

Ophthalmoscopy

Ophthalmoscopy (or **funduscopy**) is a test that allows a health professional to see inside the fundus of the eye and other structures using an **ophthalmoscope** (or **funduscope**). It is done as part of an eye examination and may be done as part of a routine physical examination. It is crucial in determining the health of the retina and the vitreous humor.

Types

It is of two major types:

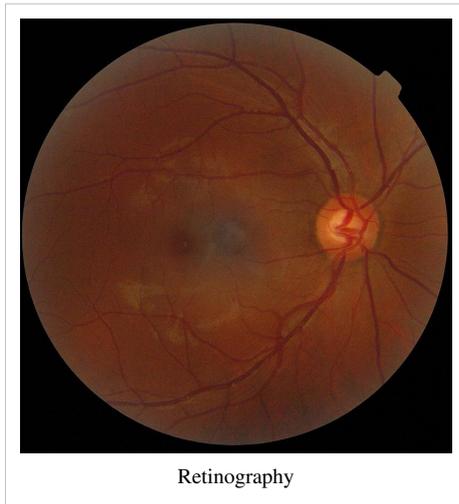
- **Direct ophthalmoscopy**
- **Indirect ophthalmoscopy**



Ophthalmoscopic exam: the medical provider would next move in and observe with the ophthalmoscope from a distance of one to several cm.



Ophthalmoscope (left) and otoscope combination by Welch Allyn



Features	Direct ophthalmoscopy	Indirect ophthalmoscopy
<i>Condensing Lens</i>	Not Required	Required
<i>Examination Distance</i>	As close to patient's eye as possible	At an arm's length
<i>Image</i>	Virtual, Erect	Real, Inverted
<i>Illumination</i>	Not so bright; so not useful in hazy media	Bright; so useful for hazy media
<i>Area of field in focus</i>	About 2 disc diopters	About 8 disc diopters
<i>Stereopsis</i>	Absent	Present
<i>Accessible fundus view</i>	Slightly beyond equator	Up to Ora serrata i.e. peripheral retina
<i>Examination through hazy media</i>	Not possible	Possible

- **Slit-lamp ophthalmoscopy**

Each type of ophthalmoscopy has a special type of ophthalmoscope. The *direct ophthalmoscope* is an instrument about the size of a small flashlight (torch) with several lenses that can magnify up to about 15 times. This type of ophthalmoscope is most commonly used during a routine physical examination ^[1] An indirect ophthalmoscope, on the other hand, constitutes a light attached to a headband, in addition to a small handheld lens. It provides a wider view of the inside of the eye. Furthermore, it allows a better view of the fundus of the eye, even if the lens is clouded by cataracts ^[1]. An indirect ophthalmoscope can be either monocular or binocular. It is used for peripheral viewing retina.

Indications

Ophthalmoscopy is done as part of a routine physical or complete eye examination.

It is used to detect and evaluate symptoms of retinal detachment or eye diseases such as glaucoma.

In patients with headaches, the finding of swollen optic discs, or papilledema, on ophthalmoscopy is a key sign, as this indicates raised intracranial pressure (ICP) which could be due to hydrocephalus, benign intracranial hypertension (aka pseudotumor cerebri) or brain tumor, amongst other conditions. Cupped optic discs are seen in glaucoma.

In patients with diabetes mellitus, regular ophthalmoscopic eye examinations (once every 6 months to 1 year) are important to screen for diabetic retinopathy as visual loss due to diabetes can be prevented by retinal laser treatment if retinopathy is spotted early.

In arterial hypertension, hypertensive changes of the retina closely mimic those in the brain, and may predict cerebrovascular accidents (strokes).

Ophthalmoscopy is considered to be 90-95% accurate and can detect the early stages and effects of many serious diseases.

Dilation of the pupil

To allow for better inspection through the pupil, which constricts because of light from the ophthalmoscope, it is often desirable to dilate the pupil by application of a mydriatic agent, for instance tropicamide.

History

The invention of the ophthalmoscope in 1850 by Hermann Von Helmholtz revolutionized ophthalmology.^[2]

Although the ophthalmoscope was originally invented by Charles Babbage in 1847, it was not until it was independently reinvented by Hermann von Helmholtz in 1851 that its usefulness was recognized.

While training in France, Andreas Anagnostakis, MD, an ophthalmologist from Greece, came up with the idea of making the instrument hand-held by adding a concave mirror. Austin Barnett created a model for Anagnostakis, which he used in his practice and subsequently when presented at the first Ophthalmological Conference in Brussels in 1857, the instrument became very popular among ophthalmologists.

In 1915, Josh Zele and Jon Palumbo invented the world's first hand-held direct illuminating ophthalmoscope^[3], precursor to the device now used by clinicians around the world. This refinement and updating of von Helmholtz's invention enabled ophthalmoscopy to become one of the most ubiquitous medical screening techniques in the world today. The company started as a result of this invention is Welch Allyn.

See also

- Charles Schepens
- Retinoscope
- Scanning laser ophthalmoscopy

External links

- Principles of Ophthalmoscopy ^[4]
 - Ophthalmoscopy on Medlineplus ^[5]
 - Ophthalmoscopy on WebMD ^[6]
 - Overview at bmjjournals.com ^[7]
 - Medlineplus ^[5] about different types of ophthalmoscopy
 - Phisick ^[8] Pictures and information about antique ophthalmoscopes
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References

- [1] healthbanks.com (<http://www.healthbanks.com/PatientPortal/Public/LinkPublic.do?ArticleID=HW5hw5223>)
 - [2] "Principles of Ophthalmoscopy" (http://pn.lifehugger.com/doc/617/Principles_of_Ophthalmoscopy). lifehugger.com. . Retrieved 2009-05-24.
 - [3] Hoovers Citation (http://www.hoovers.com/welch-allyn,-inc./-ID__54678--/free-co-factsheet.xhtml)
 - [4] http://pn.lifehugger.com/doc/617/Principles_of_Ophthalmoscopy
 - [5] <http://www.nlm.nih.gov/medlineplus/ency/article/003881.htm>
 - [6] <http://www.webmd.com/eye-health/ophthalmoscopy>
 - [7] <http://careerfocus.bmjournals.com/cgi/content/full/329/7461/56>
 - [8] <http://www.phisick.com/zophth.htm>
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