Treatment [8]:
The goal of treating nearsightedness is to improve vision by helping focus light on your retina through the use of corrective lenses or refractive surgery.

a) Corrective lenses
Wearing corrective lenses treats nearsightedness by counteracting the increased curvature of your cornea or the increased length of your eye. Types of corrective lenses include:

- **Eyeglasses.** This is a simple, safe way to correct vision problems caused by myopia. The variety of eyeglasses is wide and includes bifocals, trifocals and reading lenses.
- **Contact lenses.** These lenses are worn right on your eyes. They are available in a variety of types and styles, including hard, soft, extended wear, disposable, rigid gas permeable and bifocal. Ask your eye doctor about the pros and cons of contact lenses and what might be best for you.

b) Refractive surgery
Refractive surgery improves vision and reduces the need for eyeglasses or contact lenses. Your eye surgeon uses a laser beam to reshape the cornea. This type of surgery has become routine, but it's usually not recommended until the eyes have fully developed, in the 20s.
Refractive surgical procedures for nearsightedness include:

- **Laser-assisted in-situ keratomileusis (LASIK).** With this procedure, your eye surgeon makes a thin, hinged flap in your cornea. He or she then uses an excimer laser to remove layers from the center of your cornea to flatten it to a domed shape. An excimer laser differs from other lasers in that it doesn't produce heat. After the excimer laser is used, the thin corneal flap is repositioned.
- **Laser-assisted subepithelial keratectomy (LASEK).** Instead of creating a flap in the cornea, the surgeon creates a flap only in the cornea's thin protective cover (epithelium). He or she then uses an excimer laser to reshape the cornea's outer layers and flatten its curvature and then repositions the epithelial flap. You may need to wear a bandage contact lens for several days afterward to encourage healing.
- **Photorefractive keratectomy (PRK).** This procedure is similar to LASEK, except the surgeon removes the epithelium. It will grow back naturally, conforming to your cornea's new shape. You may need to wear a bandage contact lens for a few days afterward.
- **Intraocular lens (IOL) implant.** These lenses are surgically implanted into the eye, in front of the eye's natural lens. They may be an option for people with moderate to severe myopia. IOL implants are not currently considered a mainstream treatment option.

Some of the possible complications that can occur after refractive surgery include:

- Undercorrection or overcorrection of your initial problem
- Visual side effects, such as a halo or starburst appearing around lights
- Dry eye
- Infection
- Corneal scarring
- Rarely, vision loss

2. Hyperopia

Farsightedness, or **hyperopia**, as it is medically termed, is a vision condition in which distant objects are usually seen clearly, but close ones do not come into proper focus. Farsightedness occurs if your eyeball is too short or the cornea has too little curvature, so light entering your eye is not focused correctly. Common signs of farsightedness include difficulty in concentrating and maintaining a clear focus on near objects, eye strain, fatigue and/or headaches after close work, aching or burning eyes, irritability or nervousness after sustained concentration [9].

In mild cases of farsightedness, your eyes may be able to compensate without corrective lenses. In other cases, your optometrist can prescribe eyeglasses or contact lenses to optically correct farsightedness by altering the way the light enters your eyes. People experience hyperopia differently. Some people may not notice any problems with their vision, especially when they are young. For people with significant hyperopia, vision can be blurry for objects at any distance, near or far. It is an eye focusing disorder, not an eye disease. Farsightedness usually is present at birth and tends to run in families. You can easily correct this condition with eyeglasses or contact lenses. Another treatment option is surgery [10].

Causes of Hyperopia [10]:
Farsightedness is the result of the visual image being focused behind the retina rather than directly on it. It is mainly cause by two reasons-

- Low converging power of eye lens because of weak action of ciliary muscles.
- Eyeball being too short because of which the distance between eye lens and retina decreases.

Farsightedness is often present from birth, but children have a very flexible eye lens, which helps make up for the problem. As aging occurs, glasses or contact lenses may be required to correct the vision. Farsightedness is hereditary.

Classification of Hyperopia:
Hyperopia is typically classified according to clinical appearance, its severity, or how it relates to the eye's accommodative status.

- Simple hyperopia
- Pathological hyperopia
- Functional hyperopia

Symptoms of Hyperopia [10]:
Symptoms of farsightedness can include:

- Blurred vision, especially at night.
- Trouble seeing objects up close. For example, you can't see well enough to read newspaper print.
- Aching eyes, eyestrain, and headaches.

Children with this problem may have no symptoms. But a child with more severe farsightedness may:

- Have headaches.
- Rub his or her eyes often.
- Have trouble reading or show little interest in reading.

Diagnosis of Hyperopia

Visual acuity screening is recommended to detect hyperopia as well as other eye conditions. The gold standard for visual acuity testing is to use the Snellen chart using manifest and cycloplegic refraction. The difference between Cycloplegic hyperopia and Manifest (Noncycloplegic) hyperopia is Latent hyperopia.

Subjective refraction can be performed with a visual acuity chart at far distance (20ft or 6m) and near distance (1ft or 0.33m). These screenings typically are performed by teachers, primary care physicians (e.g. pediatricians, family physicians, etc.), optometrists, and/or ophthalmologists. The charts used for visual acuity screening include, but are not limited to, Snellen, Allen, HOTV, Tumbling E, etc.

Objective refraction can be performed using an autorefraction machine or retinocopy. This first uses rays to measure at what distance an object is focused on the retina. Retinoscopy is the method preferred in babies and children. It requires a cycloplegic, retinoscope, and a series of lenses or a phoropter to determine when light rays are focused onto the retinal plane. The tester neutralizes the movement of the reflected light with one of the lenses in the series.

Differential diagnosis of Hyperopia:

Orbital tumors, serous elevation of the retina, posterior scleritis, presbyopia, hypoglycemia, cataracts, and/or post refractive surgery may present in a similar fashion to hyperopia.

Management of Hyperopia [11]:

The standard, and safest, treatment for symptomatic hyperopia is corrective lenses. Mild hyperopia does not need treatment. Hyperopic correction can be achieved by glasses lenses, contact lenses, or refractive surgery. The lenses required to correct hyperopia are convex lenses that converge light rays entering the eye to bring the focal point of the eye onto the retina. Glasses lenses are tolerated better in babies and children. Contact lenses are typically not preferred until adolescence or later, however the decision is based on the responsibility level of the patient or caregiver. A survey of practitioners revealed a common threshold for treatment intervention of hyperopia was 3.00D to 5.00D of asymptomatic hyperopia in children at age.

Refractive surgery is typically not preferred until the refractive error of the eye has stabilized and growth of the eye has stopped, which typically occurs in the third decade of life. Surgical options for hyperopia include thermal laser keratoplasty (TLK), conductive keratoplasty (CK), spiral hexagonal keratotomy, excimer laser, clear lens extraction with intraocular lens implantation or phakic intraocular lens implantation.

Astigmatism

Astigmatism is a common eye condition that's usually corrected by eyeglasses, contact lenses, or surgery. Astigmatism is caused by an eye that is not completely round and occurs in nearly everybody to some degree. For vision problems due to astigmatism, glasses, contact lenses, and even vision correction procedures are all possible treatment options.

A person's eye is naturally shaped like a sphere. Under normal circumstances, when light enters the eye, it refracts, or bends evenly, creating a clear view of the object. However, the eye of a person with astigmatism is shaped more like a football or the back of a spoon. For this person, when light enters the eye it is refracted more in one direction than the other, allowing only part of the object to be in focus at one time. Objects at any distance can appear blurry and wavy[12].

Causes of Astigmatism[12]:

Astigmatism is a natural and commonly occurring cause of blurred or distorted vision that is usually associated with an imperfectly shaped cornea. The exact cause in not known.

Symptoms of Astigmatism [13]:

Although astigmatism may be asymptomatic, higher degrees of astigmatism may cause symptoms such as blurry vision, squinting, eye strain, fatigue, or headaches. Some research has pointed to the link between astigmatism and higher prevalence of migraine headaches.

Diagnosis of Astigmatism [13]:

Astigmatism can be diagnosed through a comprehensive eye examination. Testing for astigmatism measures how the eyes focus light and determines the power of any optical lenses needed to compensate for reduced vision. This examination may include:

- **Visual acuity**—As part of the testing, you'll be asked to read letters on a distance chart. This test measures visual acuity, which is written as a fraction such as 20/40. The top number is the standard distance at which testing is done, twenty feet. The bottom number is the smallest letter size you were able to read. A person with 20/40 visual acuity would have to get within 20 feet of a letter that should be seen at forty feet in order to see it clearly. Normal distance visual acuity is 20/20.
- **Keratometry**—A keratometer is the primary instrument used to measure the curvature of the cornea. By focusing a circle of light on the cornea and measuring its reflection, it is possible to determine the exact curvature of the cornea's surface. This measurement is particularly critical in determining the proper fit for contact lenses. A more sophisticated procedure called corneal topography may be performed in some cases to provide even more detail of the shape of the cornea.
- **Refraction**—Using an instrument called a phoropter, your optometrist places a series of lenses in front of your eyes and measures how they focus light. This is performed using a hand held lighted instrument called a retinoscope or an automated instrument that automatically evaluates the focusing power of the eye. The power is then refined by patient's responses to determine the lenses that allow the clearest vision.

Using the information obtained from these tests, your optometrist can determine if you have astigmatism. These findings, combined with those of other tests performed, will allow the optometrist to determine the power of any lens

correction needed to provide clear, comfortable vision, and discuss options for treatment.

Treatment of Astigmatism [13]:

Astigmatism may be corrected with eyeglasses, contact lenses, or refractive surgery. Various considerations involving eye health, refractive status, and lifestyle determine whether one option may be better than another. In those with keratoconus, certain contact lenses often enable patients to achieve better visual acuity than eyeglasses. Once only available in a rigid, gas-permeable form, toric lenses are now available also as soft lenses.

Laser eye surgery (LASIK and PRK) is successful in treating astigmatism. Corneal incisions if properly placed can correct astigmatism. These techniques include Mini Asymmetric Radial Keratotomy (M.A.R.K.), Astigmatic Keratotomy (AK) and Limbal relaxing incision (LRI). However these techniques are used less often than laser-performed ones.

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