

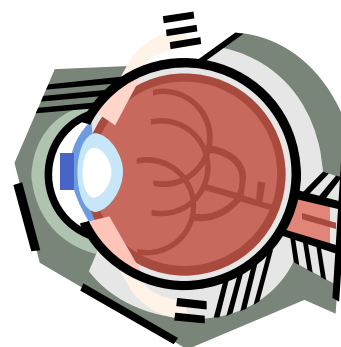
Moving Beyond Cancer Treatment

Dedicated to Living after Cancer

Eye Problems after Cancer Treatment

Anatomy of the eye

The eye is like a camera. Light comes in through the cornea, a clear cover that is like the glass of a camera's aperture. The amount of light coming in is controlled by the pupil, an opening that opens and closes a little like a camera shutter. The light focuses on the retina, a series of light-sensitive cells lining the back of the eye. The retina acts like camera film, reacting to the incoming light and sending a record of it via the optic nerve to the brain.



Effects of Cancer Treatment

The Most Common Eye Problems Following Cancer Treatment

Cataracts: Clouding of the lens of the eye. When this happens, it becomes difficult for light to pass through the lens. As the clouding progresses, the cataract interferes with your vision. Common symptoms of cataracts include painless blurring of vision, sensitivity to light and glare, double vision in one eye, poor night vision, fading or yellowing of colors, and the need for frequent changes in glasses or contact lens prescriptions.

Not all cataracts require treatment. In many cases, an ophthalmologist may monitor the vision closely over many years, and will recommend treatment if and when it becomes necessary. The only treatment for cataracts is surgical removal of the lens and replacement with an artificial lens. Today, cataract surgery is a low-risk, outpatient procedure that is very successful in restoring vision.

Keratoconjunctivitis sicca: Inflammation of the cornea (the clear, outer surface of the eye) and the conjunctiva (the membrane covering the eye and eyelids) due to dryness. This occurs when radiation or graft-versus-host disease reduces the amount of tears produced by the lacrimal gland. Symptoms include pain at the surface of the eye and light sensitivity.

The frequent use of artificial tears (eye drops) or ointments to moisten the surface of the eye is recommended. Patching the affected eye during sleep may also promote healing. Keratitis caused by infection is treated with antibiotic eye drops or ointment. In rare cases, surgical replacement (transplant) of the cornea is necessary

The Following Eye Problems are Less Common and are Usually Seen Only in Survivors who had Radiation Treatments Directed at the Eye or Orbit:

Keratitis: Inflammation of the cornea (the clear, outer surface of the eye) that can generate pain at the surface of the eye and light sensitivity.

The frequent use of artificial tears (eye drops) or ointments to moisten the surface of the eye is recommended. Patching the affected eye during sleep may also promote healing. Keratitis caused by infection is treated with antibiotic eye drops or ointment. In rare cases, surgical replacement (transplant) of the cornea is necessary.

Lacrimal duct atrophy: Shrinking of the lacrimal duct, which drains tears from the eye. Lacrimal duct atrophy can result in problems with increased tear production.

A surgical procedure to widen the tear drainage system can be performed if heavy tearing is a significant problem.

Optic chiasm neuropathy: Damage to the nerves that send visual information from the eye to the brain. This can result in vision loss.

No treatment available.

Orbital hypoplasia: Underdevelopment of the eye and surrounding tissues, caused by radiation to the eye or to the area surrounding the eye. This can result in a small eye and orbit (orbital hypoplasia).

Usually no treatment is needed for orbital hypoplasia. In severe cases, rebuilding of the bones around the eye may be possible.

Retinopathy: Damage to the retina (the back surface of the eye where visual information is passed from the eye to the brain). The major symptom of retinopathy is painless vision.

May require laser or photocoagulation (heat) treatment of the retina.

Telangiectasias: Enlargement of blood vessels in the white part of the eye. This condition usually does not cause any symptoms, but may generate cosmetic concerns in some individuals because of their appearance.

No treatment is necessary.

Xerophthalmia: Scarring of the tear (lacrimal) glands following radiation to the eye or orbit. This can result in dry eyes (xerophthalmia).

Treatment of dry eye includes the frequent use of artificial tears (eye drops) or ointments to moisten the surface of the eye. In severe cases, the tear drainage system can be blocked by surgery to reduce the drainage of tears from the eye.

Enophthalmos: Sunken eyeball within the orbit.

Plastic surgery can be done to reconstruct the orbit.

Cancer Therapies Which Increase the Risk of Developing Eye Complications

Certain medications such as **Busulfan** and **corticosteroids** (prednisone and dexamethasone) increase the risk of cataracts, but do not typically increase the risk of developing other eye complications. **Radiation therapy** directed at the eye, orbits, brain, brain and spine, or total body irradiation (TBI) is responsible for most treatment-related eye problems. Radiation doses less than 30 Gy (3000 cGy/rads) increase the risk of cataracts, but do not usually increase the risk of developing other eye complications. The risk for other long-term complications affecting the eye is usually associated with a radiation dose of 30 Gy (3000 cGy/rads) or more to the eye or orbit.

Other factors that may increase the risk for developing certain eye problems include **chronic graft versus host disease** following allogeneic (from a donor other than yourself) **bone marrow or stem cell transplant** (increased risk for keratoconjunctivitis sicca), **diabetes mellitus** (increased risk for retinopathy and optic chiasm neuropathy), **high blood pressure** (increased risk of optic chiasm neuropathy), and **frequent exposure to sunlight** (increased risk for cataracts).

The chart below provides recommendations for ongoing monitoring:

Treatment	Dose	Monitoring Required	How often
Busulfan Corticosteroids (such as prednisone or dexamethasone)	Any	Evaluation of vision during regular medical checkup – including evaluation of vision (visual acuity) and examination for cataracts (fundusoscopic examination)	Yearly (If any eye problems are detected you should have an evaluation done by an ophthalmologist)
Total body irradiation (TBI)	Any	Examination by ophthalmologist	Yearly
Radiation to the brain, eye, orbit	30 Gy (3000 cGy) or higher	Examination by ophthalmologist	Yearly
	Less than 30 Gy (3000 cGy)	Examination by ophthalmologist	Every 3 years, plus yearly vision and fundusoscopic exams during regular medical checkups

The use of medications or radiation during cancer treatment can sometimes lead to eye problems. Patients can help to maintain optimal visual health by taking these important steps:

1. Become educated about your eyes, and potential vision problems.
2. Immediately report any significant symptoms to your doctor.
3. Be aware of available treatments.
4. Schedule a yearly eye exam, even if no problems are evident.

PROTECTING YOUR VISION

Whether or not you have treatment-related eye disorders, the following precautions should be taken to maintain visual health:

- Wear sunglasses with UV protection and broad-brimmed hats when in bright sunlight.
- Select protective eyewear that is appropriate when participating in sports. Eye wear worn for sports should be properly fitted by an eye care professional.
- Never play with fireworks or sparklers of any kind to avoid accidental injury.
- Wear protective eyewear when working with hazardous household chemicals, power tools, and dangerous equipment in the workshop.
- If you do experience an eye injury, seek professional medical attention promptly.

If you experience any of the following symptoms, you should seek prompt medical evaluation. In some cases, referral to an ophthalmologist may be needed:

- Blurry vision
- Double vision
- Blind spots
- Sensitivity to light
- Poor night vision
- Persistent irritation of surface of eye or eyelids
- Excessive tearing/watering of eyes
- Pain within the eye
- Dry eyes

Note: An ophthalmologist is a medical doctor (MD or DO) who specializes in eye problems – this is different from a doctor of optometry (OD), who is also a vision specialist but not a medical doctor. Examination by an ophthalmologist should include vision screening, examination for cataracts, and a full examination of the internal structures of the eye. Individuals who develop vision problems should be followed regularly by an ophthalmologist.

PERMANENT VISION IMPAIRMENT

If impaired vision is detected, it is important to follow the recommendations of your ophthalmologist regarding treatment. If vision is **not** correctable, services are available in most communities to assist people with visual impairments. The Americans with disabilities Act (ADA, PL 101-336) guarantees people with visual impairment equal access to public events, spaces and opportunities.