

OPTIC NERVE

What is the function of the optic nerve?

The optic nerve is a cable of 1.2 million nerve fibres that conveys vision in the form of electrical impulses from the eye to the brain. Damage to the optic nerve can result in loss of vision.

Unlike other nerves, the optic nerve is actually an extension of the brain itself. Thus serious brain disorders can often present with vision related symptoms. The neuro ophthalmologist is a specialist who deals with optic nerve and visual pathway problems.

What can go wrong with the optic nerve?

Involvement of the optic nerve is termed optic neuropathy and can be due to various causes.

Injury: Trauma can permanently damage the optic nerve. Sometimes early treatment with high dose intravenous steroids can help recover some vision.

Inflammation: Optic neuritis (Optic Nerve inflammation) can occur due to a variety of causes and is sometimes associated with a neurological condition called multiple sclerosis in which other nerves may also be affected at different times. An MRI scan is helpful in arriving at the diagnosis. Visual loss is sudden in onset. The visual outcome is generally very good and treatment with intravenous steroids is sometimes recommended.

Ischemia: The optic nerve can be damaged by lack of blood circulation (ischemia). This commonly affects middle-aged individuals with risk factors like diabetes, high blood pressure, or elevated cholesterol. Loss of vision is usually sudden in onset. The outcome is variable with 40% of patients having some visual improvement. Another more serious kind of damage can occur with a disease of blood vessels called temporal arteritis.

Raised fluid pressure within the brain: This is a serious condition that can lead to blindness and even be life threatening if caused by brain tumors. The eye doctor is often the first person to detect this because one of the early signs is swelling of the optic nerves termed papilledema.

Other causes: Toxic neuritis is caused by drugs like ethambutol (used in TB treatment), methyl alcohol poisoning, nutritional deficiencies and vitamin B complex deficiencies. Tumors of the optic nerve cause gradual progressive loss of vision. Optic nerve disorders can occasionally be genetic in origin.

How will I know if I have these problems?

Visual loss gradual or sudden in onset, temporary blurring of vision lasting a few seconds to minutes, and loss of side vision (visual field defects) are symptoms of optic nerve disease.

How can these conditions be detected?

A detailed evaluation of the eye with special attention to the reactivity of the pupil and the appearance of the optic nerve head at the back of the eye is required. Common tests done to evaluate optic nerve function include testing of colour vision and examination of the visual field. Sometimes additional testing to evaluate the thickness of the nerve fibre layer (Optical Coherence Tomography or OCT) and electrophysiological tests called VEP (Visual Evoked Potential) may be needed. Suspicion of intracranial (brain related) conditions required imaging of the brain by CT or MRI scan.

How can these conditions be treated?

Optic nerve disease is difficult to treat since once an optic nerve fibre is damaged it is difficult to restore it to normal function. Nevertheless some optic nerve diseases such as optic neuritis have good outcomes with treatment. Even if the visual outcome is guarded, it is necessary to investigate the causes thoroughly to preserve existing vision and prevent further loss of sight.

Recent advances in optic nerve disease.

Optical Coherence Tomography (OCT) is a new investigation that allows us to measure nerve fibre loss. This helps early detection of even subtle loss of nerve fibres. Early treatment intervention can thus preserve vision. MRI imaging has greatly increased our ability to detect and characterize brain lesions such as multiple sclerosis, tumors, and infarctions. Preventing damage in optic nerve injury and even regenerating a damaged human optic nerve will soon become realities in the near future.

General information

Patients with optic nerve disease should have periodic examinations as per the doctor's advice. Those with risk factors like diabetes, high blood pressure or cholesterol, those taking ethambutol tablets should also undergo periodic eye check ups.