جامعة المستقبل

كلية التقنيات الصحية والطبية

قسم تقنيات البصريات

Second Stage 2024-2025

REFRACTIVE ERRORS

Lecture Title

Trial Lens Case

Lecture Number: 7 / course 1

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OPTOMETRIST

Trial Lens Case

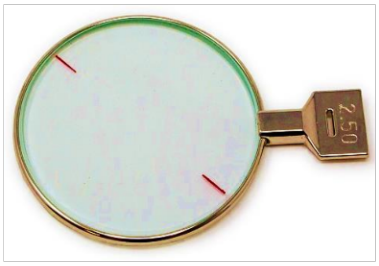
It is a case that contains a set of lenses that are used by trial and error in order to correct refractive errors. These lenses are different in type and power.

The case is divided into three groups of examination lenses: -

1) Concave spherical lenses (negative): which are used in the treatment of myopia (nearsightedness).

2) Convex spherical lenses (positive): which are used in the treatment of hypermetropia (farsightedness) and presbyopia.

3) Negative and positive cylindrical lenses: which are used to treat astigmatism, and differ from the other by the presence of two red lines on both ends of the lens to determine the axis of the lens.



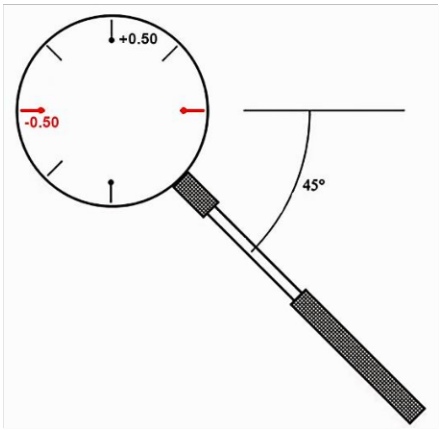
Auxiliary lens العدسات الإضافية

1) Prism lens: prismatic lenses are used in some cases of squint, which leads to diplopia, and the base of the prismatic lens is thicker than the apex.

The prismatic lens only shifts the image and does not enlarge or smaller it, unless the eyeglass lens contains power in addition to the prismatic power. The deflection of a ray as it passes through a prism depends on:

- **Apex angle**
- **The angle of incidence of the ray on the prism**
- **Refractive index of the material**
- **The wavelength of the beam**

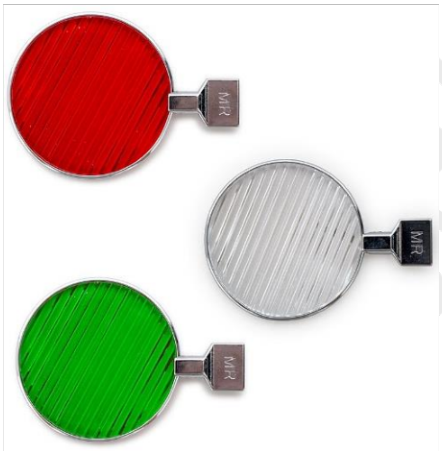
2) Jackson cross-cylinder lens: It is a type of special cylindrical lens, also called Jackson lens. It consists of two cylindrical lenses of different in sign, equal in power and orthogonal. It is used to check for astigmatism and to adjust the degree and axis of the cylindrical lens.



3) Maddox rod lens

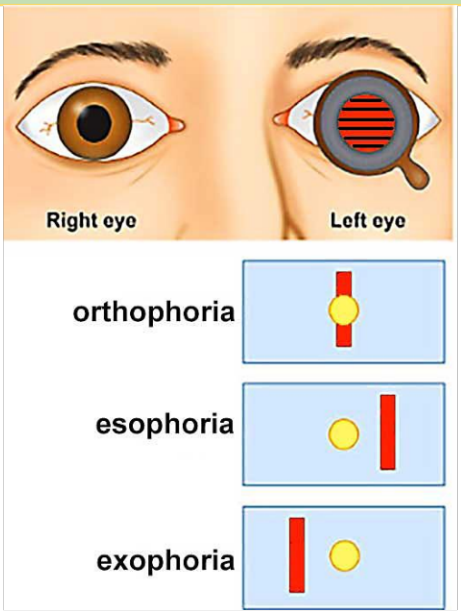
It is a glass lens consisting of parallel cylindrical lines that have several colors, including red, green and transparent, it used to subjectively detect and measure a latent, manifest, horizontal or vertical heterophoria for near and distance.

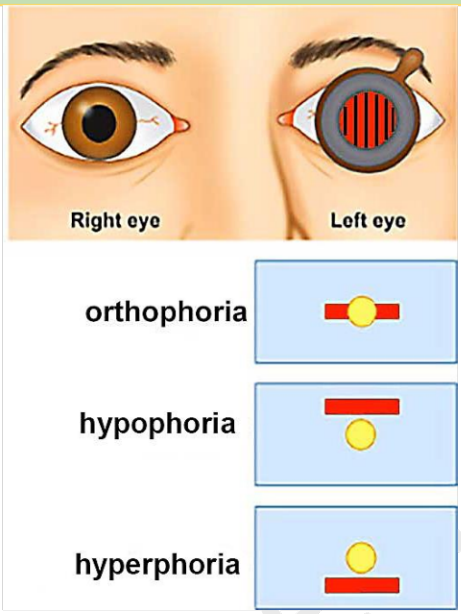
The purpose of the cylindrical lines is that they convert the point light source into a bright line, and through the direction of the cylinders we can obtain a horizontal or vertical bright line to evaluate the squint on both axes.



The lighting in the examination room will be dim. The optometrist will place a Maddox rod lens in front of the patient's right eye while holding a penlight at 40 centimeters for near or at 6 meters for distance measurement.

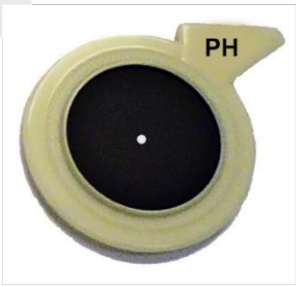
The optometrist will orient the Maddox rod vertically for vertical deviation measurement or horizontally for lateral deviation assessment. The patient will see a line light for the right eye and round light for the left eye. For horizontal deviation assessment, the optometrist will ask the patient to show where the round light is relative to the perpendicular line light.





4) Pinhole lens

It is a black, opaque circular disc, in its center there is a hole ranging in diameter (1-2 mm) to reduce the amount of peripheral light entering the eye, and it is used to find out the cause of poor vision, so that the vision improves with it, which means that the cause is a refractive error, and if the vision does not improve with it, it means that the cause is an organic eye disease.



5) Stenopaic slit lens

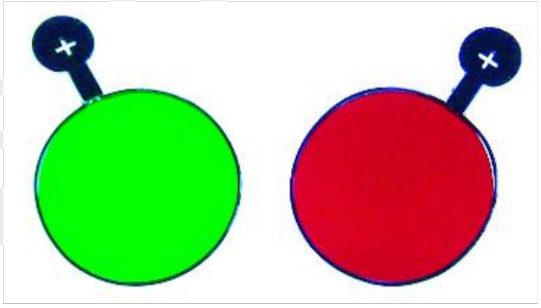
It is a black circular disc containing a linear slit of width (0.50-1.00 mm) and length (15 mm), to allow light to pass through. It is used to determine astigmatism by rotating it (horizontal and vertical) after placing spherical test lenses, and asking the patient in which direction the vision is clearer.

6) Occlude lens

It is a black circular disk and is used as a covering for the eye when examining the other eye

7) Red/Green lens

They are red and green colored lenses and have no optical power. They are used in binocular vision tests. These are used for Worth four dot test, FRIEND test and stereopsis.



The eye has a natural tendency to focus shorter wavelengths (green light) slightly in front of longer wavelengths (red light). This principle, known as chromatic aberration, helps assess if the eye is over-corrected or under-corrected.

Trial Frame الإطار التجريبي للعدسات

It is a frame intended for testing visual acuity by placing all test and additional lenses in it, and its parts are as follows