

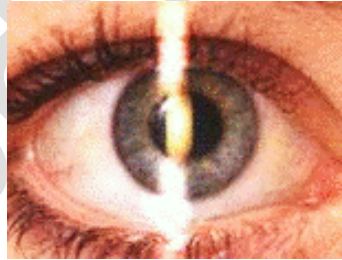
جهاز منظار الشبكية Retinoscope

- One of the most important devices used by the ophthalmologist or optometrist.
- Retinoscopy is an objective method to determine the refractive error in the eye (farsighted, nearsighted, astigmatism).
- Retinoscopy is particularly very helpful tool with uncooperative or malingering patients, infants, deafs and difficulty with language and communication.
- ✓ retinoscopy refers to measure a person's refractive error
- ✓ retinoscope refers to the use of an instrument



مبدأ عمل الجهاز Work Principle of Device

- A handheld instrument shines a beam of light on the patient's pupil



- Observing the red reflex light that is reflected from the retina, and as a result, the refractive power of the eye is determined.
- Move the device vertically or horizontally on the two axes to evaluate the refractive position.
- Put the lenses in front of the eye and as the power of the lenses changes, there is a corresponding change in the direction and pattern of the reflection.

مكونات الجهاز Components of Device

1. Light Source مصدر الضوء

The light source contains powerful halogen bulb. The streak retinoscope contains bulb to project a streak of light.

2. Condensing Lens عدسة تكثيف

Condensing lens is a plus lens that lies in the path of light. It focuses them onto the mirror. The position of this lens in relation to the bulb can be changed by raising or lowering the focusing sleeve.

3. Mirror مرآة

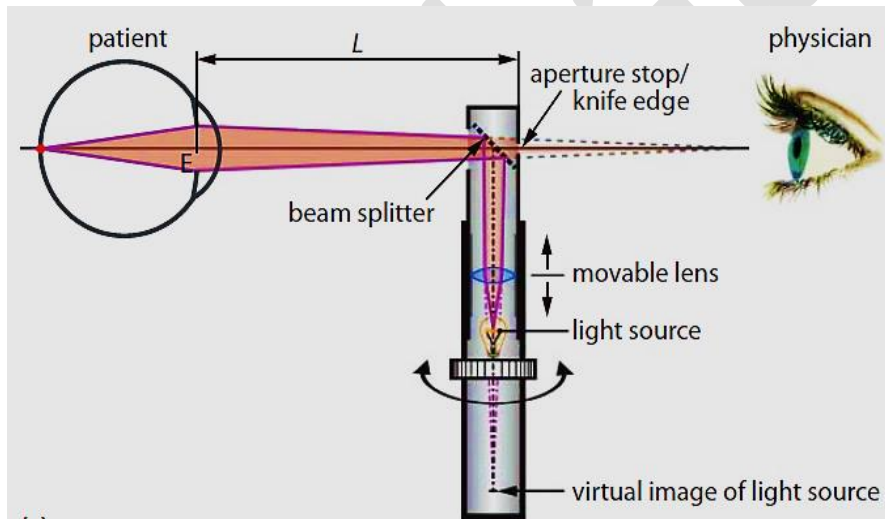
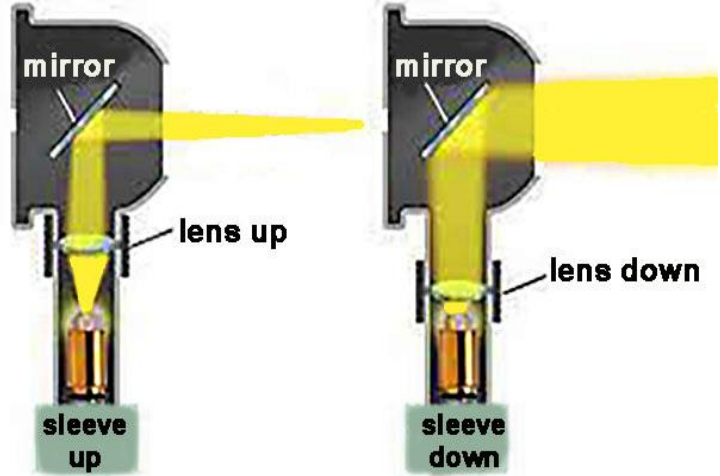
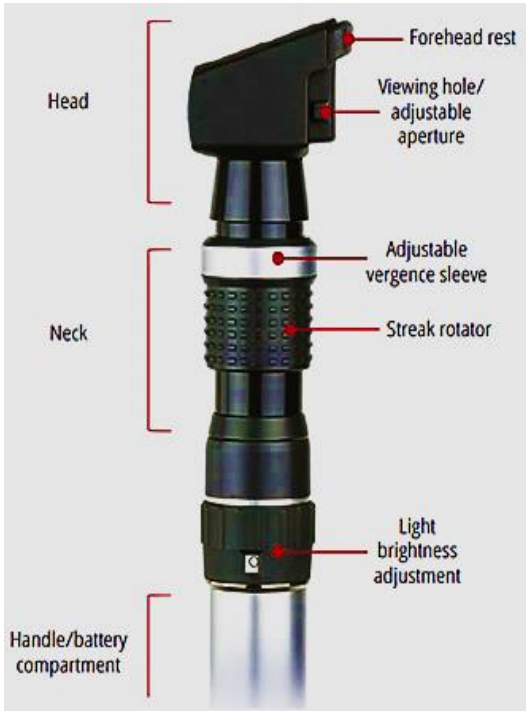
The mirror bends the path of light at right angle such that the light beam is projected onto the retina. It also facilitates reflex light from the retina to enter the examiner's eye.

4. Focusing Sleeve أداة التركيز

- Focusing sleeve varies the distance between the bulb and the lens.
- Sleeve up produces plane mirror effect.
- Sleeve down produces concave mirror effect.

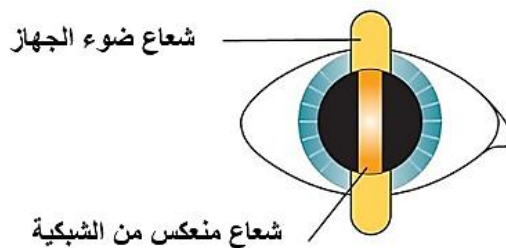
5. Power Supply مزود الطاقة

Power supply needed to project the light beam may be generated either through battery or it may be electric operated.

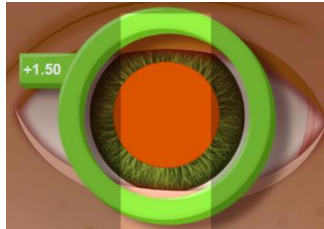


Red Reflex المنعكس الاحمر

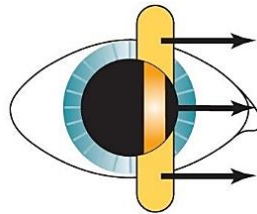
When we shine light from a retinoscope on the pupil of the eye. The light rays emitted from the retina are observed as a red retinal reflex in the patient's pupil.



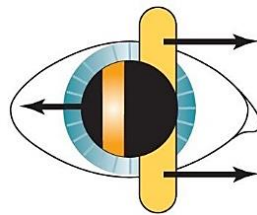
- **In the case of a healthy eye (emmetropia):** The red reflex in the pupil appears completely neutral after placing the corrective lens in front of the eye (depending on the working distance)



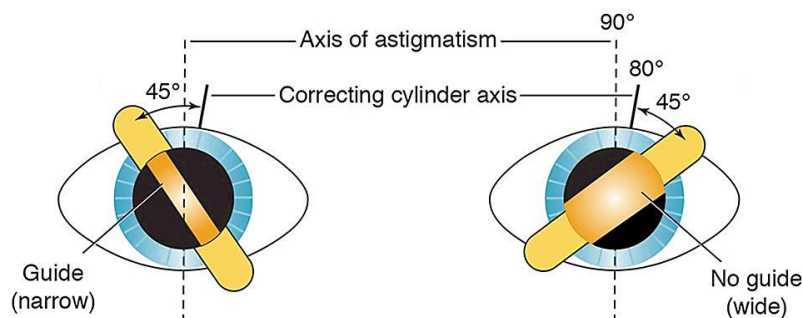
- **With motion:** when the retinal reflex (red reflex) moves in the same direction of the streak light. To reach the state of neutrality, a plus lens is added in front of the patient's eye



- **Against movement:** when the retinal reflex (red reflex) moves in the opposite direction of the streak light. To reach the state of neutrality, a minus lens is added in front of the patient's eye



- ❖ In case of oblique astigmatism, the light ray reflex from the retina is tilted at an angle (i.e. not vertical or horizontal).



Working Distance مسافة العمل

- It is the distance between the patient's eye and the device.
- The power of the working distance lens can be known through the working distance and the application of the equation:

$$D = \frac{1}{f}$$

where

D : lens power

f : working distance in meters

- Most optometrists rely on a working distance of approximately 67 cm.
- This is an appropriate distance (approximately the length of the examiner's arm), so the working distance lens is (-1.50 D). Why minus sign?!
- Some optometrists rely on a working distance of 50 cm, i.e. a working distance lens (-2.00 D).

This distance is important in the examination process,
working distance lens + correction lens

Correction Lens عدسة التصحيح

It is the lens that is used to detect and correct the refractive error by neutral light reflex from the retina with the light of the device in the hand of the examiner.

- Plus (+) power lens is placed on the reflex eye "with motion"
- Minus (-) power lens is placed on the reflex eye "against motion"

What are the cases of refractive errors based on the red reflex?

1- with moving: the movement of the red reflex and beam of light became with in case that patient have normal or myopia or hypermetropia.

2- against moving: the movement of the red reflex and the beam became against in case that patient have myopia.

Steps of Retinoscope Examination خطوات الفحص بمنظار الشبكية

1. The examination room is dimly light in order to clarify the reflex and obtain a dilated pupil.

2. The patient looks at a far point (6 meter) to cancel the accommodation.

3. Trial case lenses is placed near the examiner, the device is held with the right hand, and the correction lenses are placed in front of the patient's eye with the left hand to reach the neutral.

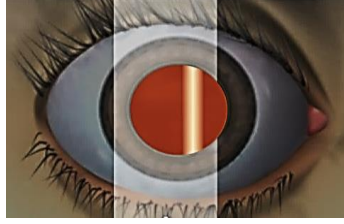
4. The working distance is estimated at 67 cm (i.e., the working distance lens is -1.50).

5. The light of the device shines towards the pupil of the eye and monitors the light reflected from the retina (red reflex) on the horizontal, vertical or oblique axis to find the correction lens power on each axis.

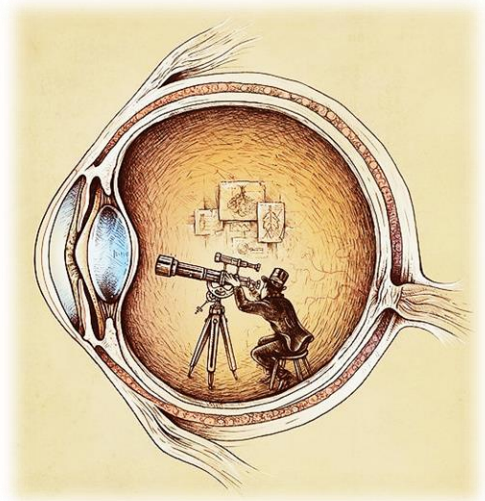


6. In case of similar in the power of the axes, the patient has spherical. In the case of difference in the power of the axes, the patient has astigmatism.

عندما تكون حركة الضوء الساقط على البؤبؤ حول المحور الافقي (أي حركة يمين ويسار)، يتم كتابة الدرجة على المحور 180°



عندما تكون حركة الضوء الساقط على البؤبؤ حول المحور العمودي (أي حركة اعلى وأسفل)، يتم كتابة الدرجة على المحور 90°



جامعة المستقبل
AL MUSTAQBAL UNIVERSITY