



EyeSystems

- Mary E. Schmidt, ABOC, CPO
- Mary@EyeSystems.info
- www.EyeSystems.info

No audio or video recording permitted

1



Eww, It has



Prism

...You do it

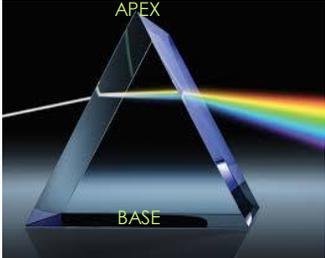
Introduction to Prism and Patients

2



Prism

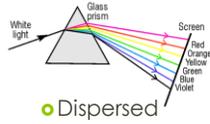
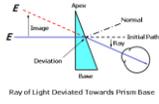
- Apex
- Base



3

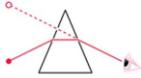
Light through a prism

- Refracted



- Dispersed

- Displaced



4

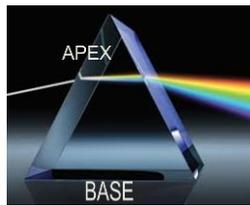
Refraction

- Light always bends

- Base

- Image displaced toward

- Apex



5

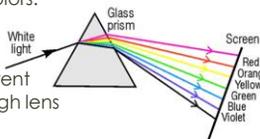
Dispersion

- White light separates into natural component colors.

- Each color has a different velocity (speed) through lens materials.

- Same velocity in air.

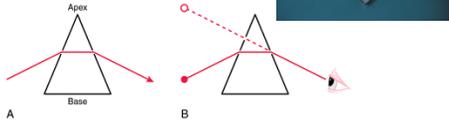
- Body in air – car accident



6

Displaced

- Prism displaces light changing the apparent location of an object.



7

Prism



Plus lenses

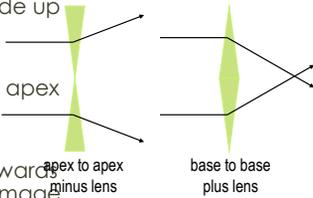


Minus Lenses

8

Imagining a Lens

- Lenses are made up of prisms
- A prism has an apex and a base
- Light bends towards the base, the image towards the apex

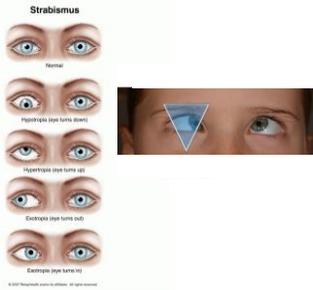


9

Eye Position

- Eso
- Exo
- Hyper
- Hypo

- Phoria
- Tropia



13

Why is Prism Prescribed

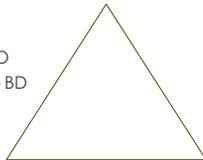
- A lens with prism correction displaces the image, which is used to treat muscular imbalance or other conditions that cause errors in eye orientation.
- Prism correction is measured in prism dioptres.
- Prism dioptre is represented by the Greek symbol delta (Δ).
- A prism of power 1Δ would produce 1 unit of displacement for an object held 100 units from the prism. Thus a prism of 1Δ would produce 1 cm visible displacement at 100 cm and so on.
- $P = 100 \tan d$ where P is the amount of prism correction in prism dioptres, and d is the angle of deviation of the light.
- For a prism with apex angle α and refractive index n, $d = (n-1) \alpha$.

14

Why is Prism Prescribed

- A prescription that specifies prism correction will also specify the "base", which is the direction of displacement.

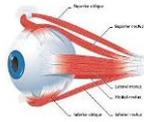
- Base in – BI Base out – BO
- Base up – BU Base down – BD
- BI & UP BI & DN
- BO & UP BO & DN



15

Adverse Prism

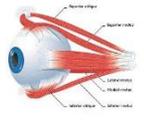
- "Adverse prism" is prescribed to strengthen a weak rectus muscle.
- The "apex" is placed over the weak rectus muscle, causing the eye to turn toward the image.



16

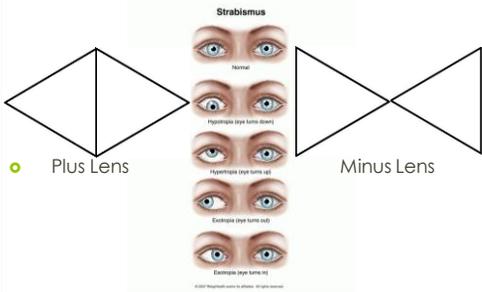
Therapeutic Prism

- "Therapeutic prism" is prescribed to relieve visual disturbances such as: double vision, low vision, strabismus, head injury .
- The "base" of the prism is prescribed over the weak rectus muscle , which displaces the image in the same direction of the eye.



17

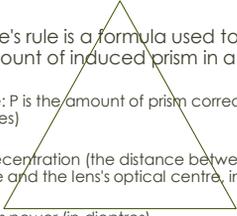
Prism Movement



18

Prentice's Rule $P=cf$

- Prentice's rule is a formula used to determine the amount of induced prism in a lens: $P = cf$
- where: P is the amount of prism correction (in prism dioptres)
- c is decentration (the distance between the pupil centre and the lens's optical centre, in centimetres)
- f is lens power (in dioptres)



19

Prentice's Rule $P=cf$

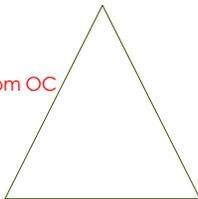
- The primary use of Prentice's rule is that under certain circumstances, the prescribed prism can be obtained without grinding prism into the lenses, by decentering the lenses as worn by the patient.



20

Prentice Rule

- Determine the power of the lens
- Calculate PD
- Convert mm to cm
- Multiply
- +6.25 PD is 5 mm away from OC
- 5mm = .5cm
- +6.25 x .5 = 3 Diopters

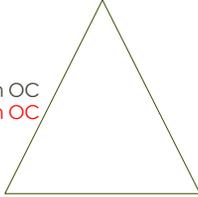


21

Examples

- 4.00 PD is 3mm away from OC
- 4.00 PD is 3 mm away from OC
- 3 mm = .3cm
- 4.00 x .3 = 1 Diopter

- +7.50 PD is 6 mm away from OC
- +7.50 PD is 6 mm away from OC
- 6 mm = .6cm
- +7.50 x .6 = 4.5 Diopter



22

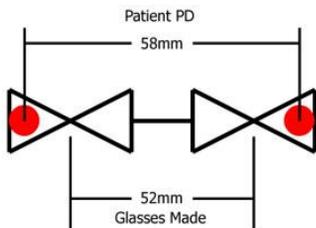
PRISM Direction

- PLUS Lens**
- Patient PD **OUTSIDE** of OC = Base **OUT**
- Patient PD **INSIDE** of OC = Base **IN**

- MINUS Lens**
- Patient PD **OUTSIDE** of OC = Base **IN**
- Patient PD **INSIDE** of OC = Base **OUT**

23

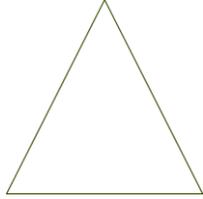
Wanted vs Unwanted Prism



24

Impact to of Prescribed Prism

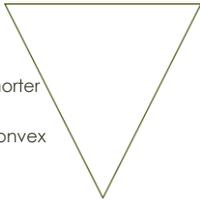
- How can prism have a positive impact on a patient?
 - Strengthen vision
 - Align eyes
 - Eliminate:
 - Double Vision
 - Eyestrain
 - Headaches



25

Too much Prism

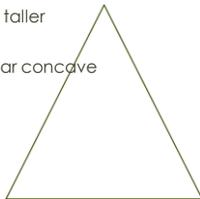
- Too much BASE UP:
 - Vertical objects appear shorter
 - Horizontal items appear convex
 - Floor slants downward



26

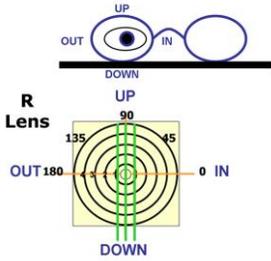
Too much Prism

- Too much BASE DOWN:
 - Vertical objects appear taller
 - Horizontal objects appear concave
 - Floors slant upward



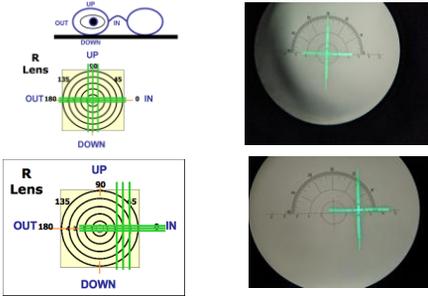
27

Lensometry - No Prism



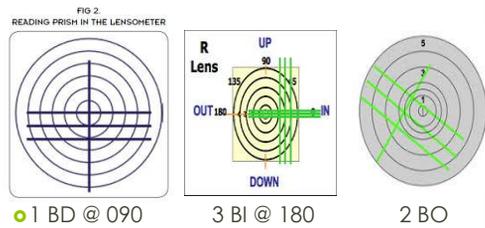
28

Basics - Prism



29

Lensometer - Prism



30

Prism Tolerances ANSI Z80.1

Fig. 1: Vertical Prism Tolerance Examples

Ordered	Received No. 1	Received No. 2	Received No. 3
OD: -1.50D	OD: -1.50D 0.33° BI	OD: -1.50D	OD: -1.50D 0.33° BI
OS: -1.50D	OS: -1.50D	OS: -1.50D 0.33° BI	OS: -1.50D 0.33° BI
	Passes	Passes	Fails

Fig. 2: Horizontal Prism Tolerance Examples

Ordered	Received No. 1	Received No. 2	Received No. 3
OD: +1.00D	OD: +1.00D 0.66° BI	OD: +1.00D	OD: +1.00D 0.66° BI
OS: +1.00D	OS: +1.00D	OS: +1.00D 0.66° BI	OS: +1.00D 0.66° BI
	Passes	Passes	Fails

31

Simple right?

- These are the basics
 - Build on these
 - Study more
 - Take additional classes



32