

Visualizing the Finished Eyeglasses

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What's Your Professional Responsibility?

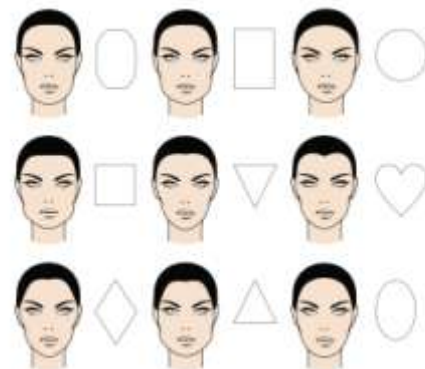
- To analyze and interpret prescriptions into cosmetically fashionable and visually functional eyewear
- How do you do this?
 - Technical knowledge
 - Product knowledge
 - Matching patient needs and wants to product features and benefits
 - Maintaining professional control

Envisioning Eyewear

- What do you do first?
 - Read the Rx or
 - Take the PD or
 - Assess their face shape and coloring
- Why?
 - A skill all good opticians have
 - Read the Rx 3 times
 - The dramatic pause (about 7-8 seconds)

Assess Facial Features

- Stare at their face a few seconds to assess
 - Face shape
 - Skin, hair and eye coloring
 - Nose structure
 - Asymmetrical facial features
 - High eye, low ear, broken nose, etc.
 - Potentially wide or narrow PD



Coloring

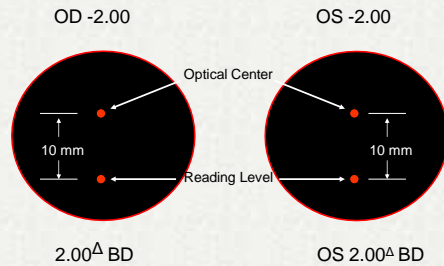
- Warm vs. cool
 - Warm = yellow base
 - Cool = blue base
- Use a yellow and blue lens to assess skin color base
 - Hold it over their forearm (so they can see it too)
 - Which one matches best?
- Dyed hair is not always in the right palette

First Reading: Envision Their Vision

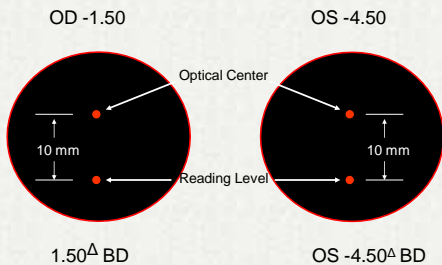
- First reading – envision their refractive error
 - Classify their refractive error
 - How blurred do they see through their lenses
 - The size, shape and speed of the world they see

Classifying Prescriptions

Isometropia	Identical or nearly identical OD -2.00 OS -2.00
Anisometropia	Significantly different but have the same sign OD -2.00 OS -4.50 -0.50 x 180
Antimetropia	Opposite prescription signs OD -1.50 OS +2.50



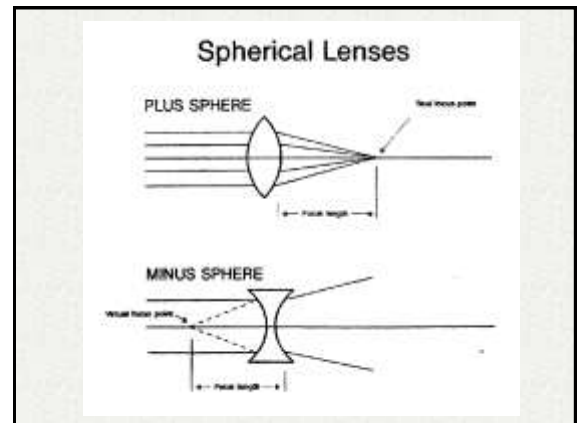
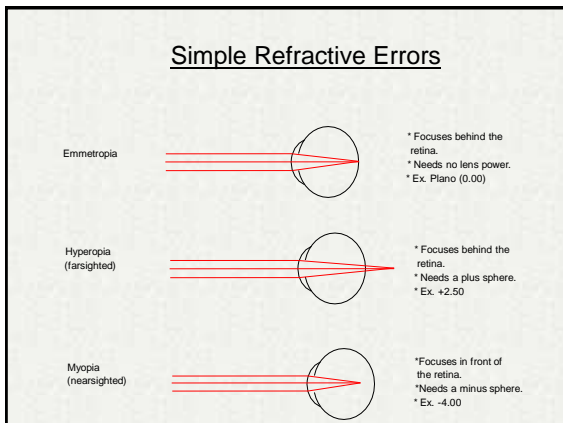
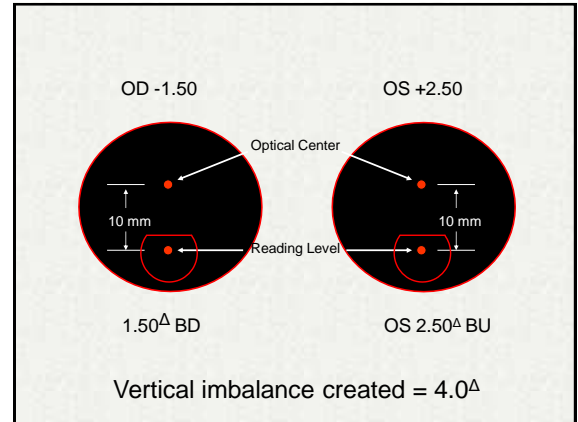
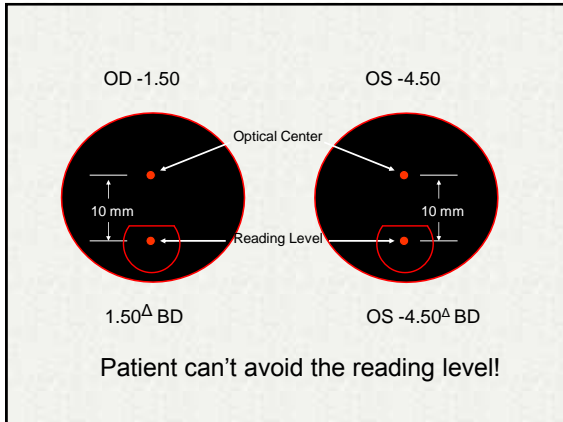
Vertical imbalance created = 0.0^Δ



Vertical imbalance created = 3.0^Δ

To avoid vertical imbalance at the reading level, patients will ...

- Avoid the reading level
 - Look through the optical center
- Suppress one eye
- Use independent vision
- Most patients will not tolerate 1^Δ or more of vertical prism



Plus Spherical Characteristics

- Converge light rays to a single point
- Have a real focal point
- Center thickness greater than edge thickness
- Have “against” motion
- Magnify
- Act more plus as the lens is moved away from the eye (positional effective)

Minus Lens Characteristics

- Diverge light rays to a single point
- Have a virtual focal point
- Edge thickness greater than center thickness
- Have “with” motion
- Minify
- Act less minus as the lens is moved away from the eye (positional effect)

Simple Hyperopic Astigmatism

- * One meridian focuses correctly on retina.
- * One focuses long.
- * Needs 0.00 +cyl x ?
- * Ex. Plano +1.50 x 180 (or +1.50 -1.50 x 90)

Simple Myopic Astigmatism

- * One meridian focuses correctly on retina.
- * One focuses short.
- * Needs 0.00 -cyl x ?
- * Ex. Plano -2.25 x 180 (or -2.25 +2.25 x 90)

Compound Hyperopic Astigmatism

- * Both meridians focus long.
- * Needs two different plus powers to correct.
- * Plus on Plus
- * Ex. +1.25 +1.75 x 180 (or +3.00 -1.75 x 90)

Compound Myopic Astigmatism

- * Both meridians focus short.
- * Needs two different minus powers to correct.
- * Minus on Minus.
- * Ex. -2.00 -1.00 x 180 (or -3.00 +1.00 x 90)

Mixed Astigmatism

- * One meridian focuses short, one long.
- * Plus on Minus or Minus on Plus.
- * Ex. +1.00 -2.50 x 180 (or -1.50 +1.00 x 90)

Presbyopia

- * Blurred vision at near.
- * Needs additional plus power.
- * Ex. Add +2.50

Cylinder Lens (Toric)

First focus point Second focus point

Toric Lens Characteristics

- Has one toric and one spherical surface
- Two different powers crossed at 90°
- Has two focal points
- Has scissor motion
- Uneven thickness
- Magnifies differently in the two principle meridians
- Also exhibit positional effect like spheres do

How Blurred?

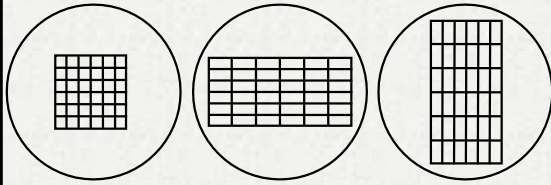
Diopters	Single Hyperopic And Myopic Astigmatism			Single Myopia Or Hyperopia
	Abscissa Hyperopia	Horizontal Axis	Oblique Axis	
.50	30/30	---	---	30/30
.75	30/45	---	30/30	30/40
1.00	30/30	20/30	30/40	20/50
1.25	---	---	---	20/50
1.50	30/300	20/40	30/50	20/300
1.75	---	---	30/70	---
2.00	30/150	30/30	---	30/150
2.25	---	---	30/100	---
2.50	30/300	30/70	---	30/300
2.75	---	---	30/150	---
3.00	---	30/100	---	30/250
3.50	30/300	---	---	---
4.00	---	30/150	---	---
4.25	---	---	30/250	---
4.50	30/450	---	---	---
5.00	---	30/250	---	---

(a) It may be noted that low vision is low in proportion to the error when

Magnification Through Spherical Lenses

Grid Object & Plano Lens Plus Lens Minus Lens

Magnification Through a Cylinder Lens

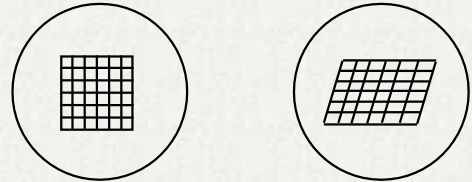


*Grid Object &
Plano Lens*

Plano +cyl x 90

Plano +cyl x 180

Oblique Cylinder Magnification



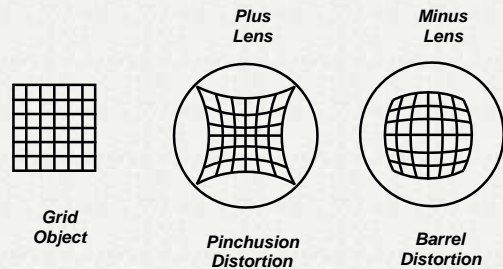
*Grid Object &
Plano Lens*

Plano +cyl x 135

Symptoms From Equal Magnification In Both Eyes

- Change in the size of the world
- Change in spatial orientation
- Change in the speed of objects
- Distortion
- Disorientation, nausea, dizziness

Distortion

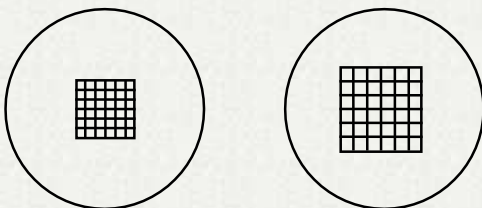


*Grid
Object*

*Pinchusion
Distortion*

*Barrel
Distortion*

Unequal Magnification



OD: +1.00 sphere

OS: +4.00 sphere

Symptoms From Unequal Magnification

- Double vision (diplopia)
- Visual confusion
- Independent vision
- Suppression
- Headaches, eyestrain, asthenopia (especially in small differences, 1 to 2 %)

Second Reading: Envision the Lenses

- What lens style do they need?
- What material?
- Factors affecting thickness
 - Where's the thickest point on the lens?
 - Lens shape affects thickness
 - Thickness of multifocal lenses
 - Prism thinning
 - Decentration as a thickness factor
- Guessimating how thick the lenses will be

What Style Lens?

- What can you determine without asking?
 - Style written on the Rx
 - Age (SV or multifocals)
 - Old Rx
 - Lens style they have now
 - Does gender tell you anything about lens style preference?

What Material?

- There are 3 criteria
 - Impact resistance
 - The Rx
 - Availability
- What can you learn without questioning?
 - Age (kid, senior)
 - Activity (wearing bicycling clothes)
 - Rx tells a LOT

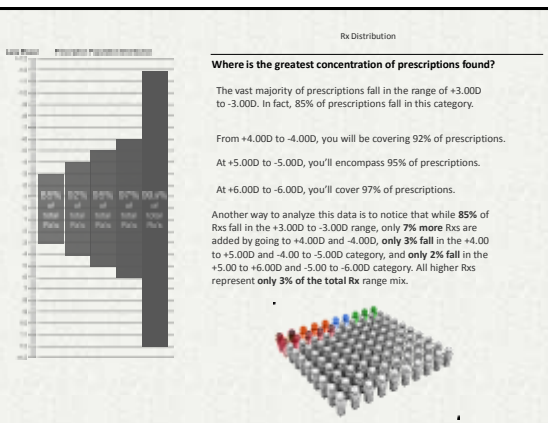
Lens Materials

Standard Impact Resistant

Crown glass (1.53)
CR-39
1.53
1.56
1.60
1.66
1.67
1.70
1.71
1.74

Safety Lenses

- Trivex
- Polycarbonate
- NXT
- Some proprietary ones
 - Plutonite (Oakley)
 - SR-91 (Kaenon Polarized)



Factors Affecting Lens Thickness

- Power
- Lens material's index of refraction
- Diameter
- Lens shape
- Decentration and/or prescribed prism
- Prism thinning

Power as a Factor of Thickness

- The sphere power is found in the axis meridian
- Add the sphere and cylinder algebraically to obtain the power 90° away

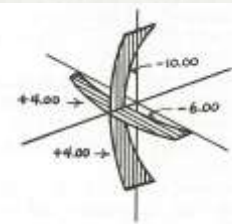
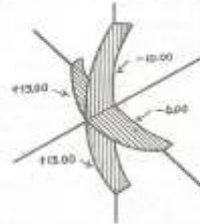
$$\begin{array}{c} \swarrow \quad \searrow \\ -2.50 \quad -1.25 \times 75 \end{array}$$

Axis Meridian: -2.50D
90° away: -3.75D

Power as a Factor of Thickness

$$+7.00 -4.00 \times 180$$

$$-2.00 -4.00 \times 180$$



Where's The Thickest Edge On This Round Lens?

- | | |
|---------------------|-----------------------------------|
| • Plus sphere | • Same |
| • Minus sphere | • Same |
| • Plano + cyl x 180 | • 180 th meridian edge |
| • Plano + cyl x 90 | • 90 th meridian edge |
| • Plano - cyl x 180 | • 90 th meridian edge |
| • Plano - cyl x 90 | • 180 th meridian edge |
| • Plano + cyl x 45 | • 45 th meridian edge |
| • Plano - cyl x 45 | • 135 th meridian edge |

Lens Shape Affecting Thickness



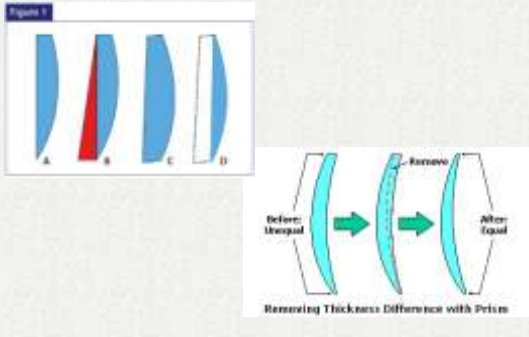
How Does Lens Shape Affect These?

- | | |
|---------------------|---------------------|
| • Plus sphere | • Round |
| • Minus sphere | • P3 |
| • Plano + cyl x 180 | • Oval |
| • Plano + cyl x 90 | • Deep rectangle |
| • Plano - cyl x 180 | • Shallow rectangle |
| • Plano - cyl x 90 | • Cat eye |
| • Plano + cyl x 45 | • Aviator |
| • Plano - cyl x 45 | |

Does a multifocal's style have an effect on its thickness?

- Segmented lenses
 - Affects the thickness of the segment, not the distance portion
 - Executive's "shelf" thickness difference
- Progressives
 - Upper region of plus lenses needs thinning
 - Prism thinning

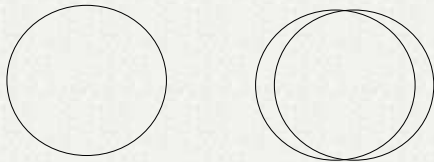
Prism Thinning



Prism Thinning Factors

- Prism = $0.6 \times \text{Add}$
 - Approximately 2/3 add power
- Used when the combined distance and add power in the *vertical* meridian exceeds +1.50D or so
- Factors:
 - Add power
 - Distance prescription
 - Fitting cross height
 - Fitting cross decentration
 - Frame shape

Decentration As A Factor Of Thickness



- You lose 2mm of lens diam. for each 1mm of dec.
- Ex: 48mm eye dec. 3mm = 54mm eye
- This can have a significant effect on lens thickness

Third Reading: Envision the Frame

- What type of frame must you pick to accommodate the lens issues?
 - Thick rim, thin rim, metal, rimless, semi-rimless, combination, etc?
- Physical factors affecting frame choice
 - Rx, lens materials, lens thickness, eyesize, eyewire shape, decentration
 - Which of these do you control?
- Which is more important, frame fashion or Rx function?
 - NOTE: You're not concerned with the cosmetics of a frame here, that occurs during frame selection

What Shouldn't They Use?

Rx: -1.00 OU

- Thin plastic
- Thick plastic
- Metal
- Combination
- Drilled - piece rimless
- Cord mounted semi-rimless

Shape

- Round
- P3
- Oval
- Deep rectangle
- Shallow rectangle
- Cat eye
- Aviator

What Shouldn't They Use?

Rx: +4.00 OU

- Thin plastic
- Thick plastic
- Metal
- Combination
- Drilled - piece rimless
- Cord mounted semi-rimless

Shape

- Round
- P3
- Oval
- Deep rectangle
- Shallow rectangle
- Cat eye
- Aviator

What Shouldn't They Use?

Rx: -1.00 -3.00 x 90 OU

- Thin plastic
- Thick plastic
- Metal
- Combination
- Drilled - piece rimless
- Cord mounted semi-rimless

Shape

- Round
- P3
- Oval
- Deep rectangle
- Shallow rectangle
- Cat eye
- Aviator

What Should They Use?

Rx: -0.25 +4.25 x 180 OU

- Thin plastic
- Thick plastic
- Metal
- Combination
- Drilled - piece rimless
- Cord mounted semi-rimless

Shape

- Round
- P3
- Oval
- Deep rectangle
- Shallow rectangle
- Cat eye
- Aviator

What Should They Use?

Rx: -0.25 -4.50 x 45 OU

- Thin plastic
- Thick plastic
- Metal
- Combination
- Drilled - piece rimless
- Cord mounted semi-rimless

Shape

- Round
- P3
- Oval
- Deep rectangle
- Shallow rectangle
- Cat eye
- Aviator

The Final Step

- Armed with your vision and the preliminary ideas you've formed, start the measuring, frame and lens selection process.

Thanks for Attending!

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