Retinitis pigmentosa
Retinitis pigmentosa

Retinitis pigmentosa (RP) is a genetic disorder of the eyes that causes loss of vision.

Symptoms include trouble seeing at night and decreasing peripheral vision (side vision). As peripheral vision worsens, people may experience "tunnel vision". Complete blindness is uncommon. Onset of symptoms is generally gradual and often begins in childhood.
Signs and symptoms

1- decreased night vision (nyctalopia)
2- loss of the mid-peripheral visual field
3- extending into the central visual field
4- color vision can become compromised
5- Photopsia (Spontaneously occurring flashes/blinkings/swirling/shimmering lights)
6- Photophobia (aversion to bright lights)
7- Eventual blindness
Causes

(1) non-syndromic, that is, it occurs alone, without any other clinical findings,

(2) syndromic, with other neurosensory disorders, developmental abnormalities, or complex clinical findings,

(3) secondary to other systemic diseases
There is currently no cure for retinitis pigmentosa, but the efficacy and safety of various prospective treatments are currently being evaluated. The efficiency of various supplements, such as vitamin A, and lutein, in delaying disease progression remains an unresolved, yet prospective treatment option.

Clinical trials investigating optic prosthetic devices, gene therapy mechanisms, and retinal sheet transplantations are active areas of study in the partial restoration of vision in retinitis pigmentosa patients.
Corneal cross linking
Corneal cross linking

Corneal cross linking is a procedure used to strengthen corneas. While corneal cross linking (sometimes referred to as CL or CXL) the procedure was only recently approved for use. The Kellogg Eye Center is proud to be one of the few eye centers to offer this innovative new treatment.
Corneal cross linking is a minimally invasive procedure that uses ultraviolet light and eye drops in order to strengthen the collagen fibers in the cornea. The procedure is used for patients with keratoconus, a condition in which the cornea grows thin and weak.
Corneal cross linking

During a corneal cross linking procedure, first apply riboflavin (vitamin B2) eye drops, and then shine a specific type of ultraviolet light directly onto your cornea. The eye drops consist of a substance conducive to photo enhancing, which enables cross linking to take place. The procedure causes new corneal collagen cross-links to develop. Those cross links cause the collagen fibrils to shorten and thicken, leading to a stiffer, stronger cornea.
Symptoms/Conditions

A healthy cornea resembles a clear, round dome. Located at the front of your eye, your cornea is what helps you to see, by focusing the light that enters through your eye.
Symptoms/Conditions

In people with keratoconus, however, the cornea doesn’t have enough collagen fiber cross-links, which serve as a kind of structural support. Without those cross-links, the cornea begins to bulge out in a cone-like shape. That bulge results in blurred, distorted vision as the cornea weakens and thins. The condition, which can significantly impair vision, is difficult to treat with glasses or contact lenses. Severe cases of keratoconus may even require corneal transplant.
Risk

As with any other surgical procedure, there are risks involved with corneal cross linking. Because corneal cross linking includes the removal of the corneal epithelium (the thin layer on the cornea’s surface), risks may include epithelial haze, corneal epithelium defect (disruption of surface cells), and delayed epithelial healing.
Risk

Other risks may include infectious keratitis, herpetic keratitis, corneal opacity, visual acuity, blurred vision, stromal scarring, and corneal striae (the appearance of fine white lines in your field of vision). Ulcerative keratitis, or severe inflammation of the eye, is another potential side effect. Corneal cross linking is associated with a low rate of risks and complications.
Surgical Options

Until recently, patients with keratoconus had no treatment options available. Corneal cross linking is currently the only effective treatment for progressive keratoconus.
Post operative Expect

- You’ll be awake during the procedure, which will take about an hour.
- You’ll be given a mild sedation and numbing anesthetic drops will be applied to your eyes.
- Patients typically do not experience any discomfort during the procedure.
- After the procedure, you may experience increased sensitivity to light, as well as general discomfort in the affected eye. Some patients describe that discomfort as a gritty, burning sensation. If you experience more severe pain, contact your doctor immediately.
- Avoid rubbing your eyes for up to five days following the procedure.
EYE DROP
Eye drops

Eye drops are liquid drops applied directly to the surface of the eye, particularly the human eye, usually in small amounts such as a single drop or a few drops. Eye drops usually contain saline to match the salinity of the eye. Drops containing only saline and sometimes a lubricant are often used as artificial tears to treat dry eyes or simple eye irritation such as itching or redness. Eye drops may also contain one or more medications to treat a wide variety of eye diseases. Depending on the condition being treated, they may contain steroids, antihistamines, sympatho-mimetics, beta receptor blockers, para-sympatho-mimetics, para-sympatholytics, prostaglandins, non-steroidal anti-inflammatory drugs (NSAIDs), antibiotics, antifungals, or topical anesthetics.
Types and uses

Different pharmacological classes of eye drops can be recognized by patients by their different colored tops. For instance, the tops to dilating drops are a different color than anti-allergy drops.
Types and uses

1- Dry eyes
2- Steroid and antibiotic eye drops
3- Pink eye
4- Allergies
5- Glaucoma
6- Mydriatic eye drops
Dry eyes

Eyes drops sometimes do not have medications in them and are only lubricating and tear-replacing solutions. There is a wide variety of artificial tear eye drops that provide different surface healing strategies. One can find bicarbonate ions, hypotonicity, high viscosity gels and ointments, and non-preserved types. They all act differently and therefore, one may have to try different artificial tears to find the one that works the best.
Steroid and antibiotic eye drops are used to treat eye infections. They also have prophylactic properties and are used to prevent infections after eye surgeries. They should be used for the entire time prescribed without interruptions. The infection may relapse if the use of the medication is stopped.
Pink eye

Antibiotic eye drops are prescribed when conjunctivitis is caused by bacteria but not when it is caused by a virus. In the case of allergic conjunctivitis, artificial tears can help dilute irritating allergens present in the tear film.
Some eye drops may contain histamine antagonists or non-steroidal anti-inflammatory drug (NSAIDs), which suppress the optical mast cell responses to allergens including (but not limited to) aerosolized dust particles.
Glaucoma

Eye drops used in managing glaucoma help the eye's fluid to drain better and decrease the amount of fluid made by the eye which decreases eye pressure. They are classified by their active ingredient and they include: prostaglandin analogs, beta blockers, alpha agonists, and carbonic anhydrase inhibitors. There are also combination drugs available for those patients who require more than one type of medication.
Mydriatic eye drops

These make the eye's pupil widen to maximum, to let an optometrist have the best view inside the eyeball behind the iris. Afterwards in sunny weather they can cause dazzling and photophobia until the effect of the mydriatic has worn off.
Steroid and antibiotic eye drops may cause stinging for one or two minutes when first used and if stinging continues, medical advice should be sought. Also, one should tell their doctor if vision changes occur or if they experience persistent sore throat, fever, easy bleeding or bruising when using drops with chloramphenicol. Also, one should be aware of symptoms of an allergic reaction, such as: rash, itching, swelling, dizziness, and trouble breathing. Long term steroid use can cause many adverse effects including steroid-induced glaucoma and cataract.
Prostaglandin analogs may cause changes in iris color and eyelid skin, growth of eyelashes, stinging, blurred vision, eye redness, itching, and burning. Beta blockers' side effects include low blood pressure, reduced pulse rate, fatigue, shortness of breath, and in rare occasions, may cause stinging, burning, and eye discomfort.

Lubricant eye drops may cause some side effects and one should consult a doctor if pain in the eye or changes in vision occur. Furthermore, when redness occurs but lasts more than 3 days, one should immediately consult a doctor.
Keratitis
Keratitis

Keratitis is a condition in which the eye's cornea, the clear dome on the front surface of the eye, becomes inflamed. The condition is often marked by moderate to intense pain and usually involves any of the following symptoms: pain, impaired eyesight, photophobia (light sensitivity), red eye and a 'gritty' sensation
Classification (by duration)

**Acute**

1. Acute epithelial keratitis
2. Nummular keratitis
3. Interstitial keratitis
4. Disciform keratitis

**Chronic**

1. Neurotrophic keratitis
2. Mucous plaque keratitis
Classification (infective)

1 - bacterial
2 - viral
3 - fungal
4 - Ameobic
5 - parasitic
Classification (by stage of disease)

1- Superficial punctate keratitis

2- Ulcerative keratitis
Classification (by environmental aetiology)

**Exposure keratitis** (also known as exposure keratopathy) — due to dryness of the cornea caused by incomplete or inadequate eyelid closure).

**Photokeratitis** — keratitis due to intense ultraviolet radiation exposure

**Contact lens acute red eye (CLARE)** — a non-ulcerative sterile keratitis associated with colonization of Gram-negative bacteria on contact lenses.
Treatment

Treatment depends on the cause of the keratitis. Infectious keratitis can progress rapidly, and generally requires urgent antibacterial, antifungal, or antiviral therapy to eliminate the pathogen. Antibacterial solutions include levofloxacin, gatifloxacin, moxifloxacin, ofloxacin. It is unclear if steroid eye drops are useful or not.
Symptoms

- red eyes
- pain and irritation in the affected eye
- vision changes, such as blurriness or inability to see
- sensitivity to light
- inability to open your eye
- eye discharge
- excessive tearing
In addition, contact lens wearers are typically advised to discontinue contact lens wear and replace contaminated contact lenses and contact lens cases. (Contaminated lenses and cases should not be discarded as cultures from these can be used to identify the pathogen)
Aciclovir is the mainstay of treatment for HSV keratitis and steroids should be avoided at all costs in this condition. Application of steroids to a dendritic ulcer caused by HSV will result in rapid and significant worsening of the ulcer to form an 'amoeboid' or 'geographic' ulcer, so named because of the ulcer's map like shape.
Treatment

There is little evidence that most of the commonly used treatments for hyphema (antifibrinolytic agents [oral and systemic aminocaproic acid, tranexamic acid, and aminomethylbenzoic acid], corticosteroids [systemic and topical], cycloplegics, miotics, aspirin, conjugated estrogens, monocular versus bilateral patching, elevation of the head, and bed rest) are effective at improving visual acuity after two weeks.
Prognosis

Some infections may scar the cornea to limit vision. Others may result in perforation of the cornea, endophthalmitis (an infection inside the eye), or even loss of the eye. With proper medical attention, infections can usually be successfully treated without long-term visual loss.
Adenoviral keratitis
Acanthamoeba keratitis
non-ulcerative sterile keratitis.
Slit Lamp biomicroscopy of filamentary keratitis
Corneal transplantation
Corneal transplantation

Corneal transplantation, also known as corneal grafting, is a surgical procedure where a damaged or diseased cornea is replaced by donated corneal tissue (the graft).
Type

**penetrating keratoplasty** the entire cornea is replaced

**lamellar keratoplasty** only part of the cornea is replaced
Indications

**Optical:** To improve visual acuity by replacing the opaque or distorted host tissue by clear healthy donor tissue. The most common indication in this category is pseudophakic bullous keratopathy, followed by keratoconus, corneal degeneration, keratoglobus and dystrophy, as well as scarring due to keratitis and trauma.
Indications

Tectonic/reconstructive: To preserve corneal anatomy and integrity in patients with stromal thinning and descemetoceles, or to reconstruct the anatomy of the eye, e.g. after corneal perforation.

Therapeutic: To remove inflamed corneal tissue unresponsive to treatment by antibiotics or antivirals.

Cosmetic: To improve the appearance of patients with corneal scars that have given a whitish or opaque hue to the cornea.
The prognosis for visual restoration and maintenance of ocular health with corneal transplants is generally very good. Risks for failure or guarded prognoses are multifactorial. The type of transplant, the disease state requiring the procedure, the health of the other parts of the recipient eye and even the health of the donor tissue may all confer a more or less favorable prognosis.
The majority of corneal transplants result in significant improvement in visual function for many years or a lifetime. In cases of rejection or transplant failure, the surgery can generally be repeated.
Nystagmus
Nystagmus

is a condition of involuntary eye movement. Infants can be born with it but more commonly acquire it in infancy or later in life. In many cases it may result in reduced or limited vision. Due to the involuntary movement of the eye, it has been called "dancing eyes"
Nystagmus

There are two key forms of nystagmus: pathological and physiological, with variations within each type. Nystagmus may be caused by congenital disorder or sleep deprivation, acquired or central nervous system disorders, toxicity, pharmaceutical drugs, alcohol, or rotational movement. Previously considered untreatable, in recent years several drugs have been identified for treatment of nystagmus. Nystagmus is also occasionally associated with vertigo.
Early-onset nystagmus occurs more frequently than acquired nystagmus. It can be insular or accompany other disorders (such as micro-ophthalmic anomalies or Down syndrome). Early-onset nystagmus itself is usually mild and non-progressive. The affected persons are usually unaware of their spontaneous eye movements, but vision can be impaired depending on the severity of the eye movements.
Type

Infantile: □
Latent nystagmus □
Noonan syndrome □
Nystagmus blockage syndrome □
Acquired nystagmus

Nystagmus that occurs later in childhood or in adulthood is called acquired nystagmus. The cause is often unknown, or idiopathic, and thus referred to as idiopathic nystagmus. Other common causes include diseases and disorders of the central nervous system, metabolic disorders and alcohol and drug toxicity. In the elderly, stroke is the most common cause.
Retinal detachment
Retinal detachment

is a disorder of the eye in which the retina peels away from its underlying layer of support tissue. Initial detachment may be localized, but without rapid treatment the entire retina may detach, leading to vision loss and blindness.

It is a surgical emergency.
Types

- Rhegmatogenous retinal detachment
- Exudative, serous, or secondary retinal detachment
- Tractional retinal detachment
A rhegmatogenous retinal detachment occurs due to a hole or tear (both of which are referred to as retinal breaks) in the retina that allows fluid to pass from the vitreous space into the subretinal space between the sensory retina and the retinal pigment epithelium.
An exudative retinal detachment occurs due to inflammation, injury or vascular abnormalities that results in fluid accumulating underneath the retina without the presence of a hole, tear, or break.
A tractional retinal detachment occurs when fibrovascular tissue, caused by an injury, inflammation or neovascularization, pulls the sensory retina from the retinal pigment epithelium.
Symptoms of Retinal Detachment

- flashes of light (photopsia) – very brief in the extreme peripheral (outside of center) part of vision
- a sudden dramatic increase in the number of floaters
- Sometimes a detachment may be due to atrophic retinal holes in which case it may not be preceded by photopsia or floaters.
- Although most posterior vitreous detachments do not progress to retinal detachments, those that do produce the following symptoms:
Symptoms of Retinal Detachment

- a dense shadow that starts in the peripheral vision and slowly progresses towards the central vision
- the impression that a veil or curtain was drawn over the field of vision
- straight lines (scale, edge of the wall, road, etc.) that suddenly appear curved (positive Amsler grid test)
- central visual loss
fluid under the retina in a retinal detachment.

center of macula remains attached.