-sighted people may have headaches and uncomfortable vision. They may have difficulties seeing with both eyes (binocular vision), as the brain will tend to ignore signals coming from the most long-sighted eye. Lazy eye (amblyopia) or squint (strabismus) can therefore also occur in long sight.

Causes of Long-sightedness:

The causes of long sight are usually hereditary (genetic). Long-sightedness can occur at any age but it tends to become more noticeable above the age of 40 years. In rare case, long sight is caused by other conditions such as diabetes, small eye syndrome (microphthalmia), cancers around the eye and problems with the blood vessels in the retina. Many babies and very young children tend to be slightly long-sighted but usually grow out of this by about 3 years of age.

Treatment for Long-Sightedness:

Glasses:

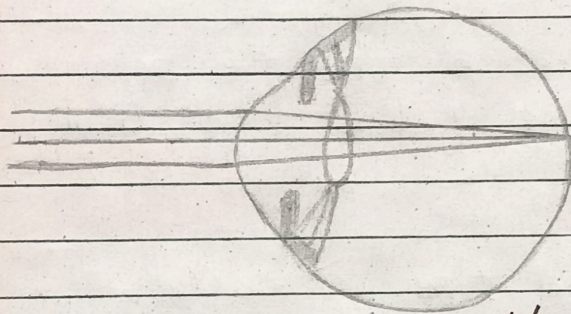
The simplest, cheapest and safest way to correct long sight is with glasses. Convex prescription lenses (called plus lenses) are used to bend light rays slightly inward to give a little bit of additional focusing power to the eye. The light ray then have a lesser angle to bend travelling through the cornea and lens and the lens has less work to do. As a result, the light ray are able to focus on the retina. There is an enormous choice of spectacle frames available, to suit all budgets, faces and personal styles.

Contact lenses:

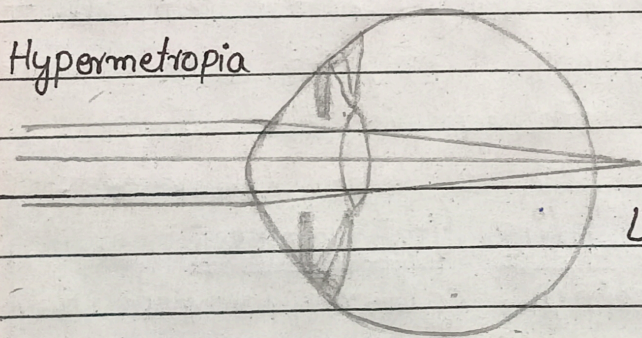
Lenses do the same job as glasses but they sit right on the surface of the eye. Many different types of contact lenses are available. Lenses may be soft or rigid gas-permeable. They can be daily disposable, extended wear, monthly disposable, or non-disposable. They require more care and meticulous hygiene. They provide good all-round vision and do not mist over (for example, while doing sports or in hot environments). They should not be worn during swimming, showering or sleeping. They are more suitable for older teenagers and adults, rather than very young children.

Laser eye surgery:

Laser eye surgery is an option for some people with long-sightedness. Generally, this type of surgery is not available on the NHS and can be expensive. Complete and permanent resolution of the refractive error is possible in a number of people. Other have a significant improvement even though perfect vision is not achieved and glasses or contact lenses may still be needed. Generally, a person's vision after laser eye surgery is comparable to how it would be with contact lenses before eye surgery.

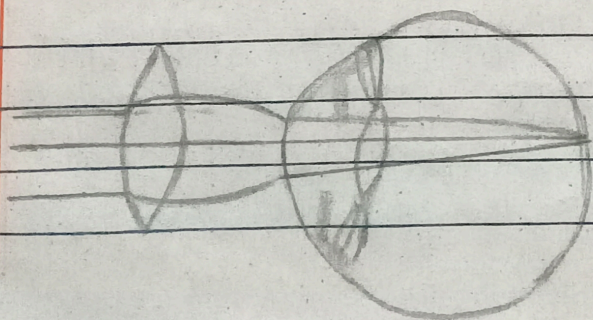


Normal eye



Hypermetropia

Light focused behind the retina



Corrected with convex lens

Color Blindness:

Colour blindness, also called colour vision deficiency, is a condition where the eyes have trouble distinguishing certain colours. Most affected people have either red or green colour blindness. Blue colour blindness and monochromatism, a condition in which a person sees only black, white and grey are very rare.

Types of Colour Blindness:

1st type: In the 1st type, the person has trouble telling the difference between red and green.

Second Type:

In second type the person has difficulty telling yellow and blue apart.

Third type:

The third type is called achromatopsia. A person with this form can't perceive any colours at all, - everything appears gray or black and white. Achromatopsia is the least common form of colour blindness.

Causes of Colour Blindness:

Seeing colours across the light spectrum is a complex process that begins with your eyes' ability to respond to different wavelengths of light. Light, which contains all colour wavelengths enters the eye through the

cornea and passes through the lens and transparent, jelly like tissue in the eye (vitreous humor) to wavelength-sensitive cells (cones) at the back of your eye in the macular area of the retina. The cones are sensitive to short (blue), medium (green) or long (red) wavelengths of light. Chemicals in the cones trigger a reaction and send the wavelength information through ~~your~~^{the} optic nerve to ~~your~~ the brain. If the eyes are normal so it can perceive color. But if cones lack one or more wavelength-sensitive chemicals, then the person will be unable to distinguish the colors red, green or blue. Colour blindness has several causes:

Inherited disorders:

Inherited colour deficiencies are much more common in males than females. The most common colour deficiency is red-green, with blue-yellow deficiency being much less common. It is rare to have no colour vision at all. Any one can inherit a mild, moderate or severe degree of the disorder. Inherited colour deficiencies usually affect both eyes, and the severity doesn't change over your lifetime.

Diseases:

Some conditions that can cause colour deficits are sickle cell anemia, diabetes, macular degeneration, Alzheimer's disease, multiple sclerosis, glaucoma, Parkinson's disease, chronic alcoholism and leukemia. One eye may be more affected than the other, and the color deficit may get better if the underlying disease can be treated.

Certain medications:

Some medications can alter color vision, such as some drugs that treat certain ~~auto~~ autoimmune diseases, heart problems, high blood pressure, erectile dysfunction, infections, nervous disorders and psychological problems.

Aging:

The ability to see colours deteriorates slowly as with the age.

Chemicals:

Exposure to some chemicals in the workplace, such as carbon disulfide and fertilizers, may cause loss of colour vision.

Symptoms of Colour Blindness:

Symptoms of colour blindness can vary from person to person. Many people have such mild symptoms that they don't know they have a colour deficiency. The main symptom of colour blindness is difficulty telling colours apart or making mistakes when identifying colours. People with colour blindness may not be able to tell the difference between the shades of colours, especially shades of red and green or shades of green and blue and the brightness of colours. In rare cases, people with severe colour blindness may also experience symptoms like nystagmus (rapid, uncontrollable eye movements) or sensitivity to light.

Treatment of Colour Blindness:

There is no cure of colour blindness that is passed down in families, but most people find ways to adjust to it. If the colour blindness is happening because of another health problem, then the doctor will treat the condition that is causing the problem. If someone is taking a medicine that causes the colour blindness, then the doctor may adjust to switch a person to a different medicine.

Night Blindness:

Night blindness (nyctalopia) is inability to see well at night or in poor light. It is often associated with an inability to quickly adapt from a well-illuminated to a poorly illuminated environment. It is not a disease in itself, but rather a symptom of an underlying eye problem, usually a retinal problem. It is common for people who are myopic to have some difficulties with night vision, but this is not due to retinal disease, but rather optical issues.

Causes of Night Blindness:

Night blindness is the result of one of several conditions, many of which are treatable. The conditions are the following.

Glaucoma:

Glaucoma refers to a group of eye conditions where damage to the optic nerve, which connects the eye to the brain, causes pressure in the eye. This may impair vision, which can be permanent.

Cataracts:

Cataracts occur when the lens of the eye becomes cloudy. This often happens when proteins in the lens break down, usually due to aging. Clouding of the lens can impair vision, including in

dim lighting.

Near-sightedness:

People with near-sightedness, which doctors call myopia, are unable to see objects in the distance accurately. This occurs when the eye grows too long and no longer focuses light correctly.

Vitamin A deficiency:

Vitamin A is or retinal, is an essential nutrient for vision. For example, it makes up a protein that absorbs light in the retina and supports eye functioning. Vitamin A deficiencies can have a serious impact on vision.

Retinitis pigmentosa:

This is a group of rare eye diseases that damage the retina. It is a genetic disorder that results in difficulty seeing in low light.

Symptoms of Night Blindness:

The sole symptom of night blindness is difficulty seeing in the dark. A person more likely to experience night blindness when his eyes transition from a bright environment to an area of low light, such as when a person leave a sunny sidewalk to enter a dimly lit restaurant. A person with night blindness is also likely to experience poor vision when driving due to the intermittent brightness of headlights and street lights on the road.

Treatment of Night Blindness:

Treatment of Night blindness will vary depending on the cause. Treatment may include wearing specific type of glasses or contact lenses, which can help to support correct vision. Wearing sunglasses can also protect the eye from ultraviolet light, which can cause further eye damage. When the cause is a lack of vitamin A, treatment involves adding more Vitamin A to the diet. Eye surgery may be necessary in more severe cases. For example, LASIK is a type of surgery that changes the shape of the cornea to improve vision. Other types of surgery may aim to remove a cataract from the eye or to release pressure in the eye for treatment of glaucoma. In some cases, night blindness may not be treatable. Retinitis pigmentosa currently has no effective treatments, although certain eye devices and therapy services may improve symptoms and quality of life.