

Al-Mustaqbal University

Department/ Optical techniques



جامعة المستقبل
كلية التقنيات الصحية والطبية
قسم التقنيات البصرية

Medical glasses 2

4th stage

By

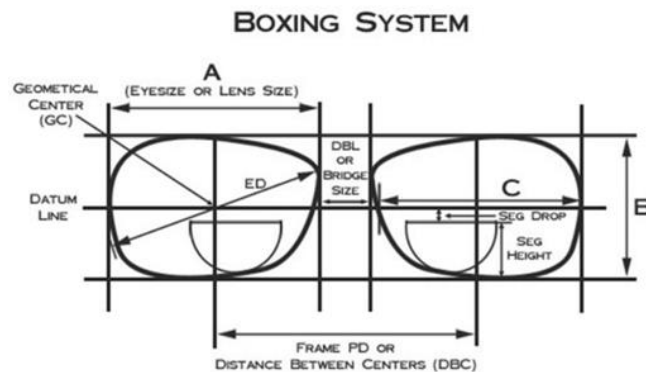
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Lecture 4 &5

Decentration & prism



Calculating Horizontal Decentration

Two measurements are required in the calculation decentration. One depends on the wearer, and the second depends on the worn frame. The first measurement is how far apart the person's pupil centres are from each other. This is known as the interpupillary distance (PD). The second measurement is the distance between the geometrical (boxing) centers of the frame's two lens openings. This is known as the distance between centers (DBC). DBL = bridge size

A wearer's PD is 62 mm. The frame size has an A dimension of 48 mm and a DBL of 20 mm. What is the decentration per lens required?

Solution

The following formula is used to find decentration per lens:

$$\text{Decentration per lens} = \frac{\text{DBC} - \text{PD}}{2}$$

and because

$$\text{DBC} = \text{A} + \text{DBL}$$

$$\text{Decentration per lens} = \frac{(\text{A} + \text{DBL}) - \text{PD}}{2}$$

then

$$\begin{aligned}\text{Decentration per lens} &= \frac{(48 + 20) - 62}{2} \\ &= \frac{68 - 62}{2} \\ &= \frac{6}{2} \\ &= 3 \text{ mm}\end{aligned}$$

So for the example, the decentration needed per lens is 3 mm inward.

Optical centre:

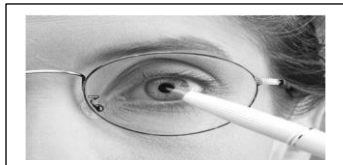
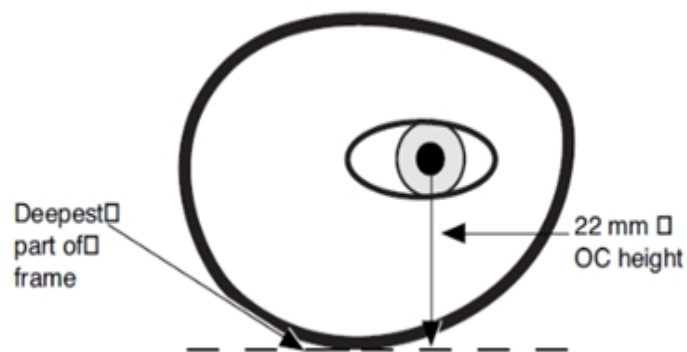
The optical centre (OC) of a lens is the point at which light rays can pass with no deviation.

A lens must be ground so that its optical centre is directly in front of the patient's pupils to allow optimum vision through the lens.

When the light goes through the optical centre (OC) of the lens, it goes straight through. It is not bent.

When light goes through any other point on a lens, the ray of light is bent.

Mark the optical centre with a felt tip pen. Neutralization of the lens should occur at the optical centre.

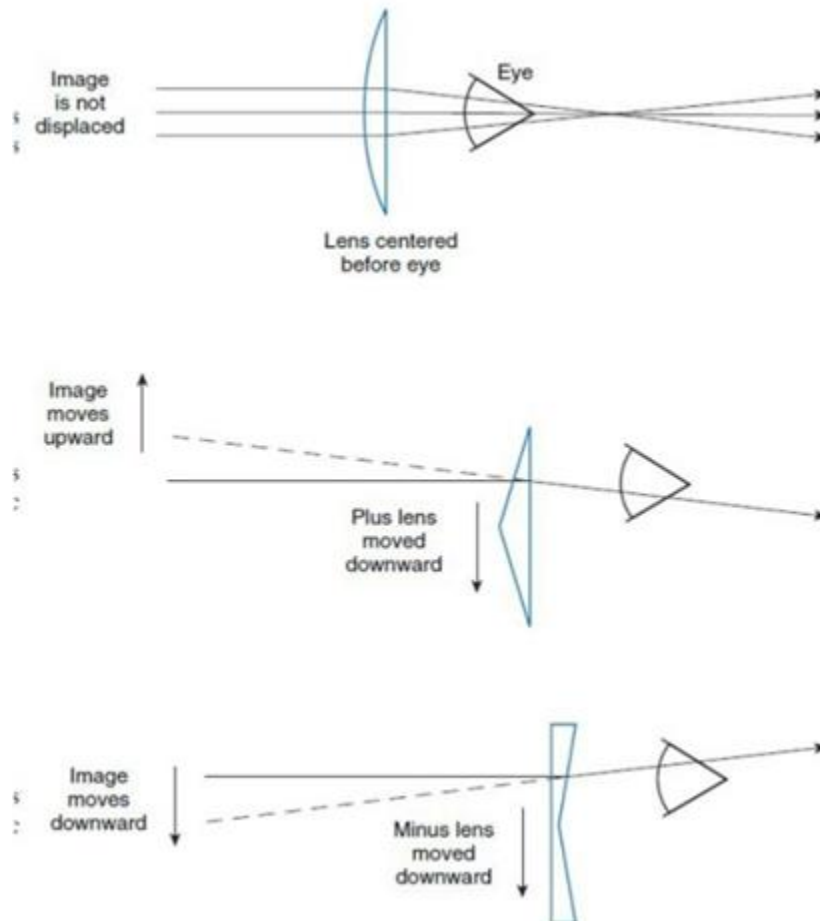


When the optical centre of a lens is moved away from its expected position in front of the eye, that lens now causes a prismatic effect.

The farther the lens is moved or decentered from its original position the greater the amount of prism resulting.

At the exact OC of a lens, the front and back lens surfaces are parallel to each other. The line that passes through the OC of a lens is known as the optical axis.

If the optic axis of a lens passes through the centre of the pupil, the lens is centred in front of the eye. If the lens is moved so that it does not coincide with the line of sight of the eye (for our purposes at the centre of the pupil), it is said to be decentered.



When a lens is decentered, a prismatic effect is created. With decentration, both prism power and prism base direction are manifested.

The unit used in the prism is called the prism diopter

Prentice law: $\Delta = c \times f$

is commonly known as Prentice's

c = image displacement from centre in cm.

f = lens focal length.

The power of the prism depends on the amount of lens decentration and the refractive power of the lens being decentered.

The prism base orientation depends on the direction of decentration and whether the lens is positive or negative.

When the wearer looks right through the centre of the lens, the object is not displaced from its actual location.

But when a plus or minus lens is moved off-center in relationship to the location of the eye, the object appears displaced. This means that a decentered lens causes a prismatic effect.

What is prism:

A prism: is a clear, triangular device made up of plastic or glass (or any transparent material). When white light goes through a prism, the light bends due to the phenomenon called refraction. Refraction is the process of

bending light.

Prism has a base and a head.

When a light reflects in a prism it reflects toward the base and as a result the image shows toward the head.

Induced prism: when will we have a prismatic effect??

Prism can be created intentionally or unintentionally.

If a prism is prescribed for a patient

1. Strabismus
2. Convergence problems,
3. Hemianopia, then we induce it by decentering intentionally.

But, if a prism is not prescribed, lab errors can create an unwanted prism.

The power of the prism depends on the amount of lens decentration, and the refractive power of the lens being decentered.

The prism base orientation depends on the direction of decentration and whether the lens is positive or negative.



Thank you
for listening