Indirect ophthalmoscopes

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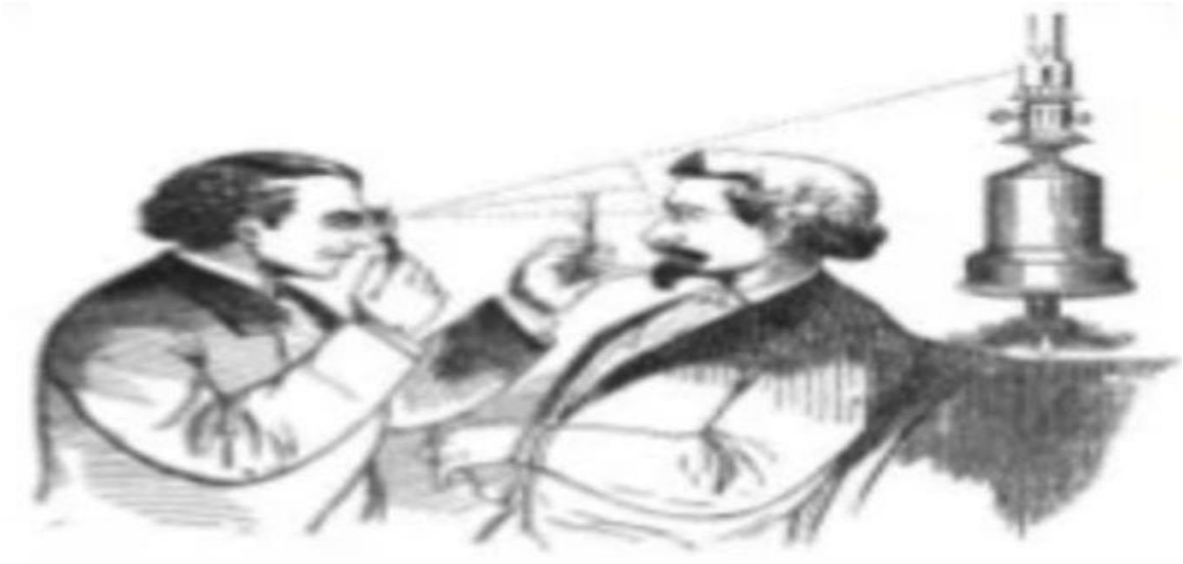
Ophthalmoscope:

- Also known as ophthalmoscopy or funduscopy, represents one of the most important techniques in the basic diagnostics of the human eye.
- Instrument for inspecting the posterior of the eye.
- Ophthalmoscopes are relatively simple (hand-held) optical instruments with which ophthalmoscopy can be performed in a fast and uncomplicated manner.

Distant direct ophthalmoscopy (DDO)

- The device consists of a strong light that can be directed into the eye by a small mirror or prism. The light reflects off the retina and back through a small hole in the ophthalmoscope, through which the examiner sees a nonstereoscopic magnified image of the structures at the back of the eye, including the optic disk, retina, retinal blood vessels, macula, and choroid.
- Distance: - 20 to 25cm.
- The ophthalmoscope is particularly useful as a screening tool for various ocular diseases, such as diabetic retinopathy.



Applications

- To diagnose opacities in the ocular media seen as dark spots in the red glow at the pupillary area

- To differentiate between a mole and a hole of the iris.

- To recognize detached retina o r a tumors arising from the fundus

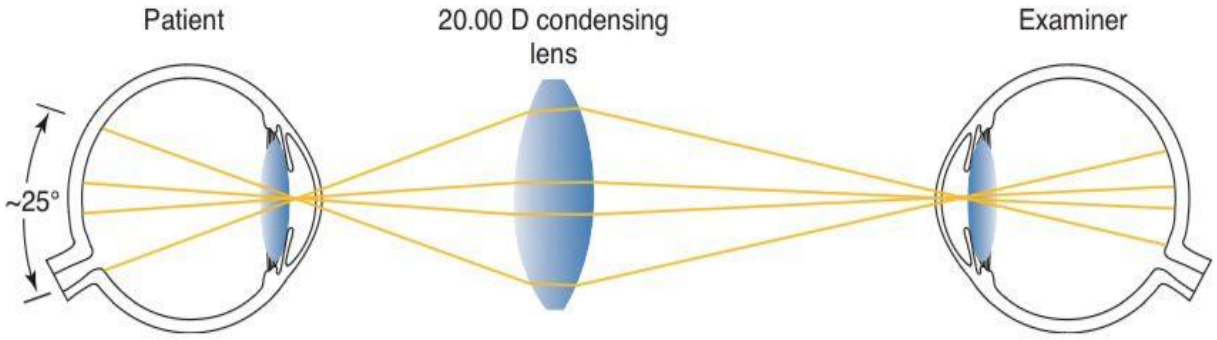
There are two types of ophthalmoscope:

- Distant direct ophthalmoscopy (DDO)
- Indirect ophthalmoscopes in which a real intermediate image is used for evaluation.
- Direct ophthalmoscopes in which the patient’s fundus is directly observed.

Indirect ophthalmoscopes

An indirect ophthalmoscope is a device worn on the head that is used for posterior segment examination in conjunction with auxiliary handheld diagnostic condensing lenses.

- In indirect ophthalmoscopy, an ophthalmic "condensing" lens is used to increase the field of view by capturing the peripheral rays and bringing them into the examiner's pupil .Thus, a much wider field of view is seen with the indirect ophthalmoscope (eg, about 25° with an ordinary 20.00 D condensing lens).

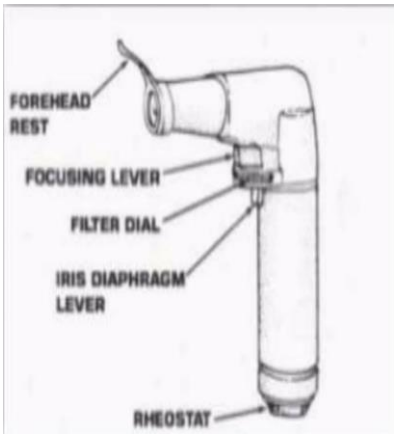


Types

There are two types of indirect ophthalmoscopes:

- Original type of uniocular indirect ophthalmoscope that is no more in use.
- Modern binocular indirect ophthalmoscope, which can either be attached to a headband or spectacle mounted. The former is more popular than latter.

❖ Monocular Indirect Ophthalmoscopy



➢ It consists of

- Illumination rheostat at its base
- Focusing lever for image refinement
- Filter dial
- Iris diaphragm lever to adjust the illumination beam diameter -Forehead rest for proper observer head positioning

➢ Indications

- Need for an increased field of view
- Small pupil
- Uncooperative children
- Basic Fundus screening
- Patients intolerance to bright light of binocular indirect ophthalmoscope

➢ Advantages

- Increased field of view similar to binocular indirect ophthalmoscopy
- Erect imaging similar to direct ophthalmoscopy

➢ Disadvantages

- Limited illumination
- Lack of stereopsis
- Fixed magnification

❖ Binocular Indirect Ophthalmoscope

➢ Optics of indirect ophthalmoscopy

- Make eye highly myopic by placing strong convex lens in front of patient's eye
- Emergent rays from area of fundus brought to focus as real inverted image between lens & observer's eyes
- Binocularity is achieved by decreasing IPD(from 60mm to 15 mm) Requires dilated pupils
- Here, the patient's retina, the aerial image, and the examiner's retina are all conjugate to each other.

➢ Image characteristics

- Real
- Inverted
- Magnified
  - ➢ Magnification depends on:
    1) Diopteric power of lens
    2) Position of lens in relation to eyeball 3.Refractive state of eyeball

➢ Factors affecting field of view

- Power of condensing lens
- Patients pupil size
- Distance at which the condensing lens is held from the eye

Field of view is inversely proportional to magnification and directly proportional to power of lens

➢ Advantages

- Large field of retina visible
- Less distortion of image
- Easy visualization of retina anterior to equator(retinal holes; degeneration) Useful in hazy media due to bright light & optical property
- Easier to examine patient with high spherical & astigmatic refractive error

Disadvantages

- Magnification less
- Difficult in small pupil
- Uncomfortable to patient(intense light & scleral indentation)
- Requires extreme practice in both technique & interpretation